NSX API Guide

NSX 6.0.4 for vSphere

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Contents

About This Book

This manual, the *NSX for vSphere API Guide*, describes how to install, configure, monitor, and maintain the VMware® NSX system by using REST API requests. .

Intended Audience

This manual is intended for anyone who wants to use REST API to programmatically control NSX in a VMware vSphere environment. The information in this manual is written for experienced developers who are familiar with virtual machine technology, virtualized datacenter operations, and REST APIs. This manual also assumes familiarity with vShield.

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NSX Documentation

The following documents comprise the vShield documentation set:

- *NSX for vSphere Administration Guide*
- *NSX for vSphere Installation and Upgrade*
- *NSX API Programming Guide*, this guide

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The following sections describe the technical support resources available to you. To access the current version of this book and other books, go to http://www.vmware.com/support/pubs.

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Overview of NSX 1

VMware NSX® is a software networking and security virtualization platform that delivers the operational model of a virtual machine for the network. Virtual networks reproduce the Layer2 - Layer7 network model in software, allowing complex multi-tier network topologies to be created and provisioned programmatically in seconds. NSX also provides a new model for network security. Security profiles are distributed to and enforced by virtual ports and move with virtual machines.

NSX supports VMware's software-defined data center strategy. By extending the virtualization capabilities of abstraction, pooling and automation across all data center resources and services, the software-defined data center architecture simplifies and speeds the provisioning and management of compute, storage and networking resources through policy-driven automation. By virtualizing the network, NSX delivers a new operational model for networking that breaks through current physical network barriers and enables data center operators to achieve better speed and agility with reduced costs.

NSX includes a library of logical networking services - logical switches, logical routers, logical firewalls, logical load balancers, logical VPN, and distributed security. You can create custom combinations of these services in isolated software-based virtual networks that support existing applications without modification, or deliver unique requirements for new application workloads. Virtual networks are programmatically provisioned and managed independent of networking hardware. This decoupling from hardware introduces agility, speed, and operational efficiency that can transform datacenter operations.

Examples of NSX use cases include:

- Data center automation
  - Speed up network provisioning
  - Simplify service insertion - virtual and physical
  - Streamline DMZ changes
- Self-Service Enterprise IT
  - Rapid application deployment with automated network and service provisioning for private clouds and test/dev environments
  - Isolated dev, test, and production environments on the same physical infrastructure
- Multi-tenant clouds
  - Automate network provisioning for tenants with customization and complete isolation
  - Maximize hardware sharing across tenants

NSX can be configured through the vSphere Web Client, a command line interface (CLI), and REST API.

This chapter includes the following topics:

- "Ports Required for NSX REST API" on page 26
- "An Introduction to REST API for NSX Users" on page 24

NSX Capabilities

Logical Switches

A cloud deployment or a virtual data center has a variety of applications across multiple tenants. These applications and tenants require isolation from each other for security, fault isolation, and avoiding overlapping IP addressing issues. The NSX logical switch creates logical broadcast domains or segments to which an application or tenant virtual machine can be logically wired. This allows for flexibility and speed of deployment while still providing all the characteristics of a physical network's broadcast domains (VLANs) without physical Layer 2 sprawl or spanning tree issues. A logical switch is distributed and can span arbitrarily large compute clusters. This allows for virtual machine mobility (vMotion) within the datacenter without limitations of the physical Layer 2 (VLAN) boundary. The physical infrastructure does not have to deal with MAC/FIB table limits since the logical switch contains the broadcast domain in software.

Logical Routers

Dynamic routing provides the necessary forwarding information between layer 2 broadcast domains, thereby allowing you to decrease layer 2 broadcast domains and improve network efficiency and scale. NSX extends this intelligence to where the workloads reside for doing East-West routing. This allows more direct virtual machine to virtual machine communication without the costly or timely need to extend hops. At the same time, NSX also provides North-South connectivity, thereby enabling tenants to access public networks.

Logical Firewall

Logical Firewall provides security mechanisms for dynamic virtual data centers. The Distributed Firewall component of Logical Firewall allows you to segment virtual datacenter entities like virtual machines based on VM names and attributes, user identity, vCenter objects like datacenters, and hosts as well as traditional networking attributes like IP addresses, VLANs, etc. The Edge Firewall component helps you achieve key perimeter security needs such as building DMZs based on IP/VLAN constructs, tenant to tenant isolation in multi-tenant virtual data centers, Network Address Translation (NAT), partner (extranet) VPNs, and User based SSL VPNs.

The Flow Monitoring feature displays network activity between virtual machines at the application protocol level. You can use this information to audit network traffic, define and refine firewall policies, and identify threats to your network.

Logical Virtual Private Networks (VPN)s

SSL VPN-Plus allows remote users to access private corporate applications. IPSec VPN offers site-to-site connectivity between an NSX Edge instance and remote sites. L2 VPN allows you to extend your datacenter by allowing virtual machines to retain network connectivity across geographical boundaries.

Logical Load Balancer

The NSX Edge load balancer enables network traffic to follow multiple paths to a specific destination. It distributes incoming service requests evenly among multiple servers in such a way that the load distribution is transparent to users. Load balancing thus helps in achieving optimal resource utilization, maximizing throughput, minimizing response time, and avoiding overload. NSX Edge provides load balancing up to Layer 7.

Service Composer

Service Composer helps you provision and assign network and security services to applications in a virtual infrastructure. You map these services to a security group, and the services are applied to the virtual machines in the security group.

Data Security provides visibility into sensitive data stored within your organization's virtualized and cloud environments. Based on the violations reported by NSX Data Security, you can ensure that sensitive data is adequately protected and assess compliance with regulations around the world.

Extensibility

VMware partners can integrate their solutions with the NSX platform, which enables customers to have an integrated experience across VMware products and partner solutions. Data center operators can provision complex, multi-tier virtual networks in seconds, independent of the underlying network topology or components.

NSX Components

This section describes NSX components. NSX can be configured through the vSphere Web Client, a command line interface (CLI), and REST API.

NSX Manager

The NSX Manager is the centralized network management component of NSX, and is installed as a virtual appliance on any ESX™ host in your vCenter Server environment. It provides an aggregated system view.

One NSX Manager maps to a single vCenter Server environment and multiple NSX Edge, vShield Endpoint, and NSX Data Security instances.

NSX vSwitch

NSX vSwitch is the software that operates in server hypervisors to form a software abstraction layerbetween servers and the physical network.

As the demands on datacenters continue to grow and accelerate, requirements related to speed and access to the data itself continue to grow as well. In most infrastructures, virtual machine access and mobility usually depend on physical networking infrastructure and the physical networking environments they reside in. This can force virtual workloads into less than ideal environments due to potential layer 2 or layer boundaries, such as being tied to specific VLANs.

NSX vSwitch allows you to place these virtual workloads on any available infrastructure in the datacenter regardless of the underlying physical network infrastructure. This not only allows increased flexibility and mobility, but increased availability and resilience.

NSX Controller

NSX controller is an advanced distributed state management system that controls virtual networks and overlay transport tunnels.

NSX controller is the central control point for all logical switches within a network and maintains information of all virtual machines, hosts, logical switches, and VXLANs. The controller supports two new logical switch control plane modes, Unicast and Hybrid. These modes decouple NSX from the physical network. VXLANs no longer require the physical network to support multicast in order to handle the Broadcast, Unknown unicast, and Multicast (BUM) traffic within a logical switch. The unicast mode replicates all the BUM traffic locally on the host and requires no physical network configuration. In the hybrid mode, some of the BUM traffic replication is offloaded to the first hop physical switch to achieve better performance.

NSX Edge

NSX Edge provides network edge security and gateway services to isolate a virtualized network. You can install an NSX Edge either as a logical (distributed) router or as a services gateway.

The NSX Edge logical (distributed) router provides East-West distributed routing with tenant IP address space and data path isolation. Virtual machines or workloads that reside on the same host on different subnets can communicate with one another without having to traverse a traditional routing interface.

The NSX Edge gateway connects isolated, stub networks to shared (uplink) networks by providing common gateway services such as DHCP, VPN, NAT, dynamic routing, and Load Balancing. Common deployments of NSX Edge include in the DMZ, VPN Extranets, and multi-tenant Cloud environments where the NSX Edge creates virtual boundaries for each tenant.

An Introduction to REST API for NSX Users

REST, an acronym for REpresentational State Transfer, is a term that has been widely employed to describe an architectural style characteristic of programs that rely on the inherent properties of hypermedia to create and modify the state of an object that is accessible at a URL.

How REST Works

Once a URL of such an object is known to a client, the client can use an HTTP GET request to discover the properties of the object. These properties are typically communicated in a structured document with an HTTP Content-Type of XML that provides a representation of the state of the object. In a RESTful workflow, documents (representations of object state) are passed back and forth (transferred) between a client and a service with the explicit assumption that neither party need know anything about an entity other than what is presented in a single request or response. The URLs at which these documents are available are often “sticky,” in that they persist beyond the lifetime of the request or response that includes them. The other content of the documents is nominally valid until the expiration date noted in the HTTP Expires header.

IMPORTANT All NSX REST requests require authentication. The default NSX Manager login credentials are user admin password default. Unless you changed these, you can use the following basic authentication, where YWRtaW46ZGVmYXVsdA== is the Base 64 encoding of the default credentials admin:default.

```
Authorization: Basic YWRtaW46ZGVmYXVsdA==
```

About the REST API

REST APIs use HTTP requests (often sent by script or high-level language) as a way of making idempotent remote procedure calls that create, modify, or delete objects defined by the API. A REST API is defined by a collection of XML documents that represent the objects on which the API operates. The HTTP operations themselves are generic to all HTTP clients. To write a RESTful client, you should understand HTTP protocol and the semantics of standard HTML markup. For NSX REST API, you must know three things:

- The set of objects that the API supports, and what they represent. For example, what are vDC and Org?
- How the API represents these objects. For instance, what is the XML schema for the NSX Edge firewall rule set? What do the individual elements and attributes represent?
- How the client refers to an object on which it wants to operate. For example, what is a managed object ID?

To answer these questions, you look at NSX API resource schemas. These schemas define a number of XML types, many of which are extended by other types. The XML elements defined in these schemas, along with their attributes and composition rules (minimum and maximum number of elements or attributes, or the prescribed hierarchy with which elements can be nested) represent the data structures of NSX objects. A client can “read” an object by making an HTTP GET request to the object’s resource URL. A client can “write” (create or modify) an object with an HTTP PUT or POST request that includes a new or changed XML body document for the object. Usually a client can delete an object with an HTTP DELETE request.

This document presents example requests and responses, and provides reference information on the XML schemas that define the request and response bodies.

RESTful Workflow Patterns

All RESTful workflows fall into a pattern that includes only two fundamental operations, which you repeat in this order for as long as necessary.

- Make an HTTP request (GET, PUT, POST, or DELETE). The target of this request is either a well-known URL (such as NSX Manager) or a link obtained from the response to a previous request. For example, a GET request to an Org URL returns links to vDC objects contained by the Org.
- Examine the response, which can be an XML document or an HTTP response code. If the response is an XML document, it may contain links or other information about the state of an object. If the response is an HTTP response code, it indicates whether the request succeeded or failed, and may be accompanied by a URL that points to a location from which additional information can be retrieved.

For More Information About REST

For a comprehensive discussion of REST from both client and server perspectives, see *RESTful Web Services* by Leonard Richardson and Sam Ruby, published 2007 by O'Reilly Media.

There are also many sources of information about REST on the Web, including:

- http://www.infoq.com/articles/rest-introduction
- http://www.infoq.com/articles/subbu-allamaraju-rest
- http://www.stucharlton.com/blog/archives/000141.html

Using the NSX REST API

You have several choices for programming the NSX REST API: using Firefox, Chrome, or cURL. To make XML responses more legible, you can copy and paste them into an XML friendly editor such as xmlcopyeditor or pspad.

To use the REST API in Firefox

1 Locate the RESTClient Mozilla add-on, and add it to Firefox.

2 Click **Tools > REST Client** to start the add-on.

3 Click **Login** and enter the NSX login credentials, which then appear encoded in the Request Header.

4 Select a method such as GET, POST, or PUT, and type the URL of a REST API. You might be asked to accept or ignore the lack of SSL certificate. Click **Send**.

Response Header, Response Body, and Rendered HTML appear in the bottom window.

To use the REST API in Chrome

1 Search the Web to find the Simple REST Client, and add it to Chrome.

2 Click its globe-like icon to start it in a tab.

3 The Simple REST Client provides no certificate-checking interface, so use another Chrome tab to accept or ignore the lack of SSL certificate.

4 Type the URL of a REST API, and select a method such as GET, POST, or PUT.

5 In the Headers field, type the basic authorization line, as in the Important note above. Click **Send**.

Status, Headers, and Data appear in the Response window.

To use the REST API in curl

1 Install curl if not already installed.

2 In front of the REST URL, the -k option avoids certificate checking, and the -u option specifies credentials.

```
curl -k -u admin:default https://<vsm-ip>/api/2.0/services/usermgmt/user/admin
```

Ports Required for NSX REST API

The NSX Manager requires port 443/TCP for REST API requests.

User Management 2

In many organizations, networking and security operations are handled by different teams or members. Such organizations may require a way to limit certain operations to specific users. This topic describes the options provided by NSX to configure such access control. NSX also supports Single Sign On (SSO), which enables NSX to authenticate users from other identity services such as Active Directory, NIS, and LDAP.

User management in the vSphere Web Client is separate from user management in the CLI of any NSX component.

The chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Configuring SSO on NSX Manager

Integrating the single sign on (SSO) service with NSX improves the security of user authentication for vCenter users and enables NSX to authenticate users from other identity services such as AD, NIS, and LDAP.

With SSO, NSX supports Security Assertion Markup Language (SAML) tokens from a trusted source to authenticate REST API calls. NSX Manager can also acquire authentication SAML tokens for use with other VMware solutions.

Example 2-1. Configure SSO

Request:

```
POST https://<nsxmgr-ip>/api/2.0/services/ssoconfig
```

Request Body:

```
<ssoconfig>
      <ssoLookupServiceUrl></ssoLookupServiceUrl>
      <ssoAdminUsername></ssoAdminUsername>
      <ssoAdminUserpassword></ssoAdminUserpassword>
</ssoConfig>
```

Query SSO Details

Example 2-2. Get SSO details

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ssoconfig
```

Response Body:

```
<ssoConfig>
      <vsmSolutionName></vsmSolutionName>
      <ssoLookupServiceUrl></ssoLookupServiceUrl>
      <ssoAdminUsername></ssoAdminUsername>
</ssoConfig>
```

Query SSO Configuration Status

Example 2-3. Get SSO configuration status

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ssoconfig/status
```

Response Body:

```
<boolean></boolean>
```

Delete SSO Configuration

Example 2-4. Delete SSO configuration

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/ssoconfig/
```

User Management

The authentication and authorization APIs include methods to manage users and roles.

Get Information About a User

You can retrieve information about a user.

Example 2-5. Get information about a user

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/usermgmt/user/<userId>
```

Request Body:

```
<userInfo>
      <objectId></objectId>
      <type>
            <typeName></typeName>
      </type>
      <name></name>
      <revision></revision>
      <objectTypeName></objectTypeName>
      <userId></userId>
      <fullname></fullname>
```

```
        <email></email>
        <isLocal></isLocal>
        <isEnabled></isEnabled>
        <isGroup></isGroup>
        <hasGlobalObjectAccess></hasGlobalObjectAccess>
        <accessControlEntry>
            <role></role>
            <resource>
            <objectId></objectId>
            <type>
                <typeName></typeName>
            </type>
            <name></name>
            <revision></revision>
            <objectTypeName></objectTypeName>
            <scope>
                <id></id>
                <objectTypeName></objectTypeName>
                <name></name>
            </scope>
            </resource>
            ...
        </accessControlEntry>
</userInfo>
```

User information includes user name, full name, email address, whether local or not, whether enabled, resource objects, roles, and scope.

Enable or Disable a User Account

You can disable or enable a user account, either local user or vCenter user. When a user account is created, the account is enabled by default.

Example 2-6. Enable or disable a user account

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/usermgmt/user/<userId>/enablestate/<value>
```

The <value> can be 0 (zero) to disable the account, or 1 (one) to enable the account.

This API returns “204 No Content” if successful.

Remove Role Assignment

The first API removes the NSX role assignment for a vCenter user, without affecting the vCenter account. The second API removes a vCenter user’s roles.

Example 2-7. Remove role assignment

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/usermgmt/user/<userId>
```

Example 2-8. Delete a user role

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/usermgmt/role/<userId>
```

Both APIs return “204 No Content” if successful.7

Role Management

When assigning or retrieving the role for a user, you cannot use a backslash (\) in the user name (userID parameter). Instead of specifying Domain\user1 as the user name, say user1@Domain.

Get Role for a User

You can retrieve information about the role assigned to this user.

Example 2-9. Get user role

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/usermgmt/role/<userId>
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<accessControlEntry>
    <role></role>
    <resource>
        <objectId></objectId>
        <type>
            <typeName></typeName>
        </type>
        <name></name>
        <revision></revision>
        <objectTypeName></objectTypeName>
        <scope>
            <id></id>
            <objectTypeName></objectTypeName>
            <name></name>
        </scope>
    </resource>
    <resource>...</resource>
    ...
    ...
</accessControlEntry>
```

Possible roles are super_user, vshield_admin, enterprise_admin, security_admin, and auditor.

Get Role for a NSX Manager User

You can retrieve information about users who have been assigned a NSX Manager role (local users as well as vCenter users with the NSX Manager role).

Example 2-10. Get user role

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/usermgmt/users/vsm
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<users>
    <userInfo>
    <objectId></objectId>
    <type>
        <typeName></typeName>
    </type><name></name>
    <revision></revision>
    <objectTypeName></objectTypeName>
    <userId></userId>
    <fullname></fullname>
    <email></email>
```

```
        <isLocal></isLocal>
        <isEnabled></isEnabled>
        <isGroup>false</isGroup>
        <hasGlobalObjectAccess></hasGlobalObjectAccess>
        <accessControlEntry>
              <role></role>
              <resource>
                    <objectId></objectId>
                    <type>
                          <typeName></typeName>
                    </type>
                    <name></name>
                    <revision></revision>
                    <objectTypeName></objectTypeName>
                    <scope>
                          <id>group-d1</id>
                          <objectTypeName></objectTypeName>
                          <name></name>
                    </scope>
                    </resource>
        </accessControlEntry>
        </userInfo>
        <userInfo>
        ...
        </userInfo>
</users>
```

Possible roles are super_user, vshield_admin, enterprise_admin, security_admin, and auditor.

Add Role and Resources for a User

You can add role and accessible resources for the specified user. It affects only vCenter users, not local users.

You cannot use a backslash (\) in the user name (userID parameter). Instead of specifying Domain\user1 as the user name, say user1@Domain.

Set isGroup=true to assign a role to a group and isGroup=false to assign a role to a user.

Example 2-11. Update user role

Request Header:

```
POST https://<nsxmgr-ip>/api/2.0/usermgmt/role/userId??isGroup=true|false
```

Request Body:

```
<accessControlEntry>
      <role>new_role</role>
      <resource>
            <resourceId>resource-num</resourceId>
            ...
      </resource>
</accessControlEntry>
```

This API returns “204 No Content” if successful.

Change User Role

You can update the role assignment for a given user. The API returns an output representation specifying a new <accessControlEntry> for the user.

Example 2-12. Change user role

Request Header:

PUT https://<nsxmgr-ip>/api/2.0/services/usermgmt/role/<userId>

Request Body:

```
<accessControlEntry>
      <role>new_role</role>
      <resource>
            <resourceId>resource-num</resourceId>
            ...
      </resource>
</accessControlEntry>
```

Possible roles are super_user, vshield_admin, enterprise_admin, security_admin, and auditor.

Get List of Possible Roles

You can retrieve the possible roles in NSX Manager.

Example 2-13. Get possible roles

Request:

GET https://<nsxmgr-ip>/api/2.0/services/usermgmt/roles

Response Body:

```
<list>
      <string></string>
      <string></string>
      ...
</list>
```

Get List of Scoping Objects

You can retrieve a list of objects that can be used to define a user's access scope.

Example 2-14. Get scoping objects

Request:

GET https://<nsxmgr-ip>/api/2.0/services/usermgmt/scopingobjects

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<scopingObjects>
<object>
      <objectId></objectId>
      <type>
            <typeName></typeName>
      </type>
      <name></name>
      <revision></revision>
      <objectTypeName></objectTypeName>
      <scope>
            <id></id>
            <objectTypeName></objectTypeName>
            <name></name>
      </scope>
</object>
<object>
      <objectId></objectId>
      <type>
            <typeName></typeName>
      </type>
      <name></name>
```

```
        <revision></revision>
        <objectTypeName></objectTypeName>
        <scope>
                <id></id>
                <objectTypeName></objectTypeName>
                <name></name>
        </scope>
</object>
...
...
</scopingObjects>
```

The scoping objects are usually managed object references or vCenter Server names of datacenters and folders.

Delete User Role

You can delete the role assignment for the specified vCenter user. Once this role is deleted, the user is removed from NSX Manager.

You cannot delete the role for a local user.

Example 2-15. Delete role

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/usermgmt/role/<user Id>
```

Managing the NSX Manager Appliance 3

With the appliance management tool, you can manage:

- System configurations like network configuration, syslog, time settings, and certificate management etc.
- Components of appliance such as NSX Manager, Postgres, SSH component, Rabbitmq service etc.
- Overall support related features such as tech support logs, backup restore, status, and summary reports of appliance health.

The chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Upgrading the Appliance Manager

You can upgrade NSX Manager to a later version.

Upload Upgrade Bundle

Example 3-1. Upload upgrade bundle

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/upgrade/uploadbundle/<component-id>
```

Query Upgrade Information

After the upgrade bundle is uploaded, you can query upgrade details such as pre-upgrade validation warning or error messages along with pre-upgrade questions.

Example 3-2. Query upgrade information

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/upgrade/uploadbundle/<component-id>

Response Body:

```
<upgradeInformation>
   <fromVersion></fromVersion>
   <toVersion></toVersion>
   <upgradeBundleDescription></upgradeBundleDescription>
   <preUpgradeQuestionsAnswers>
      <preUpgradeQuestionAnswer>
         <questionId></questionId>
         <question></question>
         <questionAnserType></questionAnserType>
      </preUpgradeQuestionAnswer>
      ....
      <preUpgradeQuestionAnswer>
         <questionId></questionId>
         <question></question>
         <questionAnserType></questionAnserType>
      </preUpgradeQuestionAnswer>
   </preUpgradeQuestionsAnswers>
   <upgradeStepsDto>
      <step>
         <stepId></stepId>
         <stepLabel></stepLabel>
         <description></description>
      </step>
      ...
      <step>
         <stepId></stepId>
         <stepLabel></stepLabel>
         <description></description>
      </step>
   </upgradeStepsDto>
   <warningMessages></warningMessages>
</upgradeInformation>
```

Begin Upgrade

Starts upgrade process.

Example 3-3. Start upgrade

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/upgrade/start/<component-id>

Response Body:

```
<preUpgradeQuestionsAnswers>
      <preUpgradeQuestionAnswer>
         <questionId></questionId>
         <question></question>
         <questionAnserType></questionAnserType>
         <answer></answer>
      </preUpgradeQuestionAnswer>
      ...
   </preUpgradeQuestionsAnswers>
```

Query Upgrade Status

Retrieves upgrade status.

Example 3-4. Query upgrade status

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/status/<component-id>
```

Response Body:

```
<upgradeStatus>
  <stepStatus>
    <upgradeStep>
      <stepId></stepId>
      <stepLabel></stepLabel>
      <description></description>
    </upgradeStep>
    <status></status>
  </stepStatus>
  <status></status>
  <existingBundleFileName></existingBundleFileName>
</upgradeStatus>
```

Configuring NSX Manager with vCenter Server

You can synchronize NSX Manager with a vCenter Server, which enables the Networking and Security tab in the vCenter Web Client to display your VMware Infrastructure inventory.

Configure vCenter Server with NSX Manager

Example 3-5. Synchronize NSX Manager with vCenter server

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/vcconfig
```

Request Body:

```
<vcInfo>
      <ipAddress></ipAddress>
      <userName></userName>
      <password></password>
      <certificateThumbprint></certificateThumbprint>
      <assignRoleToUser></assignRoleToUser>
      <pluginDownloadServer></pluginDownloadServer>
      <pluginDownloadPort></pluginDownloadPort>
</vcInfo>
```

Query Configuration Details

Example 3-6. Get vCenter Server configuration details on NSX Manager

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/vcconfig
```

Response Body:

```
<vcInfo>
      <ipAddress></ipAddress>
      <userName></userName>
      <certificateThumbprint></certificateThumbprint>
```

```
        <assignRoleToUser></assignRoleToUser>
        <vcInventoryLastUpdateTime></vcInventoryLastUpdateTime>
</vcInfo>
```

Example 3-7. Get default vCenter Server connection status

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/vcconfig/status
```

Response Body:

```
<vcConfigStatus>
        <connected></connected>
        <lastInventorySyncTime></lastInventorySyncTime>
</vcConfigStatus>
```

Certificate Management

Generate CSR Certificate

Generates CSR. Response header contains created file location.

Example 3-8. Generate CSR

Request:

```
PUT https://<nsxmgr-ip>/api/1.0/appliance-management/certificatemanager/csr/nsx
```

Request Body:

```
<csr>
  <algorithm></algorithm>
  <keySize></keySize>
  <subjectDto>
    <commonName></commonName>
    <organizationUnit></organizationUnit>
    <organizationName></organizationName>
    <localityName></localityName>
    <stateName></stateName>
    <countryCode></countryCode>
  </subjectDto>
</csr>
```

Download CSR Certificate

Downloads generated CSR from appliance.

Example 3-9. Download CSR

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/certificatemanager/csr/nsx
```

Upload Certificate Chain

Input is certificate chain file which is a PEM encoded chain of certificates received from the CA after signing a CSR.

Example 3-10. Upload certificate chain

Request:

```
PUT https://<nsxmgr-ip>/api/1.0/appliance-management/certificatemanager/uploadchain/nsx
```

Query Certificates

Retrieves certificates.

Example 3-11. Query certificates

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/certificatemanager/certificates/nsx
```

Response Body:

```
<x509Certificates>
   <x509certificate>
      <subjectCn></subjectCn>
      <issuerCn></issuerCn>
      <version></version>
      <serialNumber></serialNumber>
      <signatureAlgo></signatureAlgo>
      <signature></signature>
      <notBefore></notBefore>
      <notAfter></notAfter>
      <issuer></issuer>
      <subject></subject>
      <publicKeyAlgo></publicKeyAlgo>
      <publicKeyLength></publicKeyLength>
      <rsaPublicKeyModulus></rsaPublicKeyModulus>
      <rsaPublicKeyExponent></rsaPublicKeyExponent>
      <sha1Hash></sha1Hash>
      <md5Hash></md5Hash>
      <isCa></isCa>
      <isValid></isValid>
   </x509certificate>
   ....
</x509Certificates>
```

Upload Keystore File

Input is PKCS#12 formatted NSX file along with password.

Example 3-12. Upload file

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/certificatemanager/pkcs12keystore/nsx?password="123"
```

Resource Management

Query Global Appliance Manager Information

Retrieves global information containing version information as well as current logged in user.

Example 3-13. Query global information

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/global/info

Response Body

```
<globalInfo>
   <currentLoggedInUser>Joe</currentLoggedInUser>
   <versionInfo>
      <majorVersion>6</majorVersion>
      <minorVersion>0</minorVersion>
      <patchVersion>0</patchVersion>
      <buildNumber>1300000000</buildNumber>
   </versionInfo>
</globalInfo>
```

Query Summary Appliance Manager Information

Retrieves system summary information such as address, dns name, version, CPU, memory, and storage.

Example 3-14. Query summary

Request:

GET https://<nsx-ip>/api/1.0/appliance-management/summary/system

Response Body:

```
<systemSummary>
   <ipv4Address></ipv4Address>
   <dnsName></dnsName>
   <applianceName></applianceName>
   <versionInfo>
      <majorVersion></majorVersion>
      <minorVersion></minorVersion>
      <patchVersion></patchVersion>
      <buildNumber></buildNumber>
   </versionInfo>
   <uptime></uptime>
   <cpuInfoDto>
      <totalNoOfCPUs></totalNoOfCPUs>
      <capacity></capacity>
      <usedCapacity></usedCapacity>
      <freeCapacity></freeCapacity>
      <usedPercentage></usedPercentage>
   </cpuInfoDto>
   <memInfoDto>
      <totalMemory></totalMemory>
      <usedMemory></usedMemory>
      <freeMemory></freeMemory>
      <usedPercentage></usedPercentage>
   </memInfoDto>
   <storageInfoDto>
      <totalStorage></totalStorage>
      <usedStorage></usedStorage>
      <freeStorage></freeStorage>
      <usedPercentage></usedPercentage>
   </storageInfoDto>
   <currentSystemDate></currentSystemDate>
</systemSummary>
```

Query Component Information

Retrieves summary of all available components available and their status information.

Example 3-15. Query global information

Request:

```
GET https://<nsx-ip>/api/1.0/appliance-management/summary/components
```

Response Body

```
<componentsSummary>
   <componentsByGroup class="tree-map">
      <entry>
         <string></string>
         <components>
            <component>
               <componentId></componentId>
               <name></name>
               <description></description>
               <status></status>
               <enabled></enabled>
               <showTechSupportLogs></showTechSupportLogs>
               <usedBy>
                  <string></string>
               </usedBy>
               <componentGroup></componentGroup>
            </component>
            <component>
            ...
            </component>
         </components>
      </entry>
      <entry>
      ...
       </entry>
   </componentsByGroup>
</componentsSummary>
```

Reboot Appliance Manager

Reboots the appliance manager.

Example 3-16. Reboot appliance

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/system/restart
```

Query Appliance Manager CPU

Example 3-17. Query CPU

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/cpuinfo
```

Response Body

```
<cpuInfo>
   <totalNoOfCPUs></totalNoOfCPUs>
   <capacity></capacity>
   <usedCapacity></usedCapacity>
   <freeCapacity></freeCapacity>
   <usedPercentage></usedPercentage>
</cpuInfo>
```

Query Appliance Manager Uptime

Example 3-18. Query uptime

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/uptime

Response Body

<> days, <> hours, <> minutes

Query Appliance Manager Memory

Example 3-19. Query memory

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/meminfo

Response Body

```
<memInfo>
      <totalMemory>11996 MB</totalMemory>
      <usedMemory>6524 MB</usedMemory>
      <freeMemory>5471 MB</freeMemory>
      <usedPercentage>54</usedPercentage>
</memInfo>
```

Query Appliance Manager Storage

Example 3-20. Query storage

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/storageinfo

Response Body

```
<storageInfo>
   <totalStorage></totalStorage>
   <usedStorage></usedStorage>
   <freeStorage></freeStorage>
   <usedPercentage></usedPercentage>
</storageInfo>
```

Working with Network Settings

Query Network Information

Retrieves network information such as configured host name, IP address, and DNS settings.

Example 3-21. Query network details

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/network

Response Body

```
<network>
   <hostName></hostName>
   <domainName></domainName>
```

```
  <networkIPv4AddressDto>
    <ipv4Address></ipv4Address>
    <ipv4NetMask></ipv4NetMask>
    <ipv4Gateway></ipv4Gateway>
  </networkIPv4AddressDto>
  <networkIPv6AddressDto>
    <ipv6Address></ipv6Address>
    <ipv6PrefixLength></ipv6PrefixLength>
    <ipv6Gateway></ipv6Gateway>
  </networkIPv6AddressDto>
  <dns>
    <ipv4Address></ipv4Address>
    <ipv6Address></ipv6Address>
    <domainList></domainList>
  </dns>
</network>
```

Configure DNS Servers

Configures DNS servers.

Example 3-22. Configure DNS

Request:

```
PUT https://<nsxmgr-ip>/api/1.0/appliance-management/system/network/dns
```

Request Body

```
<dns>
    <ipv4Address></ipv4Address>
    <ipv6Address></ipv6Address>
    <domainList></domainList>
</dns>
```

Delete DNS Servers

Deletes DNS servers.

Example 3-23. Configure DNS

Request:

```
DELETE https://<nsxmgr-ip>/api/1.0/appliance-management/system/network/dns
```

Working with Time Settings

Configure Time Settings

You can either configure time or specify the NTP server to be used for time synchronization.

Example 3-24. Configure time

Request:

```
PUT https://<nsxmgr-ip>/api/1.0/appliance-management/system/timesettings
```

Response Body

```
<timeSettings>
  <ntpServer>
    <string></string>
  </ntpServer>
```

```
   <datetime></datetime>
   <timezone></timezone>
</timeSettings>
```

Query Time Settings

Retrieves time settings like timezone or current date and time with NTP server, if configured.

Example 3-25. Query time settings

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/timesettings
```

Response Body

```
<timeSettings>
   <ntpServer>
      <string></string>
      <string></string>
   </ntpServer>
   <datetime></datetime>
   <timezone></timezone>
</timeSettings>
```

Delete Time Settings

Deletes NTP server.

Example 3-26. Delete NTP

Request:

```
DELETE https://<nsxmgr-ip>/api/1.0/appliance-management/system/timesettings/ntp
```

Working with Locale Settings

Configure Locale

Configures locale.

Example 3-27. Configure locale

Request:

```
PUT https://<nsxmgr-ip>/api/1.0/appliance-management/system/locale
```

Request Body

```
<locale>
   <language>en</language>
   <country>US</country>
</locale>
```

Query Locale

Retrieves locale information.

Example 3-28. Query locale

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/locale

Response Body

```
<locale>
   <language>en</language>
   <country>US</country>
</locale>
```

Working with Syslog Servers

If you specify a syslog server, NSX Manager sends all audit logs and system events from NSX Manager to the syslog server.

Configure Syslog Servers

Configures syslog servers.

Example 3-29. Configure syslog

Request:

PUT https://<nsxmgr-ip>/api/1.0/appliance-management/system/syslogserver

Request Body

```
<syslogserver>
   <syslogServer></syslogServer>
   <port></port>
   <protocol></protocol>
</syslogserver>
```

Query Syslog Servers

Retrieves syslog servers.

Example 3-30. Query syslog

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/system/syslogserver

Response Body

```
<syslogserver>
   <syslogServer></syslogServer>
   <port></port>
   <protocol></protocol>
</syslogserver>
```

Delete Syslog Servers

Deletes syslog servers.

Example 3-31. Delete syslog

Request:

DELETE https://<nsxmgr-ip>/api/1.0/appliance-management/system/syslogserver

Components Management

Query Components

Retrieves all Appliance Manager components.

Example 3-32. Query components

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/components
```

Response Body

```
<components>
      <component>
            <componentId></componentId>
            <name></name>
            <description></description>
            <status></status>
            <enabled>true</enabled>
            <showTechSupportLogs></showTechSupportLogs>
            <usedBy>
                  <string></string>
            </usedBy>
            <componentGroup></componentGroup>
      </component>
      ...
      <component>
            <componentId></componentId>
            <name></name>
            <description></description>
            <status></status>
            <enabled>true</enabled>
            <showTechSupportLogs></showTechSupportLogs>
            <usedBy>
                  <string></string>
            </usedBy>
            <componentGroup>
            </componentGroup>
      </component>
</components>
```

Query Specific Component

Retrieves details for the specified component ID.

Example 3-33. Query component

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/components/component/componentID
```

Response Body

```
<component>
   <componentId></componentId>
   <name></name>
   <description> Manager</description>
   <status></status>
   <enabled></enabled>
   <showTechSupportLogs></showTechSupportLogs>
   <uses>
      <string></string>
      <string></string>
   </uses>
```

```
   <usedBy/>
   <componentGroup></componentGroup>
   <versionInfo>
      <majorVersion></majorVersion>
      <minorVersion></minorVersion>
      <patchVersion></patchVersion>
      <buildNumber></buildNumber>
   </versionInfo>
</component>
```

Query Component Dependencies

Retrieves dependency details for the specified component ID.

Example 3-34. Query component dependency details

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/components/*componentID/*dependencies

Response Body

```
<list>
      <string>VPOSTGRES</string>
      <string>RABBITMQ</string>
</list>
```

Query Specific Component Dependents

Retrieves dependents for the specified component ID.

Example 3-35. Query component dependents

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/components/*componentID/*dependents

Response Body

```
<list>
      <string></string>
      <string></string>
</list>
```

Query Component Status

Retrieves current status for the specified component ID.

Example 3-36. Query component status

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/components/*componentID/*status

Response Body

```
<result>
      <result class="status"></result>
      <operationStatus></operationStatus>
</result>
```

Toggle Specific Component Status

Toggles component status.

Example 3-37. Toggle status

Request:

POST https://<nsxmgr-ip>/api/1.0/appliance-management/components/*componentID*/toggleStatus/*command*

Working with Backup and Restore

You can back up and restore your NSX Manager data, which can include system configuration, events, and audit log tables. Configuration tables are included in every backup. Backups are saved to a remote location that must be accessible by the NSX Manager.

For information on backipng up controller data, see "Backup Controller Data" on page 81.

Configure Backup Settings

Configures backup on the Appliance Manager.

Example 3-38. Configure backup

Request:

PUT https://<nsxmgr-ip>/api/1.0/appliance-management/backuprestore/backupsettings

Request Body

```
<backupRestoreSettings>
   <ftpSettings>
      <transferProtocol></transferProtocol>
      <hostNameIPAddress></hostNameIPAddress>
      <port></port>
      <userName></userName><password></password>
      <backupDirectory></backupDirectory>
      <filenamePrefix></filenamePrefix>
      <passiveMode></passiveMode>
      <useEPRT></useEPRT>
      <useEPSV></useEPSV>
   </ftpSettings>
   <backupFrequency>
      <frequency></frequency>
      <dayOfWeek></dayOfWeek>
      <hourOfDay></hourOfDay>
      <minuteOfHour></minuteOfHour>
   </backupFrequency>
   <excludeTables>
      <excludeTable></excludeTable>
      <excludeTable></excludeTable>
   </excludeTables>
</backupRestoreSettings>
```

where:

- transferProtocol: FTP, SFTP
- frequency: weekly, daily, hourly
- dayOfWeek: SUNDAY, MONDAY, ..., SATURDAY
- Hour of Day: [0 - 24 [
- Minute of hour: [0 - 60 [

- Exclude Tables: AUDIT_LOG, SYSTEM_EVENTS, FLOW_RECORDS
  The tables specified in the excludeTables parameter are not backed up.

If you set up scheduled backups, the output is:

```
<scheduledBackupTaskDetails>
  <nextExecutionTime></nextExecutionTime>
</scheduledBackupTaskDetails>
```

You can use the following commands individually to configure a specific setting:

- Configure FTP:
  PUT https://<nsxmgr-ip>/1.0/appliance-management/backuprestore/backupsettings/ftpsettings
- Specify tables that need not be backed up:
  PUT https://<nsxmgr-ip>/1.0/appliance-management/backuprestore/backupsettings/excludedata
- Set backup schedule:
  PUT https://<nsxmgr-ip>/1.0/appliance-management/backuprestore/backupsettings/schedule
- Delete backup schedule
  DELETE https://<nsxmgr-ip>/1.0/appliance-management/backuprestore/backupsettings/schedule

Configure On-Demand Backup

You can take a backup NSX data at any given time.

Example 3-39. On-demand backup

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/backuprestore/backup
```

Query Backup Settings

Retrieves backup settings.

Example 3-40. Query backup

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/backuprestore/backupsettings
```

Response Body

```
<backupRestoreSettings>
  <ftpSettings>
    <transferProtocol></transferProtocol>
    <hostNameIPAddress></hostNameIPAddress>
    <port></port>
    <userName></userName><password></password>
    <backupDirectory></backupDirectory>
    <filenamePrefix></filenamePrefix>
    <passiveMode></passiveMode>
    <useEPRT></useEPRT>
    <useEPSV></useEPSV>
  </ftpSettings>
  <backupFrequency>
    <frequency></frequency>
    <dayOfWeek></dayOfWeek>
    <hourOfDay></hourOfDay>
    <minuteOfHour></minuteOfHour>
  </backupFrequency>
  <excludeTables>
    <excludeTable></excludeTable>
```

```
    <excludeTable></excludeTable>
  </excludeTables>
</backupRestoreSettings>
```

Delete Backup Configuration

Deletes Appliance Manager backup configuration.

Example 3-41. Delete backup settings

Request:

```
DELETE https://<nsxmgr-ip>/api/1.0/appliance-management/backuprestore/backupsettings
```

Query Available Backups

Retrieves list of all backups available at configured backup location.

Example 3-42. Query backup

Request:

```
GET https://<nsxmgr-ip>/api/1.0/appliance-management/backuprestore/backups
```

Response Body:

```
<list>
  <backupFileProperties>
    <fileName></fileName>
    <fileSize></fileSize>
    <creationTime></creationTime>
  </backupFileProperties>
  ...
  <backupFileProperties>
  <fileName></fileName>
    <fileSize></fileSize>
    <creationTime></creationTime>
  </backupFileProperties>
</list>
```

Restore Data

Restores backup from specified file.

Example 3-43. Restore data

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/backuprestore/restore?restoreFile=filename
```

Working with Tech Support Logs

Generate Tech Support Logs

Generates tech support logs. Response header contains the location of the created tech support file.

Example 3-44. Generate tech support log

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/techsupportlogs/componentID
```

Download Tech Support Logs

Downloads tech support logs. Response header contains the location of the created tech support file.

Example 3-45. Generate tech support log

Request:

```
POST https://<nsxmgr-ip>/api/1.0/appliance-management/techsupportlogs/filename
```

Querying NSX Manager Logs

You can retrieve NSX Manager system event and audit logs.

Get NSX Manager System Events

You can retrieve NSX Manager system events.

Example 3-46. Get NSX Manager system events

Request:

```
GET https://<vsm-ip>/api/2.0/systemevent?startIndex=0\&pageSize=10
```

Where

- start index is an optional parameter which specifies the starting point for retrieving the logs. If this parameter is not specified, logs are retrieved from the beginning.
- page size is an optional parameter that limits the maximum number of entries returned by the API. The default value for this parameter is 256 and the valid range is 1-1024.

Get NSX Manager Audit Logs

You can get NSX Manager audit logs.

Example 3-47. Get NSX Manager audit logs

Request:

```
GET https://<nsxmgr-ip>/api/2.0/logging/auditlog?startIndex=0\&pageSize=10
```

Where

- start index is an optional parameter which specifies the starting point for retrieving the logs. If this parameter is not specified, logs are retrieved from the beginning.
- page size is an optional parameter that limits the maximum number of entries returned by the API. The default value for this parameter is 256 and the valid range is 1-1024.

Working with Support Notifications

Query Notifications

Retrieves all system generated notifications.

Example 3-48. Query notifications

Request:

GET https://<nsxmgr-ip>/api/1.0/appliance-management/notifications

Response Body:

```
<notifications>
   <notification>
      <id></id>
      <notification></notification>
      <notificationStatus></notificationStatus>
   </notification>
</notifications>
```

Delete all Notifications

Deletes all system generated notifications regardless of whether they have been ackowledged.

Example 3-49. Delete notifications

Request:

DELETE https://<nsxmgr-ip>/api/1.0/appliance-management/notifications

Acknowledge Notifications

Acknowledges a notification. The notification is then deleted from the system.

Example 3-50. Ackonwledge notification

Request:

POST https://<nsxmgr-ip>/api/1.0/appliance-management/notifications/*NotificationId*/acknowledge

Grouping Objects 4

The Grouping feature enables you to create custom containers to which you can assign resources.

The chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Working with Security Groups

A security group is a collection of assets or grouping objects from your vSphere inventory.

Create Security Group

You can create a new security group on a global scope. Inheritance is not allowed.

The response of the call has 'Location' header populated with the URI using which the created object can be fetched.

Example 4-1. Create new security group

Request:

POST https://<nsxmgr-ip>/api/2.0/services/securitygroup//bulk/<scopeID>

Request Body:

```
<securitygroup>
  <objectId></objectId>
  <objectTypeName></objectTypeName>
  <vsmUuid></vsmUuid>
  <revision></revision>
  <type>
    <typeName></typeName>
  </type>
  <name></name>
```

```
<scope>
  <id></id>
  <objectTypeName></objectTypeName>
  <name></name>
</scope>
<clientHandle></clientHandle>
<extendedAttributes/>

<member>
  <objectId></objectId>
  <objectTypeName></objectTypeName>
  <vsmUuid></vsmUuid>
  <revision></revision>
  <type>
    <typeName></typeName>
  </type>
  <name></name>
  <scope>
    <id></id>
    <objectTypeName></objectTypeName>
    <name></name>
  </scope>
  <clientHandle></clientHandle>
  <extendedAttributes/>
</member>

<member>
  ...
</member>

<member>
  ...
</member>

<excludeMember>
  <objectId></objectId>
  <objectTypeName></objectTypeName>
  <vsmUuid></vsmUuid>
  <revision></revision>
  <type>
    <typeName></typeName>
  </type>
  <name></name>
  <scope>
    <id></id>
    <objectTypeName></objectTypeName>
    <name></name>
  </scope>
  <clientHandle></clientHandle>
  <extendedAttributes/>
</excludeMember>

<excludeMember>
  ...
</excludeMember>

<excludeMember>
  ...
</excludeMember>

<dynamicMemberDefinition>
  <dynamicSet>
    <operator></operator>
    <dynamicCriteria>
      <operator></operator>
      <key></key>
      <criteria></criteria>
      <value></value>
```

```
    </dynamicCriteria>
    <dynamicCriteria>
     ....
    </dynamicCriteria>

   </dynamicSet>

   <dynamicSet>
     ....
   </dynamicSet>

 </dynamicMemberDefinition>

</securitygroup>
```

where dynamicMemberDefinition incudes the following:

- dynamicSet represents a rule set as represented on the UI. There can be multiple dynamic sets inside dynamic member definition.
- operator : specifies how to combine the results of two dynamic sets. The operator present in this dynamic set is used to combine the result of the dynamic set(s) evaluted previously with the result of this dynamic set.
  The combining takes place serially. Consider three dynamic sets DS1, DS2 and DS3
  The possible values for this field are "AND" and "OR".
- dynamicCriteria defines the actual criteria for the membership. There can be multiple dynamicCriteria inside a dynamicSet.
  All the dynamicCriteria in a dynamicSet must have the same operator.
- key specifies the object and the attribute on which the condition has to be applied. Eg: "VM.name". The key can be any object attribute that is supported by the DynamicMember API.
- criteria specifies the condition that has to applied to the key with respect to the value. Different conditions are defined for different datatypes. For string datatype, the condition can be "=", "!=", "contains", "does not contain", etc. For numerical datatypes, condition can be "=", "!=", "<", etc.
- value is a string to which key has to compared using the criteria.

Query Security Groups

You can retrieve all the security groups that have been created on a specific scope.

Due to the dynamic nature of security groups, changes to the virtual machine listing of security groups or changes to the services associated with a virtual machine are likely to get reflected a few seconds after the security group change. Hence, there should a delay of a few seconds between a security group modification and running a GET call on it.

Example 4-2. Query all security groups on NSX Manager

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/scope/<scopeID>
```

Response Body

```
<?xml version="1.0" encoding="UTF-8"?>
<list>

 <securitygroup>
  <objectId></objectId>
  <objectTypeName></objectTypeName>
  <nsxmgrUuid></nsxmgrUuid>
  <revision></revision>
  <type>
   <typeName></typeName>
```

```
</type>
<name></name>
<scope>
  <id></id>
  <objectTypeName></objectTypeName>
  <name></name>
</scope>
<clientHandle></clientHandle>
<extendedAttributes/>
<member>
  <objectId></objectId>
  <objectTypeName></objectTypeName>
  <nsxmgrUuid></nsxmgrUuid>
  <revision></revision>
  <type>
    <typeName></typeName>
  </type>
  <name></name>
  <scope>
    <id></id>
    <objectTypeName></objectTypeName>
    <name></name>
  </scope>
  <clientHandle></clientHandle>
  <extendedAttributes/>
</member>

<member>
  ...
</member>

<member>
  ...
</member>

<excludeMember>
  <objectId></objectId>
  <objectTypeName></objectTypeName>
  <nsxmgrUuid></nsxmgrUuid>
  <revision></revision>
  <type>
    <typeName></typeName>
  </type>
  <name></name>
  <scope>
    <id></id>
    <objectTypeName></objectTypeName>
    <name></name>
  </scope>
  <clientHandle></clientHandle>
  <extendedAttributes/>
</excludeMember>

<excludeMember>
  ...
</excludeMember>

<excludeMember>
  ...
</excludeMember>

<dynamicMemberDefinition>
  <dynamicSet>
    <operator></operator>
    <dynamicCriteria>
      <operator></operator>
      <key></key>
      <criteria></criteria>
```

```
        <value></value>
      </dynamicCriteria>
      <dynamicCriteria>
       ....
      </dynamicCriteria>

    </dynamicSet>

    <dynamicSet>
     ....
    </dynamicSet>

  </dynamicMemberDefinition>

 </securitygroup>

 <securitygroup>
    ....
 </securitygroup>

 <securitygroup>
    ....
 </securitygroup>
</list>
```

where <scopeID> is the NSX Manager ID.

The following command retrieves details for the specified security group:

GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/<securityGroupID>

The following commad retrieves all internal security groups on the NSX Manager. Internal security groups are used internally by the system and are not created or managed by end users. You should not modify these.

GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/internal/scope/<scopeID>

Query Members for a Scope

You can retrieve a list of applicable member elements that can be added to security groups created on a particular scope. Because security group allows only specific type of container elements to be added, this list helps you determine all possible valid elements that can be added.

Example 4-3. Get members for a security group scope

Request:

GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/scope/<scopeID>/memberTypes

Response Body:

```
<list>
  <basicinfo>
    <objectId></objectId>
    <objectTypeName></objectTypeName>
    <nsxmgrUuid></nsxmgrUuid>
    <revision></revision>
    <type>
      <typeName></typeName>
    </type>
    <name></name>
    <scope>
      <id></id>
      <objectTypeName></objectTypeName>
      <name></name>
    </scope>
    <clientHandle />
    <extendedAttributes />
```

```
    </basicinfo>
    <basicinfo>
      ...
    </basicinfo>
    <basicinfo>
      ...
    </basicinfo>
</list>
```

Note that this API command requires a slash (/) at the end.

Use the following command to retrieve members of a specific type under a scope:

GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/scope/<scopeID>/members/*memberType*

Query Security Group Objects

Retrieves list of entities (IpNodes, MacNodes, VmNodes, or VnicNodes) that belong to a specific security group.

Example 4-4. Query security group members

Request:

GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/{securityGroupId}/translation/virtualmachines
GET https://<nsxmgr-ip>/api//2.0/services/securitygroup/{securityGroupId}/translation/ipaddresses
GET https://<nsxmgr-ip>/api//2.0/services/securitygroup/{securityGroupId}/translation/macaddresses
GET https://<nsxmgr-ip>/api//2.0/services/securitygroup/{securityGroupId}/translation/vnics

Query Security Groups that contain a Virtual Machine

Retrieves list of security groups to which the specified virtual machine belongs to.

Example 4-5. Query Security Groups that contain a Virtual Machine

Request:

GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/lookup/virtualmachine/<virtualMachineId>

Modify a Security Group

To modify a security group, you must query it first and then modify the output. The modified output can then be specified as the request body.

Example 4-6. Modify a security group

Request:

PUT https://<nsxmgr-ip>/api/2.0/services/securitygroup/bulk/<securitygroup-id>

Request Body:

See Example 4-1.

Delete a Security Group

You can delete an existing security group.

Example 4-7. Delete a security group

Request:

DELETE https://<nsxmgr-ip>/api/2.0/services/securitygroup/<securitygroup-id>

Working with Tags

You can view security tags applied on a virtual machine or create a user defined security tag.

Create Security Tag

Creates a new security tag.

Example 4-8. Create tag

Request:

POST https://<nsxmgr-ip>/api/2.0/services/securitytags/tag

Request Body:

```
<securityTag>
<objectTypeName>SecurityTag</objectTypeName>
<type><typeName>SecurityTag</typeName></type>
<name>TAG_NAME</name>
<description>description of the tag</description>
<extendedAttributes/>
</securityTag>
```

Query Security Tags

Retrieves security tags.

Example 4-9. Query tag

Request:

GET https://<nsxmgr-ip>/api/2.0/services/securitytags/tag

Response Body:

```
<securityTags>
<securityTag>
<objectId>tag-id</objectId>
<objectTypeName>SecurityTag</objectTypeName>
<type><typeName>SecurityTag</typeName></type>
<name>TAG_NAME</name>
<description>description of the tag</description>
<extendedAttributes/>
</securityTag>
</securityTags>
```

Apply Tag to Virtual Machine

Applies security tag to virtual machine.

Example 4-10. Apply tag

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/securitytags/tag/{TagIdentifierString}/vm/{vmMoid}
```

Detach Tag from Virtual Machine

Detaches security tag from virtual machine.

Example 4-11. Detach tag

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/securitytags/tag/{TagIdentifierString}/vm/{vmMoid}
```

Delete Tag from Virtual Machine

Deletes tags.

Example 4-12. Delete tag

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/securitytags/tag/{TagIdentifierString}
```

Working with IPsets

You can group a set of IP addresses into an IPSet.

Create an IPset

All IPsets are created on the global scope.

Example 4-13. Create IPset

Request:

```
POST hnsxmgrttps://<nsxmgr-ip>/api/2.0/services/ipset/<scope-moref>
```

Request Body Example:

```
<ipset>
      <objectId />
      <type>
      <typeName />
      </type>
      <description>
            New  Description
      </description>
      <name>TestIPSet2</name>
      <revision>0</revision>
      <objectTypeName />
      <value>10.112.201.8-10.112.201.14</value>
</ipset>
```

where <scope-moref> is globalroot-0.

In the request body example, a range of IP addresses on the 10.112 net is specified (201.8 to 201.14).

Query IPsets

You can retrieve all the IPsets.

Example 4-14. List IPsets on a scope

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ipset/scope/<scope-moref>
```

where <scope-moref> is globalroot-0.

Query Details of an IPset

You can retrieve details about an IPset.

Example 4-15. Get details of an IPset

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ipset/<ipset-id>
```

The <ipset-id> is as returned by listing the IPset on a scope.

Modify an IPset

You can modify an existing IPset and retrieve details about the modified IPset.

Example 4-16. Modify an IPset

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/ipset/<ipset-id>
```

Request Body Example:

```
<ipset>
  <objectId />
  <type>
  <typeName />
  </type>
  <description>
  New  Description
  </description>
  <name>TestIPSet2</name>
  <revision>0</revision>
  <objectTypeName />
  <value>10.112.201.8-10.112.201.21</value>
</ipset>
```

The <ipset-id> is as returned by listing the IPset on a scope. In the request body example, the IP address range is doubled.

Delete an IPset

You can delete an IPset. The trailing boolean flag indicates forced or unforced delete. With forced delete, the object is deleted even if used in other places such as firewall rules, causing invalid referrals. For unforced delete, the object is deleted only if it is not used by other configuration; otherwise the delete fails.

Example 4-17. Delete an IPset

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/ipset/<ipset-id>?force=<true|false>
```

Working with MACsetS

Create a MACset on a Scope

You can create a MACset on the specified scope. On success, the API returns a string identifier for the new MACset.

Example 4-18. Create MACset on a scope

Request:

```
POST https://<nsxmgr-ip>/api/2.0/services/macset/scope/<scope-moref>
```

Request Body Example:

```
<macset>
  <objectId />
  <type>
  <typeName />
  </type>
  <description>Some description</description>
  <name>TestMACSet1</name>
  <revision>0</revision>
  <objectTypeName />
  <value>22:33:44:55:66:77,00:11:22:33:44:55,aa:bb:cc:dd:ee:ff</value>
</macset>
```

where <scope-moref> is globalroot-0. In the request body example, a comma-separated list of MAC addresses is specified.

List MACsets Created on a Scope

You can retrieve all the MACsets that were created on the specified scope.

Example 4-19. List MACsets on a scope

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/macset/<scope-moref>
```

where <scope-moref> is globalroot-0.

Get Details of a MACset

You can retrieve details about a MACset.

Example 4-20. Get details of a MACset

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/macset/<macset-id>
```

The <MACset-id> is as returned by listing the MACset on a scope.

Modify an Existing MACset

You can modify an existing MACset and retrieve details about the modified MACset.

Example 4-21. Modify details of a MACsets

Request:

PUT https://<nsxmgr-ip>/api/2.0/services/MACset/<MACset-id>

Request Body:

```
<macset>
  <objectId />
  <type>
  <typeName />
  </type>
  <description>Some description</description>
  <name>TestMACSet1</name>
  <revision>1</revision>
  <objectTypeName />
  <value>22:33:44:55:66:77,00:11:22:33:44:55</value>
</macset>
```

The <MACset-id> is as returned by listing the MACset on a scope. In the request body example, one MAC address fewer is specified.

Delete a MACset

You can delete a MACset. The trailing boolean flag indicates forced or unforced delete. With forced delete, the object is deleted even if used in other places such as firewall rules, causing invalid referrals. For unforced delete, the object is deleted only if it is not used by other configuration; otherwise the delete fails.

Example 4-22. Delete a MACset

Request:

DELETE https://<nsxmgr-ip>/api/2.0/services/macset/<macset-id>

Working with Services

List Services on a Scope

You can retrieve a list of services that have been created on the scope specified by managed object reference <moref>.

Example 4-23. List services on a given scope

Request:

GET https://<nsxmgr-ip>/api/2.0/services/application/scope/<moref>

A non-existent scope results in a 400 Bad Request error.

Add Service to a Scope

You can create a new service on the specified scope.

Example 4-24. Add a service to a scope

Request:

POST https://<nsxmgr-ip>/api/2.0/services/application/<moref>

Request Body:

```
<application>
  <objectId/>
  <type>
    <typeName/>
```

```
 </type>
 <description>Some description</description>
 <name>TestApplication1</name>
 <revision>0</revision>
 <objectTypeName/>
 <element>
  <applicationProtocol>UDP</applicationProtocol>
  <value>9,22-31,44</value>
 </element>
</application>
```

For applicationProtocol, possible values are:

- TCP
- UDP
- ORACLE_TNS
- FTP
- SUN_RPC_TCP
- SUN_RPC_UDP
- MS_RPC_TCP
- MS_RPC_UDP
- NBNS_BROADCAST
- NBDG_BROADCAST

Only TCP and UDP support comma separated port numbers and dash separated port ranges. Other protocols support a single port number only.

On success, this call returns a string identifier for the newly created application, for instance Application-1. The location header in the reply contains the relative path of the created Application and can be used for further GET, PUT, and DELETE calls.

Get Details of a Service

You can retrieve details about the service specified by <applicationgroup-id> as returned by the call shown in Example 4-24.

Example 4-25. Retrieve details about a service

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/application/<application-id>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<application>
  <objectId>
    application-45
  </objectId>
  <type>
    <typeName>
      Application
    </typeName>
  </type>
  <name>
    TestApplication1
  </name>
  <revision>
    1
  </revision>
  <objectTypeName>
    Application
  </objectTypeName>
```

```
    <scope>
      <id>
        datacenter-2
      </id>
      <objectTypeName>
        Datacenter
      </objectTypeName>
      <name>
        AmolDC
      </name>
    </scope>
    <inheritanceAllowed>
      false
    </inheritanceAllowed>
    <element>
      <applicationProtocol>
        UDP
      </applicationProtocol>
      <value>
        9,22-31,44
      </value>
    </element>
</application>
```

A non-existent application ID results in a 404 Not Found error.

Modify Service Details

You can modify the name, description, applicationProtocol, or port value of a service.

Example 4-26. Modify application

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/application/<application-id>
```

Request Body:

```
<application>
  <objectId>Application-1</objectId>
  <type>
    <typeName>Application</typeName>
  </type>
  <description>Some description</description>
  <name>TestApplication</name>
  <revision>2</revision>
  <objectTypeName>Application</objectTypeName>
  <element>
    <applicationProtocol>TCP</applicationProtocol>
    <value>10,29-30,45</value>
  </element>
</application>
```

The call returns XML describing the modified service.

Delete Service

You can delete a service by specifying its <applicationgroup-id>. The force= flag indicates if the delete should be forced or unforced. For forced deletes, the object is deleted irrespective of its use in other places such as firewall rules, which invalidates other configurations referring to the deleted object. For unforced deletes, the object is deleted only if it is not being used by any other configuration. The default is unforced (false).

Example 4-27. Delete service

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/application/<application-id>?force=<true|false>
```

Working with Service Groups

Add Service Group

You can create a new service group on the specified scope.

Example 4-28. Add a service group to a scope

Request:

```
POST https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<scope-moref>
```

Request Body:

```
<applicationGroup>
    <description>Some description</description>
    <name>TestApplication1</name>
    <revision>0</revision>
    <inheritanceAllowed>false</inheritanceAllowed>
</applicationGroup>
```

Query Service Groups

You can retrieve a list of service groups that have been created on the scope specified by managed object reference <moref>.

Example 4-29. List service groups on a given scope

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<scope-moref>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<list>
    <applicationGroup>
        <objectId>applicationgroup-1</objectId>
        <type>
            <typeName>ApplicationGroup</typeName>
        </type>
        <name>testglobalAG</name>
        <description></description>
        <revision>2</revision>
        <objectTypeName>ApplicationGroup</objectTypeName>
        <scope>
            <id>globalroot-0</id>
            <objectTypeName>GlobalRoot</objectTypeName>
            <name>Global</name>
        </scope>
        <extendedAttributes />
        <inheritanceAllowed>false</inheritanceAllowed>
        <member>
            <objectId>application-37</objectId>
            <type>
                <typeName>Application</typeName>
            </type>
            <name>SMTP</name>
            <revision>3</revision>
            <objectTypeName>Application</objectTypeName>
            <scope>
                <id>globalroot-0</id>
```

```
                <objectTypeName>GlobalRoot</objectTypeName>
                <name>Global</name>
            </scope>
            <extendedAttributes />
        </member>
    </applicationGroup>
</list>
```

A non-existent scope results in a 400 Bad Request error.

Query Details of a Service Group

You can retrieve details about the service group specified by <applicationgroup-id> as returned by the call shown in Example 4-24.

Example 4-30. Retrieve details about a service group

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<applicationgroup-id>
```

A non-existent application ID results in a 404 Not Found error.

Modify Service Group Details

You can modify the name, description, applicationProtocol, or port value of a service group.

Example 4-31. Modify service group

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<applicationgroup-id>
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<applicationGroup>
    <objectId>applicationgroup-1</objectId>
    <type>
        <typeName>ApplicationGroup</typeName>
    </type>
    <name>testglobalAG-updated</name>
    <description>Updated with description</description>
    <revision>2</revision>
    <objectTypeName>ApplicationGroup</objectTypeName>
    <scope>
        <id>globalroot-0</id>
        <objectTypeName>GlobalRoot</objectTypeName>
        <name>Global</name>
    </scope>
    <extendedAttributes />
    <inheritanceAllowed>false</inheritanceAllowed>
    <member>
        <objectId>application-37</objectId>
        <type>
            <typeName>Application</typeName>
        </type>
        <name>SMTP</name>
        <revision>3</revision>
        <objectTypeName>Application</objectTypeName>
        <scope>
            <id>globalroot-0</id>
            <objectTypeName>GlobalRoot</objectTypeName>
            <name>Global</name>
        </scope>
```

```
        <extendedAttributes />
    </member>
</applicationGroup>
```

The call returns XML describing the modified service.

Delete Service Group from Scope

You can delete a service group by specifying its <applicationgroup-id>. The force= flag indicates if the delete should be forced or unforced. For forced deletes, the object is deleted irrespective of its use in other places such as firewall rules, which invalidates other configurations referring to the deleted object. For unforced deletes, the object is deleted only if it is not being used by any other configuration. The default is unforced (false).

Example 4-32. Delete service group

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<applicationgroup-id>?force=<true|false>
```

Working with the Members of a Service Group

Query Service Group Members

You can get a list of member elements that can be added to the service groups created on a particular scope. Since service group allows only either services or other service groups as members to be added, this helps you get a list of all possible valid elements that can be added to the service.

Example 4-33. Retrieve member elements

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/applicationgroup/scope/<scope-moref>/members
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<list>
    <basicinfo>
        <objectId>applicationgroup-3</objectId>
        <type>
            <typeName>ApplicationGroup</typeName>
        </type>
        <name>AGDC-1</name>
        <description>AG created in DC</description>
        <revision>1</revision>
        <objectTypeName>ApplicationGroup</objectTypeName>
        <scope>
            <id>datacenter-2</id>
            <objectTypeName>Datacenter</objectTypeName>
            <name>Datacenter</name>
        </scope>
        <extendedAttributes />
    </basicinfo>
    <basicinfo>
        <objectId>application-36</objectId>
        <type>
            <typeName>Application</typeName>
        </type>
        <name>ORACLE_TNS</name>
        <revision>2</revision>
        <objectTypeName>Application</objectTypeName>
        <scope>
            <id>globalroot-0</id>
```

```
            <objectTypeName>GlobalRoot</objectTypeName>
            <name>Global</name>
        </scope>
        <extendedAttributes />
    </basicinfo>
    <basicinfo>
        <objectId>application-37</objectId>
        <type>
            <typeName>Application</typeName>
        </type>
        <name>SMTP</name>
        <revision>3</revision>
        <objectTypeName>Application</objectTypeName>
        <scope>
            <id>globalroot-0</id>
            <objectTypeName>GlobalRoot</objectTypeName>
            <name>Global</name>
        </scope>
        <extendedAttributes />
    </basicinfo>
</list>
```

Add a Member to the Service Group

You can add a member to the service group.

Example 4-34. Add member

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<applicationgroup-id>/members/
                    <member-moref>
```

Delete a Member from the Service Group

You can delete a member from the service group.

Example 4-35. Delete member

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/applicationgroup/<applicationgroup-id>/members/
                    <member-moref>
```

Working with IP Pools

You can create a pool of IP addresses.

Add an IP Pool

Example 4-36. Add IP pool

Request:

```
POST https://<nsxmgr-ip>/api/2.0/services/ipam/pools/scope/<scopeId>
```

Request Body:

```
<ipamAddressPool>
  <name>rest-ip-pool-1</name>
  <prefixLength>23</prefixLength>
  <gateway>192.168.1.1</gateway>
```

```
 <dnsSuffix>eng.vmware.com</dnsSuffix>
 <dnsServer1>10.112.0.1</dnsServer1>
 <dnsServer2>10.112.0.2</dnsServer2>
 <ipRanges>
  <ipRangeDto>
   <startAddress>192.168.1.2</startAddress>
   <endAddress>192.168.1.3</endAddress>
  </ipRangeDto>
 </ipRanges>
</ipamAddressPool>
```

where scop id is globalroot-0.

Query IP Pool Details

Retrieves details about the specified IP pool.

Example 4-37. Query IP Pool

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>
```

Response Body:

```
<ipamAddressPool>
  <objectId>ipaddresspool-1</objectId>
  <objectTypeName>IpAddressPool</objectTypeName>
  <vsmUuid>4237BA90-C373-A71A-9827-1673BFA29498</vsmUuid>
  <revision>1</revision>
  <type>
    <typeName>IpAddressPool</typeName>
  </type>
  <name>rest-ip-pool-1</name>
  <extendedAttributes/>
  <prefixLength>23</prefixLength>
  <gateway>192.168.1.1</gateway>
  <dnsSuffix>eng.vmware.com</dnsSuffix>
  <dnsServer1>10.112.0.1</dnsServer1>
  <dnsServer2>10.112.0.2</dnsServer2>
  <ipRanges>
    <ipRangeDto>
      <id>iprange-1</id>
      <startAddress>192.168.1.2</startAddress>
      <endAddress>192.168.1.3</endAddress>
    </ipRangeDto>
  </ipRanges>
  <totalAddressCount>2</totalAddressCount>
  <usedAddressCount>0</usedAddressCount>
  <usedPercentage>0</usedPercentage>
</ipamAddressPool>
```

Modify an IP Pool

To modify an IP pool, query the IP pool first. Then modify the output and send it back as the request body.

Example 4-38. Query IP Pool

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>
```

Response Body:

```
<ipamAddressPool>
```

```
  <objectId>ipaddresspool-1</objectId>
  <objectTypeName>IpAddressPool</objectTypeName>
  <vsmUuid>4237BA90-C373-A71A-9827-1673BFA29498</vsmUuid>
  <revision>1</revision>
  <type>
    <typeName>IpAddressPool</typeName>
  </type>
  <name>rest-ip-pool-1</name>
  <extendedAttributes/>
  <prefixLength>23</prefixLength>
  <gateway>192.168.1.1</gateway>
  <dnsSuffix>eng.vmware.com</dnsSuffix>
  <dnsServer1>10.112.0.1</dnsServer1>
  <dnsServer2>10.112.0.2</dnsServer2>
  <ipRanges>
    <ipRangeDto>
      <id>iprange-1</id>
      <startAddress>192.168.1.2</startAddress>
      <endAddress>192.168.1.3</endAddress>
    </ipRangeDto>
  </ipRanges>
</ipamAddressPool>
```

Allocating a New IP Address

Allocates a new IP address from the specified pool.

Example 4-39. Allocate new address

Request:

POST https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>/ipaddresses

Request Body:

```
<ipAddressRequest>
  <allocationMode>ALLOCATE</allocationMode>
</ipAddressRequest>
Response Body:
<?xml version="1.0" encoding="UTF-8"?>
<allocatedIpAddress>
  <id>allocatedipaddress-1</id>
  <ipAddress>192.168.1.2</ipAddress>
  <gateway>192.168.1.1</gateway>
  <prefixLength>23</prefixLength>
  <dnsServer1>10.112.0.1</dnsServer1>
  <dnsServer2>10.112.0.2</dnsServer2>
  <dnsSuffix>eng.vmware.com</dnsSuffix>
  <allocationNote/>sample note</allocationNote>
</allocatedIpAddress>
```

Allocating a Specific IP Address

Allocates a specific IP address from the specified pool.

Example 4-40. Allocate new address

Request:

POST https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>/ipaddresses

Request Body:

```
<ipAddressRequest>
  <allocationMode>RESERVE</allocationMode>
```

```
  <ipAddress>192.168.1.5</ipAddress>
</ipAddressRequest>
```

Response Body:

See Example 4-39.

Query all IP Pools on Scope

Retrieves all IP pools on the specified scope.

Example 4-41. Query IP pools on scope

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>/ipaddresses
```

Response Body:

```
<ipamAddressPools>
  <ipamAddressPool>
    <objectId>ipaddresspool-1</objectId>
    <objectTypeName>IpAddressPool</objectTypeName>
    <vsmUuid>4237BA90-C373-A71A-9827-1673BFA29498</vsmUuid>
    <revision>1</revision>
    <type>
      <typeName>IpAddressPool</typeName>
    </type>
    <name>rest-ip-pool-1</name>
    <extendedAttributes/>
    <prefixLength>23</prefixLength>
    <gateway>192.168.1.1</gateway>
    <dnsSuffix>eng.vmware.com</dnsSuffix>
    <dnsServer1>10.112.0.1</dnsServer1>
    <dnsServer2>10.112.0.2</dnsServer2>
    <ipPoolType>IPV4</ipPoolType>
    <ipRanges>
      <ipRangeDto>
        <id>iprange-1</id>
        <startAddress>192.168.1.2</startAddress>
        <endAddress>192.168.1.3</endAddress>
      </ipRangeDto>
    </ipRanges>
    <totalAddressCount>2</totalAddressCount>
    <usedAddressCount>0</usedAddressCount>
    <usedPercentage>0</usedPercentage>
    <subnetId>subnet-1</subnetId>
  </ipamAddressPool>
</ipamAddressPools>
```

Query Allocated IP Addresses

Retrieves all allocated IP addresses from the specified pool.

Example 4-42. Query allocated addresses

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/ipam/pools/scope/<scopeID>
```

Response Body:

```
<allocatedIpAddresses>
  <allocatedIpAddress>
    <id>allocatedipaddress-4</id>
```

```
  <ipAddress>192.168.1.2</ipAddress>
  <gateway>192.168.1.1</gateway>
  <prefixLength>23</prefixLength>
  <dnsServer1>10.112.0.1</dnsServer1>
  <dnsServer2>10.112.0.2</dnsServer2>
  <dnsSuffix>eng.vmware.com</dnsSuffix>
  <allocationNote>sample note</allocationNote>
 </allocatedIpAddress>
 <allocatedIpAddress>
  <id>allocatedipaddress-5</id>
  <ipAddress>192.168.1.3</ipAddress>
  <gateway>192.168.1.1</gateway>
  <prefixLength>23</prefixLength>
  <dnsServer1>10.112.0.1</dnsServer1>
  <dnsServer2>10.112.0.2</dnsServer2>
  <dnsSuffix>eng.vmware.com</dnsSuffix>
  <allocationNote>sample note</allocationNote>
 </allocatedIpAddress>
</allocatedIpAddresses>
```

Release an IP Address

Example 4-43. Release IP address

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>/ipaddresses/<allocated-ip-address>
```

Delete an IP Pool

Example 4-44. Delete IP Pool

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/services/ipam/pools/<pool-ID>
```

Querying Object IDs

This section describes how to retrieve the IDs for the objects in your virtual inventory.

Query Datacenter MOID

1. In a web browser, type the following:

   http://<vCenter-IP>/mob

2. Click content.
3. Click on the rootFolder value.
4. Click on the childEntity value.

   The datacenter MOID is displayed on top of the window.

Query Datacenter ID

1. In a web browser, type the following:

   http://<vCenter-IP>/mob

2. Click content.

3 Click on the rootFolder value.

4 Click on the childEntity value.

The datacenter value is the datacenter ID.

Query Host ID

1 In a web browser, type the following:

http://<vCenter-IP>/mob

2 Click content.

3 Click on the rootFolder value.

4 Click on the childEntity value.

1 Click on the datacenter value.

The host value is the host ID.

Query Portgroup ID

1 In a web browser, type the following:

http://<vCenter-IP>/mob

2 Click content.

3 Click on the rootFolder value.

4 Click on the childEntity value.

5 Click on the datacenter value.

6 Click on the host value.

The network property value is the portgroup ID.

Installing NSX Components 5

After the installation of NSX Manager, you can install other components as required..

This chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Installing Licenses

You can install and assign an NSX for vSphere license after NSX Manager installation is complete by using the vSphere Web Client.

Before purchasing and activating an NSX for vSphere license, you can install and run the software in evaluation mode. When run in evaluation mode, intended for demonstration and evaluation purposes, NSX components are completely operational immediately after installation, do not require any licensing configuration, and provide full functionality for 60 days from the time you first activate them.

1 Log in to the vSphere Web Client.

2 Click **Administration** and then click **Licenses**.

3 Click the **Solutions** tab.

4 From the drop-down menu at the top, select **Assign a new license key**.

5 Type the license key and an optional label for the new key.

6 Click **Decode**.
Decode the license key to verify that it is in the correct format, and that it has enough capacity to license the assets.

7 Click **OK**.

What to do next

Obtain and install an NSX for vSphere license within the evaluation period.

Working with Network Virtualization Components

As the demands on datacenters continue to grow and accelerate, requirements related to speed and access to the data itself continue to grow as well. In most infrastructures, virtual machine access and mobility usually depend on physical networking infrastructure and the physical networking environments they reside in. This can force virtual workloads into less than ideal environments due to potential layer 2 or layer 3 boundaries, such as being tied to specific VLAN's.

Network virtualization allows you to place these virtual workloads on any available infrastructure in the datacenter regardless of the underlying physical network infrastructure. This not only allows increased flexibility and mobility, but increased availability and resilience.

Feature configuration is managed at a cluster level. Cluster preparation can be broken down into the following:

- Install vib and non-vib related action: Before any per-host config a vib must be installed on the host. The feature can use this time to perform other bootstrapping tasks which do not depend on vib-installation. e.g. vxlan creates the vmknicpg and sets up some opaque data.
- Post-vib install: Prepare each host for the feature. In the case of vxlan, create vmknics.

Install Network Virtualization Components

You install the network infrastructure components in your virtual environment on a per-cluster level for each vCenter server, which deploys the required software on all hosts in the cluster. This software is also referred to as an NSX vSwitch. When a new host is added to this cluster, the required software is automatically installed on the newly added host. After the network infrastructure is installed on a cluster, Logical Firewall is enabled on that cluster.

Example 5-1. Install network virtualization

Request

POST https://<nsxmgr-ip>/api/2.0/nwfabric/configure

Request Body

```
<nwFabricFeatureConfig>
    <resourceConfig>
        <resourceId>{CLUSTER MOID}</resourceId>
    </resourceConfig>
</nwFabricFeatureConfig>
```

Upgrade Network Virtualization Components

After NSX Manager is upgraded to NSX Manager, previously prepared clusters must have the 6.0 network virtualization components installed.

Example 5-2. Upgrade network virtualization

Request

PUT https://<nsxmgr-ip>/api/2.0/nwfabric/configure

Request Body

See Example 5-1.

Delete Network Virtualization Components

Remove previously installed vibs, tears down NSX manager to ESX messaging, and remove any other network fabric dependent features like logical wires etc. If a feature like logical wire is being used in your environment, this call fails.

Example 5-3. Delete network virtualization

Request

```
DELETE https://<nsxmgr-ip>/api/2.0/nwfabric/configure
```

Working with VXLAN for Logical Switches

Configuring logical switches is a multi-step process. You must follow these steps in order to complete logical switch configuration. In lieu of multicast routing on the physical fabric, you can add NSX controllers in your environment. You can later associate one of these traffic forwarding mechanisms with a transport zone.

Prerequisites

- You must have the Super Administrator or Enterprise Administrator role permissions to configure and manage logical switches.
- Install network virtualization components on the clusters that are to be part of the logical switch. See "Install Network Virtualization Components" on page 76.
- Ensure that you have the following software versions.
  - VMware vCenter Server 5.5 or later
  - VMware ESX 5.1 or later on each server
  - vSphere Distributed Switch 5.1 or later
- Physical infrastructure MTU must be at least 50 bytes more than the MTU of the virtual machine vNIC.
- Set Managed IP address for each vCenter server in the vCenter Server Runtime Settings. For more information, see vCenter Server and Host Management.
- If using DHCP for IP assignment for VMKNics, verify that DHCP is available on VXLAN transport VLANs.

  If using an IP pool for static IP assignment, selecting a gateway other than the default gateway of the ESX management network leverages a dedicated TCP stack (applies to VMware ESXi™ 5.5 or later).
- For Link Aggregation Control Protocol (LACP), it is recommended hat you enable 5- tuple hash distribution.
- You must use a consistent distributed virtual switch type (vendor etc.) and version across a given network scope. Inconsistent switch types can lead to undefined behavior in your logical switch.

  The control plane that manages logical networks and overlay transport can be set as one of the following:
  - **Multicast**: Multicast IP addresses on physical network is used for the control plane. This mode is recommended only when you are upgrading from older VXLAN deployments. Requires PIM/IGMP on physical network.
  - **Unicast** : The control plane is handled by an NSX controller. All traffic replication is handled locally by the hypervisor. No multicast IP addresses or special network configuration is required.
  - **Hybrid** : The optimized unicast mode. Offloads local traffic replication to physical network. This requires IGMP snooping on the first-hop switch, but does not require PIM. First-hop switch handles traffic replication for the subnet.

Working with Controllers

For the unicast or hybrid control plane mode, you must add an NSX controller to manage overlay transport and provide East-West routing. The controller optimizes virtual machine broadcast (ARP only) traffic, and the learning is stored on the host and the controller.

Add Controller

Adds a new NSX controller on the specified given cluster. The hostId parameter is optional. The resourcePoolId can be either the cluster Id or resourcePool Id.

The IP address of the controller node will be allocated from the specified IP pool. deployType determines the controller node memory size and can be small, medium, or large.

Example 5-4. Add controller

Request

```
POST https://<nsxmgr-ip>/api/2.0/vdn/controller
```

Request Body:

```
<controllerSpec>
   <name>nsx-controller-node1</name>
   <description>nsx-controller</description>
   <ipPoolId>ipPool-1</ipPoolId>
   <resourcePoolId>domain-c1</resourcePoolId>
   <hostId>host-1</hostId>
   <datastoreId>datastore-1</datastoreId>
   <deployType>medium</deployType>
   <networkId>dvportgroup-1</networkId>
   <password>MyTestPassword</password>
 </controllerSpec>
```

Query Controllers

Retrieves details and runtime status for controller. Runtime status can be one of the following:

- Deploying - controller is being deployed and the procedure has not completed yet.
- Removing - controller is being removed and the procedure has not completed yet.
- Running - controller has been deployed and can respond to API invocation.
- Unknown - controller has been deployed but fails to respond to API invocation.

Example 5-5. Query controllers

Request

```
GET https://<nsxmgr-ip>/api/2.0/vdn/controller
```

Response Body:

```
<controllers>
<controller>
<id>controller-...</id>
<name>controllerA</name>
<description>nvp-controller</description>
<ipAddress>10.1.1.1</ipAddress>
<status>RUNNING</status>
</controller>
...
</controllers>
```

Query Controller Addition or Deletion Details

Retrieves status of controller creation or removal. The progress gives a percentage indication of current deploy / remove procedure.

Example 5-6. Query controller addition or deletion details

Request

```
GET https://<nsxmgr-ip>/api/2.0/vdn/controller/progress/<job_id>
```

Response Body:

```
<controllerDeploymentInfo>
  <vmId>vm-1</vmId>
  <progress>90</progress>
  <status>PushingFile</status>
  <exceptionMessage></exceptionMessage>
 </controllerDeploymentInfo>
```

Query Controller Tech Support Logs

Retrieves controller logs. Response content type is application/octet-stream and response header is filename.

This streams a fairly large bundle back (possibly hundreds of MB).

Example 5-7. Query controller logs

Request

```
GET https://<nsxmgr-ip>/api/2.0/vdn/controller/{controllerId}/techsupportlogs
```

Delete Controller

Deletes NSX controller. When deleting the last controller from a cluster, the parameter forceRemovalForLast must be set to true.

Example 5-8. Delete controller

Request

```
DELETE https://<nsxmgr-ip>/api/2.0/vdn/controller/<controller-id>? forceRemoval=<true/false>
```

Query Cluster Information

Retrieves cluster wise configuration information for controller.

Example 5-9. Query cluster details

Request

```
GET https://<nsxmgr-ip>/api/2.0/vdn/controller/cluster
```

Response Body:

```
<controllerConfig>
  <sslEnabled>true</sslEnabled>
 </controllerConfig>
```

Modify Cluster Configuration

Modifies cluster wise configuration information for controller.

Example 5-10. Modify cluster configuration

Request

```
PUT https://<nsxmgr-ip>/api/2.0/vdn/controller/cluster
```

Request Body:

```
<controllerConfig>
  <sslEnabled>true</sslEnabled>
 </controllerConfig>
```

Add Controller Syslog Exporter

Configures a syslog exporter on the specified controller node.

Example 5-11. Query controller syslog exporter

Request

```
POST https://<nsxmgr-ip>/api/2.0/vdn/controller/{controller-id}/syslog
```

Request Body:

```
<controllerSyslogServer>
    <syslogServer>10.135.14.236</syslogServer>
    <port>514</port>
    <protocol>UDP</protocol>
    <level>INFO</level>
</controllerSyslogServer>
```

Query Controller Syslog Exporter

Retrieves details about the configured syslog exporter on the specified controller node.

Example 5-12. Query controller syslog exporter

Request

```
GET https://<nsxmgr-ip>/api/2.0/vdn/controller/{controller-id}/syslog
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
  <controllerSyslogServer>
    <syslogServer>10.135.14.236</syslogServer>
    <port>514</port>
    <protocol>UDP</protocol>
    <level>INFO</level>
  </controllerSyslogServer>
```

Delete Controller Syslog Exporter

Deletes syslog exporter on the specified controller node.

Example 5-13. Delete controller syslog exporter

Request

```
DELETE https://<nsxmgr-ip>/api/2.0/vdn/controller/{controller-id}/syslog
```

Backup Controller Data

Takes a snapshot of the control cluster from the specified controller nodet.

Example 5-14. Backup controller data

Request:

```
GET
https://NSXManagerIPAddress/api/2.0/vdn/controller/controllerID/snapshot
```

To retrieve the controller IDs, log in to the vSphere Web Client. Navigate to Networking & Security > Installation. The NSX Controller Nodes table lists the controller IDs (Name column) and IP addresses (Node column) of each controller.

The output of the GET call is an octet stream containing the controller snapshot. Example call to download the snapshot is as follows.

```
curl -u admin:default -H "Accept: application/octet-stream" -X GET -k
https://NSXManagerIPAddress/api/2.0/vdn/controller/controllerID/snapshot
> controller_backup.snapshot
```

Working with Segment IDs

You must specify a segment ID pool for each NSX Manager to isolate your network traffic. If an NSX controller is not deployed in your environment, you must add a multicast address range to help in spreading traffic across your network and avoid overloading a single multicast address.

Add a new Segment ID Range

You can add a segment ID range, from which an ID is automatically assigned to the logical switch.

Example 5-15. Add a segment ID range

Request:

```
POST https://<vsm-ip>/api/2.0/vdn/config/segments
```

Request Body:

```
<segmentRanges>
    <segmentRange>
        <id>1</id>
        <name>name</name>
        <desc>desc</desc>
        <begin>1000</begin>
        <end>1500</end>
    </segmentRange>
    <segmentRange>
        ....
    </segmentRange>
        ....
</segmentRanges>
```

The segment range is inclusive – the beginning and ending IDs are included.

Query all Segment ID Ranges

You can retrieve all segment ID ranges.

Example 5-16. Get all Segment ID Ranges

Request:

GET https://<vsm-ip>/api/2.0/vdn/config/segments

Response Body:

```
<segmentRanges>
      <segmentRange>
            <id>1</id>
            <name>name</name>
            <desc>desc</desc>
            <begin>5000</begin>
            <end>9000</end>
      </segmentRange>
      <segmentRange>
            ....
      </segmentRange>
</segmentRanges>
```

Query a Specific Segment ID Range

You can retrieve a segment ID range by specifying the segment ID.

Example 5-17. Get a specific Segment ID Range

Request:

GET https://<vsm-ip>/api/2.0/vdn/config/segments/*SegmentID*

Response Body:

```
<segmentRange>
      <id>1</id>
      <name>name</name>
      <desc>desc</desc>
      <begin>10000</begin>
      <end>11000</end>
</segmentRange>
```

Update a Segment ID Range

You can update the name, description, or end of a segment ID range.

Example 5-18. Update a Segment ID Range

Request:

PUT https://<vsm-ip>/api/2.0/vdn/config/segments/*SegmentID*

Request Body:

```
<segmentRange>
      <end>3000</end>
      <name>name</name>
      <desc>desc</desc>
</segmentRang>
```

Delete a Segment ID Range

You can delete a segment ID range.

Example 5-19. Delete a Segment ID Range

Request:

DELETE https://<vsm-ip>/api/2.0/vdn/config/segments/*SegmentID*

Configure VXLAN

Example 5-20. Install VXLAN

Request

POST https://<nsxmgr-ip>/api/2.0/nwfabric/configure

Request Body:

```
<nwFabricFeatureConfig>
   <featureId>com.vmware.vshield.vsm.vxlan</featureId>
   <resourceConfig>
      <resourceId>{CLUSTER MOID}</resourceId>
      <configSpec class="clusterMappingSpec">
         <switch><objectId>{DVS MOID}</objectId></switch>
         <vlanId>0</vlanId>
         <vmknicCount>1</vmknicCount>
         <!-- ipPoolId is optional and if none is specified will assume DHCP for VTEP address assignment.-->
         <ipPoolId>{IPADDRESSPOOL ID}</ipPoolId>
      </configSpec>
   </resourceConfig>
   <resourceConfig>
      <resourceId>{DVS MOID}</resourceId>
      <configSpec class="vdsContext">
         <switch><objectId>{DVS MOID}</objectId></switch>
         <mtu>1600</mtu>
         <!-- teaming value can be one of
                     FAILOVER_ORDER|ETHER_CHANNEL|LACP_ACTIVE|LACP_PASSIVE|LOADBALANCE_LOADBASE
                     D|LOADBALANCE_SRCID|LOADBALANCE_SRCMAC|LACP_V2 -->
         <teaming>ETHER_CHANNEL</teaming>
      </configSpec>
   </resourceConfig>
</nwFabricFeatureConfig>
```

Install VXLAN

Example 5-21. Install VXLAN with LACPv2

Request

POST https://<nsxmgr-ip>/api/2.0/nwfabric/configure

Request Body:

```
<nwFabricFeatureConfig>
<featureId>com.vmware.vshield.nsxmgr.vxlan</featureId>
<resourceConfig>
<resourceId>{CLUSTER MOID}</resourceId>
  <configSpec class="clusterMappingSpec">
    <switch><objectId>{DVS MOID}</objectId></switch>
    <vlanId>0</vlanId>
    <vmknicCount>1</vmknicCount>
  </configSpec>
</resourceConfig>
<resourceConfig>
<resourceId>{DVS MOID}</resourceId>
  <configSpec class="vdsContext">
    <switch><objectId>{DVS MOID}</objectId></switch>
    <mtu>1600</mtu>
    <teaming>LACP_V2</teaming>
    <!-- uplinkPortName should be as specified in vCenter. -->
    <uplinkPortName>{LAG NAME}</uplinkPortName>
```

```
   </configSpec>
</resourceConfig>
</nwFabricFeatureConfig>
```

Delete VXLAN

Deletes VXLAN from the specified cluster. This does not delete the network virtualization components from the cluster.

Example 5-22. Delete VXLAN

Request

```
DELETE https://<nsxmgr-ip>/api/2.0/nwfabric/configure
```

Delete VXLAN with vdsContext

Deletes VXLAN from the specified cluster and also removes the vdsContext.

Example 5-23. Delete VXLAN

Request

```
DELETE https://<nsxmgr-ip>/api/2.0/nwfabric/configure
```

Working with Network Scopes

A network scope is the networking infrastructure within provider virtual datacenters.

Create a Network Scope

You must specify the clusters that are to be part of the network scope. You must have the VLAN ID, UUID of the vCenter Server, and vDS ID.

Example 5-24. Create a network scope

Request:

```
POST https://<vsm-ip>/api/2.0/vdn/scopes
```

Request Body:

```
<vdnScope>
      <clusters>
            <cluster><cluster><objectId>domain-c59</objectId></cluster></cluster>
      </clusters>
</vdnScope>
```

Edit a Network Scope

You can add a cluster to or delete a cluster from a network scope.

Example 5-25. Create a network scope

Request:

```
POST https://<vsm-ip>/api/2.0/vdn/scopes/scopeID?action=patch
```

Request Body:

```
<vdnScope>
      <objectId>{id}</objectId>
```

```
    <clusters>
        <cluster><cluster><objectId>domain-c59</objectId></cluster></cluster>
    </clusters>
</vdnScope>
```

Update Attributes on a Network Scope

You can update the attributes of a network scope.

Example 5-26. Update attributes of a network scope

Request:

PUT https://<vsm-ip>/api/2.0/vdn/scopes/*scopeID*/attributes

Request Body:

```
<vdnScope>
    <objectId>vdnScope-1</objectId>
    <name>new name</name>
    <description>new description</description>
</vdnScope>
```

Query existing Network Scopes

You can retrieve all existing network scopes.

Example 5-27. Get all network scopes

Request:

GET https://<vsm-ip>/api/2.0/vdn/scopes

Response Body:

```
<vdnScopes>
<vdnScope>
<objectId>vdnscope-2</objectId>
<type><typeName>VdnScope</typeName></type>
<name>My Name</name>
<description>My Description</description>
<revision>0</revision>
<objectTypeName>VdnScope</objectTypeName>
<extendedAttributes/>
<id>vdnscope-2</id>
<clusters>
<cluster>
<cluster>
<objectId>domain-c124</objectId>
<type><typeName>ClusterComputeResource</typeName></type>
<name>vxlan-cluster</name>
<scope><id>datacenter-2</id><objectTypeName>Datacenter</objectTypeName><name>dc1</name></scope>
<extendedAttributes/>
</cluster>
</cluster>
...
</clusters>
<virtualWireCount>10</virtualWireCount>
</vdnScope>
...
<vdnScope>...</vdnScope>
...
</vdnScopes>
```

Query a Specific Network Scope

You can retrieve a specific network scope.

Example 5-28. Get a network scope

Request:

GET https://<vsm-ip>/api/2.0/vdn/scopes/*scopeID*

Response Body:

```
<vdnScope>
<objectId>vdnscope-2</objectId>
<type><typeName>VdnScope</typeName></type>
<name>My Name</name>
<description>My description</description>
<revision>0</revision>
<objectTypeName>VdnScope</objectTypeName>
<extendedAttributes/>
<id>vdnscope-2</id>
<clusters>
<cluster>
<cluster>
<objectId>domain-c124</objectId>
<type><typeName>ClusterComputeResource</typeName></type>
<name>vxlan-cluster</name>
<scope><id>datacenter-2</id><objectTypeName>Datacenter</objectTypeName><name>dc1</name></scope>
<extendedAttributes/>
</cluster>
</cluster>
...
</clusters>
<virtualWireCount>10</virtualWireCount>
</vdnScope>
```

Delete a Network Scope

You can delete a network scope.

Example 5-29. Delete network scope

Request:

DELETE https://<vsm-ip>/api/2.0/vdn/scopes/*scopeID*

Reset Communication

Resets communication between NSX Manager and a host or cluster.

Example 5-30. Reset communication

Request

POST https://<nsxmgr-ip>/api/2.0/nwfabric/configure?action=synchronize

Query Features on Cluster

Retrieves all features available on the cluster.

Example 5-31. Query features

Request

POST https://<nsxmgr-ip>/api/2.0/nwfabric/features

Response Body:

```
<featureInfos>
   <!-- Contains multiple featureInfo -->
   <featureInfo>
      <name>{FEATURE NAME}</name>
      <featureId>{FEATURE ID}</featureId>
      <version>{FEATURE VERSION}</version>
   </featureInfo>
<featureInfos>
```

Query Status of Specific Resources

Example 5-32. Query status

Request

GET https://<nsxmgr-ip>/api/2.0/nwfabric/status?resource=<RESOURCE ID>

Response Body:

```
<resourceStatuses>
   <resourceStatus>
      <resource>
         <objectId>{resource id}</objectId>
         <objectTypeName>ClusterComputeResource</objectTypeName>
         <nsxmgrUuid>jfldj</nsxmgrUuid>
         <revision>2</revision>
         <type>
            <typeName>ClusterComputeResource</typeName>
         </type>
         <name>c-1</name>
         <scope>
            <id>datacenter-2</id>
            <objectTypeName>Datacenter</objectTypeName>
            <name>dc-1</name>
         </scope>
         <clientHandle>
         </clientHandle>
         <extendedAttributes/>
      </resource>
      <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.nsxmgr.nwfabric.hostPrep</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>RED</status>
         <message>
         </message>
         <installed>true</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.nsxmgr.vxlan</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>UNKNOWN</status>
         <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.nsxmgr.messagingInfra</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>UNKNOWN</status>
         <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
```

```
        <featureId>com.vmware.vshield.firewall</featureId>
        <featureVersion>5.5</featureVersion>
        <updateAvailable>false</updateAvailable>
        <status>UNKNOWN</status>
        <installed>false</installed>
      </nwFabricFeatureStatus>
    </resourceStatus>
</resourceStatuses>
```

Query Status of Child Resources

Example 5-33. Query status

Request

GET https://<nsxmgr-ip>/api/2.0/nwfabric/status/child/<PARENT RESOURCE ID>

Response Body:

```
<resourceStatuses>
  <resourceStatus>
    <resource>
      <objectId>host-9</objectId>
      <objectTypeName>HostSystem</objectTypeName>
      <nsxmgrUuid>jfldj</nsxmgrUuid>
      <revision>4</revision>
      <type>
        <typeName>HostSystem</typeName>
      </type>
      <name>10.135.14.186</name>
      <scope>
        <id>domain-c34</id>
        <objectTypeName>ClusterComputeResource</objectTypeName>
        <name>c-1</name>
      </scope>
      <clientHandle>
      </clientHandle>
      <extendedAttributes/>
    </resource>
    <nwFabricFeatureStatus>
      <featureId>com.vmware.vshield.nsxmgr.nwfabric.hostPrep</featureId>
      <featureVersion>5.5</featureVersion>
      <updateAvailable>false</updateAvailable>
      <status>RED</status>
      <message>
      </message>
      <installed>true</installed>
    </nwFabricFeatureStatus>
    <nwFabricFeatureStatus>
      <featureId>com.vmware.vshield.nsxmgr.vxlan</featureId>
      <featureVersion>5.5</featureVersion>
      <updateAvailable>false</updateAvailable>
      <status>UNKNOWN</status>
      <installed>false</installed>
    </nwFabricFeatureStatus>
    <nwFabricFeatureStatus>
      <featureId>com.vmware.vshield.nsxmgr.messagingInfra</featureId>
      <featureVersion>5.5</featureVersion>
      <updateAvailable>false</updateAvailable>
      <status>UNKNOWN</status>
      <installed>false</installed>
    </nwFabricFeatureStatus>
    <nwFabricFeatureStatus>
      <featureId>com.vmware.vshield.firewall</featureId>
      <featureVersion>5.5</featureVersion>
      <updateAvailable>false</updateAvailable>
```

```
        <status>UNKNOWN</status>
        <installed>false</installed>
      </nwFabricFeatureStatus>
   </resourceStatus>
</resourceStatuses>
```

Query Status of Resources by Criterion

Example 5-34. Query status

Request

GET https://<nsxmgr-ip>/api/2.0/nwfabric/status/alleligible/<RESOURCE TYPE>

Response Body:

```
<resourceStatuses>
   <resourceStatus>
      <resource>
         <objectId>domain-c34</objectId>
         <objectTypeName>ClusterComputeResource</objectTypeName>
         <nsxmgrUuid>jfldj</nsxmgrUuid>
         <revision>2</revision>
         <type>
            <typeName>ClusterComputeResource</typeName>
         </type>
         <name>c-1</name>
         <scope>
            <id>datacenter-2</id>
            <objectTypeName>Datacenter</objectTypeName>
            <name>dc-1</name>
         </scope>
         <clientHandle>
         </clientHandle>
         <extendedAttributes/>
      </resource>
      <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.nsxmgr.nwfabric.hostPrep</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>RED</status>
         <message>
         </message>
         <installed>true</installed>
         </nwFabricFeatureStatus>
         <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.nsxmgr.vxlan</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>UNKNOWN</status>
         <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.nsxmgr.messagingInfra</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>UNKNOWN</status>
         <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
         <featureId>com.vmware.vshield.firewall</featureId>
         <featureVersion>5.5</featureVersion>
         <updateAvailable>false</updateAvailable>
         <status>UNKNOWN</status>
         <installed>false</installed>
      </nwFabricFeatureStatus>
```

```
    </resourceStatus>
    <resourceStatus>
      <resource>
        <objectId>domain-c32</objectId>
        <objectTypeName>ClusterComputeResource</objectTypeName>
        <nsxmgrUuid>jfldj</nsxmgrUuid>
        <revision>1</revision>
        <type>
          <typeName>ClusterComputeResource</typeName>
        </type>
        <name>c-2</name>
        <scope>
          <id>datacenter-12</id>
          <objectTypeName>Datacenter</objectTypeName>
          <name>dc-2</name>
        </scope>
        <clientHandle>
        </clientHandle>
        <extendedAttributes/>
      </resource>
      <nwFabricFeatureStatus>
        <featureId>com.vmware.vshield.nsxmgr.nwfabric.hostPrep</featureId>
        <updateAvailable>false</updateAvailable>
        <status>UNKNOWN</status>
        <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
        <featureId>com.vmware.vshield.nsxmgr.vxlan</featureId>
        <featureVersion>5.5</featureVersion>
        <updateAvailable>false</updateAvailable>
        <status>UNKNOWN</status>
        <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
        <featureId>com.vmware.vshield.nsxmgr.messagingInfra</featureId>
        <featureVersion>5.5</featureVersion>
        <updateAvailable>false</updateAvailable>
        <status>UNKNOWN</status>
        <installed>false</installed>
      </nwFabricFeatureStatus>
      <nwFabricFeatureStatus>
        <featureId>com.vmware.vshield.firewall</featureId>
        <featureVersion>5.5</featureVersion>
        <updateAvailable>false</updateAvailable>
        <status>UNKNOWN</status>
        <installed>false</installed>
      </nwFabricFeatureStatus>
    </resourceStatus>
</resourceStatuses>
```

Working with Services

The security fabric simplifies and automates deployment of security services and provide a platform for configuration of the elements that are required to provide security to workloads. These elements include:

- Internal components:
  - USVM
  - Endpoint Mux
  - Data Security
  - Logical Firewall
- External components

- Partner OVFs / Vibs
- Partner vendor policy templates

For partner services, the overall workflow begins with registration of services by partner consoles, followed by deployment of the services by the administrator.

Subsequent workflow is as follows:

1 Select the clusters on which to deploy the security fabric (Mux, Traffic filter, USVM).

2 Specify an IP pool to be used with the SVMs (available only if the partner registration indicates requirement of static IPs)

3 Select portgroup (DVPG) to be used for each cluster (a default is pre-populated for the user).

4 Select datastore to be used for each cluster (a default is pre-populated for the user).

5 NSX Manager deploys the components on all hosts of the selected clusters.

Once you deploy the security fabric, an agency defines the configuration needed to deploy agents (host components and appliances). An agency is created per cluster per deployment spec associated with services. Agents are deployed on the selected clusters, and events / hooks for all the relevant actions are generated.

Install Security Fabric

Example 5-35. Install service

Request

```
POST https://<nsxmgr-ip>/api/2.0/si/deploy?startTime=<time>
```

Request Body

```
<clusterDeploymentConfigs>
    <clusterDeploymentConfig>
        <clusterId>cluster-id</clusterId>
        <datastore>ds-id</datastore> <!-- Used only in POST. Should be empty in PUT -->
        <services>
            <serviceDeploymentConfig>
                <serviceId>service-id</serviceId>
                <dvPortGroup>dvpg-id</dvPortGroup>
                <ipPool>ipPool</ipPool>
            </serviceDeploymentConfig>
        </services>
    </clusterDeploymentConfig>
</clusterDeploymentConfigs>
```

where:

- dataStore - Needs to be specified only in POST call. In PUT call, it should be left empty otherwise the call will fail.
- dvPortGroup - This is optional. If not specified, then user will set the Agent using vCenter Server.
- ipPool - This is optional. if not specified, IP address is assigned through DHCP.
- startTime - Time when the deployment task(s) are scheduled for. If this is not specified then deployment will happen immediately.

Service Dependency

Services installed through the security fabric may be dependent on other services. When an internal service is registered, a dependencyMap is maintained with the service-id and implementation type of the internal service.

When partner registers a new service, the security fabric looks up its implementation type in the dependencyMap to identify the service it depends on, if any. Accordingly, a new field in Service object called dependsOn-service-id is populated.

Deploying a Service with a Dependency

Example 5-36. Deploy service

Request

```
POST https://<nsxmgr-ip>/api/2.0/si/deploy
```

Identify Service Dependency

Lists the service on which the specified service depends on.

Example 5-37. Identify service dependency

Request

```
GET https://<nsxmgr-ip>/api/2.0/si/deploy/service/<service-id>/dependsOn
```

Uninstall Service Dependency

Lists the service on which the specified service depends on.

Example 5-38. Uninstall service dependency

Request

```
DELETE https://<nsxmgr-ip>/api/2.0/si/deploy/clutser/<cluster-id>
```

If you try to remove a service on which a service depends on and it is already installed, the un-installation fails.

In order to uninstall services in any order, set parameter ignoreDependency true.

Query Installed Services

Retrieves all services currently deployed on the cluster along with their status.

Example 5-39. Query services

Request

```
GET https://<nsxmgr-ip>/api/2.0/si/deploy/cluster/<cluster-id>
```

Response Body

```
<deployedServices>
 <deployedService>
  <deploymentUnitId>deploymentunit-1</deploymentUnitId>
  <serviceId>service-3</serviceId>
  <cluster>
   <objectId>domain-c41</objectId>
   <objectTypeName>ClusterComputeResource</objectTypeName>
   <nsxmgrUuid>42036483-6CF3-4F0F-B356-2EB1E6369C6F</nsxmgrUuid>
   <revision>2</revision>
   <type>
    <typeName>ClusterComputeResource</typeName>
   </type>
   <name>Cluster-1</name>
   <scope>
    <id>datacenter-21</id>
```

```
      <objectTypeName>Datacenter</objectTypeName>
      <name>nasingh-dc</name>
    </scope>
    <extendedAttributes/>
  </cluster>
  <serviceName>domain-c41_service-3</serviceName>
  <datastore>
    <objectId>datastore-29</objectId>
    <objectTypeName>Datastore</objectTypeName>
    <nsxmgrUuid>42036483-6CF3-4F0F-B356-2EB1E6369C6F</nsxmgrUuid>
    <revision>1</revision>
    <type>
      <typeName>Datastore</typeName>
    </type>
    <name>datastore1</name>
    <extendedAttributes/>
  </datastore>
  <dvPortGroup>
    <objectId>dvportgroup-45</objectId>
    <objectTypeName>DistributedVirtualPortgroup</objectTypeName>
    <nsxmgrUuid>42036483-6CF3-4F0F-B356-2EB1E6369C6F</nsxmgrUuid>
    <revision>2</revision>
    <type>
      <typeName>DistributedVirtualPortgroup</typeName>
    </type>
    <name>dvPortGroup</name>
    <scope>
      <id>datacenter-21</id>
      <objectTypeName>Datacenter</objectTypeName>
      <name>nasingh-dc</name>
    </scope>
    <extendedAttributes/>
  </dvPortGroup>
  <serviceStatus>SUCCEEDED</serviceStatus>
 </deployedService>
</deployedServices>
```

Query Details about a Service

Retrieves detailed information about the service.

Example 5-40. Query service

Request

GET https://<nsxmgr-ip>/api/2.0/si/deploy/cluster/<cluster-id>/service/<service-id>

Response Body

See Example 5-39.

Query Clusters

Retrieves all clusters on which the specified service is installed.

Example 5-41. Query clusters

Request

GET https://<nsxmgr-ip>/api/2.0/si/deploy/service/<service-id>

Response Body

See Example 5-39.

Upgrade Service

Upgrades service to recent version.

Example 5-42. Query clusters

Request

PUT https://<nsxmgr-ip>/api/2.0/si/deploy/?startTime=<time>

Request Body

```
<clusterDeploymentConfigs>
   <clusterDeploymentConfig>
      <clusterId>{clusterId}</clusterId>
      <datastore>{datastoreId}</datastore>
      <services>
         <serviceDeploymentConfig>
            <serviceId>{serviceId}</serviceId>
            <serviceInstanceId>{serviceInstanceId}</serviceInstanceId>
            <dvPortGroup>{dvpg ID}</dvPortGroup>
            <ipPool>{ipPoolId}</ipPool>
         </serviceDeploymentConfig>
      </services>
   </clusterDeploymentConfig>
</clusterDeploymentConfigs>
```

The datastore, dvPortGroup, and ipPool variables should either not be specified or have same value as provided at time of deployment.

Query Agents on Host

Retrieves all agents on the specified host. The response body contains agent IDs for each agent, which you can use to retrieve details about that agent.

Example 5-43. Query agents on host

Request

GET https://<nsxmgr-ip>/api/2.0/si/host/<host-id>/agents

Response Body

```
<fabricAgents>
 <agent>
   <agentId>nsxmgragent-1</agentId>
   <agentName>agent name if present</agentName>
   <serviceId>service-6</serviceId>
   <serviceName>EndpointService</serviceName>
   <operationalStatus>ENABLED</operationalStatus>
   <progressStatus>IN_PROGRESS</progressStatus>
   <vmId>vm-92</vmId>
   <host>host-10</host>
   <allocatedIpAddress>
      <id>2</id>
      <ipAddress>10.112.5.182</ipAddress>
      <gateway>10.112.5.253</gateway>
      <prefixLength>23</prefixLength>
      <dnsServer1>10.112.0.1</dnsServer1>
      <dnsServer2>10.112.0.2</dnsServer2>
      <dnsSuffix>
      </dnsSuffix>
```

```
    <subnetId>subnet-1</subnetId>
  </allocatedIpAddress>
  <serviceStatus>
    <status>WARNING</status>
    <errorId>partner_error</errorId>
    <errorDescription>partner_error</errorDescription>
  </serviceStatus>
  <hostInfo>
    <objectId>host-10</objectId>
    <objectTypeName>HostSystem</objectTypeName>
    <nsxmgrUuid>420369CD-2311-F1F7-D4AA-1158EA688E54</nsxmgrUuid>
    <revision>1</revision>
    <type>
      <typeName>HostSystem</typeName>
    </type>
    <name>10.112.5.173</name>
    <scope>
      <id>domain-c7</id>
      <objectTypeName>ClusterComputeResource</objectTypeName>
      <name>Kaustubh-CL</name>
    </scope>
    <clientHandle>
    </clientHandle>
    <extendedAttributes/>
  </hostInfo>
  <initialData>partner data if present</initialData>
</agent>
</fabricAgents>
```

Query Agent Information

Retrieves agent (agents (host components and appliances)) details.

Example 5-44. Query agent details

Request

```
GET https://<nsxmgr-ip>/api/2.0/si/agent/<agent-id>
```

Response Body

```
<agent>
  <agentId>nsxmgragent-1</agentId>
  <agentName>agent name if present</agentName>
  <serviceId>service-6</serviceId>
  <serviceName>EndpointService</serviceName>
  <operationalStatus>ENABLED</operationalStatus>
  <progressStatus>IN_PROGRESS</progressStatus>
  <vmId>vm-92</vmId>
  <host>host-10</host>
  <allocatedIpAddress>
    <id>2</id>
    <ipAddress>10.112.5.182</ipAddress>
    <gateway>10.112.5.253</gateway>
    <prefixLength>23</prefixLength>
    <dnsServer1>10.112.0.1</dnsServer1>
    <dnsServer2>10.112.0.2</dnsServer2>
    <dnsSuffix>
    </dnsSuffix>
    <subnetId>subnet-1</subnetId>
  </allocatedIpAddress>
  <serviceStatus>
    <status>WARNING</status>
    <errorId>partner_error</errorId>
    <errorDescription>partner_error</errorDescription>
  </serviceStatus>
  <hostInfo>
```

```
      <objectId>host-10</objectId>
      <objectTypeName>HostSystem</objectTypeName>
      <nsxmgrUuid>420369CD-2311-F1F7-D4AA-1158EA688E54</nsxmgrUuid>
      <revision>1</revision>
      <type>
         <typeName>HostSystem</typeName>
      </type>
      <name>10.112.5.173</name>
      <scope>
         <id>domain-c7</id>
         <objectTypeName>ClusterComputeResource</objectTypeName>
         <name>Kaustubh-CL</name>
      </scope>
      <clientHandle>
      </clientHandle>
      <extendedAttributes/>
   </hostInfo>
   <initialData>partner data if present</initialData>
</agent>
```

Query Agents for Deployment

Retrieves all agents for the specified deployment.

Example 5-45. Query agents for deployment

Request

```
GET https://<nsxmgr-ip>/api/2.0/si/deployment/<deploymentunit-id>/agents
```

Response Body

```
<fabricAgents>
 <agent>
   <agentId>nsxmgragent-1</agentId>
   <agentName>agent name if present</agentName>
   <serviceId>service-6</serviceId>
   <serviceName>EndpointService</serviceName>
   <operationalStatus>ENABLED</operationalStatus>
   <progressStatus>IN_PROGRESS</progressStatus>
   <vmId>vm-92</vmId>
   <host>host-10</host>
   <allocatedIpAddress>
      <id>2</id>
      <ipAddress>10.112.5.182</ipAddress>
      <gateway>10.112.5.253</gateway>
      <prefixLength>23</prefixLength>
      <dnsServer1>10.112.0.1</dnsServer1>
      <dnsServer2>10.112.0.2</dnsServer2>
      <dnsSuffix>
      </dnsSuffix>
      <subnetId>subnet-1</subnetId>
   </allocatedIpAddress>
   <serviceStatus>
      <status>WARNING</status>
      <errorId>partner_error</errorId>
      <errorDescription>partner_error</errorDescription>
   </serviceStatus>
   <hostInfo>
      <objectId>host-10</objectId>
      <objectTypeName>HostSystem</objectTypeName>
      <nsxmgrUuid>420369CD-2311-F1F7-D4AA-1158EA688E54</nsxmgrUuid>
      <revision>1</revision>
      <type>
         <typeName>HostSystem</typeName>
      </type>
      <name>10.112.5.173</name>
```

```
      <scope>
        <id>domain-c7</id>
        <objectTypeName>ClusterComputeResource</objectTypeName>
        <name>Kaustubh-CL</name>
      </scope>
      <clientHandle>
      </clientHandle>
      <extendedAttributes/>
    </hostInfo>
    <initialData>partner data if present</initialData>
</agent>
</fabricAgents>
```

Working with Conflicting Agencies

When the NSX Manager database backup is restored to an older point in time, it is possible that deployment units for some EAM Agencies are missing. These APIs help the administrator identify such EAM Agencies and take appropriate action.

Query Conflicts

Retrieves conflicting Deployment Units and EAM Agencies, if any, and the allowed operations on them.

Example 5-46. Query conflicts

Request

```
GET https://<nsxmgr-ip>/api/2.0/si//fabric/sync/conflicts
```

Response Body

```
<fabricSyncConflictInfo>
  <fabricSyncConflictInfo>
  <conflictExist>true</conflictExist>
  <agencies>
    <agenciesInfo>
      <agencyConflictInfo>
        <agencyId>agency-150</agencyId>
        <agencyName>_VCNS_264_nasingh-cluster1_VMware Endpoint</agencyName>
      </agencyConflictInfo>
    </agenciesInfo>
    <allowedOperations>
      <conflictResolverOperation>DELETE</conflictResolverOperation>
      <conflictResolverOperation>RESTORE</conflictResolverOperation>
    </allowedOperations>
  </agencies>
</fabricSyncConflictInfo>
```

Restore Conflicting Agencies

Creates Deployment Units for conflicting EAM Agencies.

Example 5-47. Query conflicts

Request

```
PUT https://<nsxmgr-ip>/api/2.0/si/fabric/sync/conflicts
```

Request Body

```
<conflictResolverInfo>
  <agencyAction>RESTORE</agencyAction>
```

```
</conflictResolverInfo>
```

Delete Conflicting Agencies

Deletes conflicting EAM Agencies.

Example 5-48. Delete conflicts

Request

```
PUT https://<nsxmgr-ip>/api/2.0/si/fabric/sync/conflicts
```

Request Body

```
<conflictResolverInfo>
  <agencyAction>DELETE</agencyAction>
</conflictResolverInfo>
```

Delete Deployment Units

Deletes Deployment Units for conflictingEAM Agencies.

Example 5-49. Query conflicts

Request

```
PUT https://<nsxmgr-ip>/api/2.0/si/fabric/sync/conflicts
```

Request Body

```
<conflictResolverInfo>
  <deploymentUnitAction>DELETE</deploymentUnitAction>
</conflictResolverInfo>
```

Uninstalling Services

Uninstalls the specified services from the specified lusters.

Example 5-50. Uninstall services from a cluster

Request:

```
DELETE https://<vsm-ip>/api/2.0/si/deploy/cluster/<cluster-id>?services=service-id1,service-id2&startTime=<time>
```

where:

- services - list of service id's that needs to be uninstalled from the cluster. If this is not specified then all the services will be uninstalled.
- startTime - time when the uninstall will be scheduled for. If this is not specified then uninstall will happen immediately.

Example 5-51. Uninstall specified service from specified clusters

Request:

```
DELETE
        https://<vsm-ip>/api/2.0/si/deploy/service/<service-id>?clusters=cluster-id1,cluster-id2&startTime=<time>
```

where:

- clusters - list of cluster id's that service needs to be uninstalled from.
- startTime - time when the uninstall will be scheduled for. If this is not specified then uninstall will happen immediately.

Working with Logical Switches

6

A cloud deployment or a virtual data center has a variety of applications across multiple tenants. These applications and tenants require isolation from each other for security, fault isolation, and avoiding overlapping IP addressing issues. The NSX logical switch creates logical broadcast domains or segments to which an application or tenant virtual machine can be logically wired. This allows for flexibility and speed of deployment while still providing all the characteristics of a physical network's broadcast domains (VLANs) without physical Layer 2 sprawl or spanning tree issues.

A logical switch is distributed and can span arbitrarily large compute clusters. This allows for virtual machine mobility (vMotion) within the datacenter without limitations of the physical Layer 2 (VLAN) boundary. The physical infrastructure does not have to deal with MAC/FIB table limits since the logical switch contains the broadcast domain in software.

A logical switch is mapped to a unique VXLAN, which encapsulates the virtual machine traffic and carries it over the physical IP network.

The NSX controller is the central control point for all logical switches within a network and maintains information of all virtual machines, hosts, logical switches, and VXLANs. The controller supports two new logical switch control plane modes, Unicast and Hybrid, These modes decouple NSX from the physical network. VXLANs no longer require the physical network to support multicast in order to handle the Broadcast, Unknown unicast, and Multicast (BUM) traffic within a logical switch. The unicast mode replicates all the BUM traffic locally on the host and requires no physical network configuration. In the hybrid mode, some of the BUM traffic replication is offloaded to the first hop physical switch to achieve better performance. This mode requires IGMP snooping to be turned on the first hop physical switch. Virtual machines within a logical switch can use and send any type of traffic including IPv6 and multicast.

You must be a Security Administrator in order to create VXLAN networks.

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

This chapter includes the following topics:

- "Performing Ping Test" on page 114

Preparing for Logical Switches

Before creating a logical switch, ensure that:

- you have installed the network virtualization components on the appropriate clusters
- you have configured VXLAN on the appropriate clusters

Configuring Switches

You must prepare each vDS by specifying the VLAN for your L2 domain and the MTU for each vDS.

Prepare Switch

The MTU is the maximum amount of data that can be transmitted in one packet before it is divided into smaller packets. The frames are slightly larger in size because of the traffic encapsulation, so the MTU required is higher than the standard MTU. You must set the MTU for each switch to 1600 or higher.

Example 6-1. Prepare switch

Request:

```
POST https://<vsm-ip>/api/2.0/vdn/switches
```

Request Body:

```
<vdsContext>
      <switch>
            <objectId>dvs-26</objectId>
            <type><typeName>DistributedVirtualSwitch</typeName></type>
            <name>My Name</name>
            <revision>0</revision>
            <objectTypeName>DistributedVirtualSwitch</objectTypeName>
      </switch>
      <teaming>ETHER_CHANNEL</teaming>
      <mtu>mtu-value</mtu>
</vdsContext>
```

Query Configured Switches

You can retrieve all configured switches.

Example 6-2. Get all configured switches

Request:

```
GET https://<vsm-ip>/api/2.0/vdn/switches
```

Response Body:

```
<vdsContexts>
      <vdsContext>
      <switch>
            <objectId>dvs-26</objectId>
            <type><typeName>DistributedVirtualSwitch</typeName></type>
            <name>My Name</name>
            <revision>0</revision>
            <objectTypeName>DistributedVirtualSwitch</objectTypeName>
      </switch>
      <teaming>LACP_PASSIVE</teaming>
      <mtu>mtu-value</mtu>
      </vdsContext>
...
```

```
<vdsContext>...</vdsContext>
...
</vdsContexts>
```

Query Configured Switches on Datacenter

You can retrieve all configured switches on a datacenter.

Example 6-3. Get configured switches on a datacenter

Request:

GET https://<vsm-ip>/api/2.0/vdn/switches/datacenter/*datacenterID*

Response Body:

```
<vdsContexts>
    <vdsContext>
    <switch>
        <objectId>dvs-26</objectId>
        <type><typeName>DistributedVirtualSwitch</typeName></type>
        <name>My Name</name>
        <revision>0</revision>
        <objectTypeName>DistributedVirtualSwitch</objectTypeName>
    </switch>
    <teaming>LACP_PASSIVE</teaming>
    <mtu>mtu-value</mtu>
    </vdsContext>
...
<vdsContext>...</vdsContext>
...
</vdsContexts>
```

Query Specific Switch

You can retrieve a specific switch by specifying its ID.

Example 6-4. Get specific switch

Request:

GET https://<vsm-ip>/api/2.0/vdn/switches/*switchID*

Response Body:

```
<vdsContext>
<switch>
    <objectId>dvs-26</objectId>
    <type><typeName>DistributedVirtualSwitch</typeName></type>
    <name>My Name</name>
    <revision>0</revision>
    <objectTypeName>DistributedVirtualSwitch</objectTypeName>
</switch>
<teaming>LACP_PASSIVE</teaming>
<mtu>mtu-value</mtu>
</vdsContext>
```

Delete Switch

You can delete a switch.

Example 6-5. Delete switch

Request:

DELETE https://<vsm-ip>/api/2.0/vdn/switches/*switchID*

Working with Segment IDs

You can specify a segment ID pool to isolate your network traffic.

Add a new Segment ID Range

You can add a segment ID range, from which an ID is automatically assigned to the VXLAN virtual wire.

Example 6-6. Add a segment ID range

Request:

POST https://<vsm-ip>/api/2.0/vdn/config/segments

Request Body:

```
<segmentRanges>
      <segmentRange>
            <id>1</id>
            <name>name</name>
            <desc>desc</desc>
            <begin>1000</begin>
            <end>1500</end>
      </segmentRange>
      <segmentRange>
            ....
      </segmentRange>
            ....
</segmentRanges>
```

The segment range is inclusive – the beginning and ending IDs are included.

Query all Segment ID Ranges

You can retrieve all segment ID ranges.

Example 6-7. Get all Segment ID Ranges

Request:

GET https://<vsm-ip>/api/2.0/vdn/config/segments

Response Body:

```
<segmentRanges>
      <segmentRange>
            <id>1</id>
            <name>name</name>
            <desc>desc</desc>
            <begin>5000</begin>
            <end>9000</end>
      </segmentRange>
      <segmentRange>
            ....
      </segmentRange>
</segmentRanges>
```

Query a Specific Segment ID Range

You can retrieve a segment ID range by specifying the segment ID.

Example 6-8. Get a specific Segment ID Range

Request:

GET https://<vsm-ip>/api/2.0/vdn/config/segments/*SegmentID*

Response Body:

```
<segmentRange>
      <id>1</id>
      <name>name</name>
      <desc>desc</desc>
      <begin>10000</begin>
      <end>11000</end>
</segmentRange>
```

Update a Segment ID Range

You can update the name, description, or end of a segment ID range.

Example 6-9. Update a Segment ID Range

Request:

PUT https://<vsm-ip>/api/2.0/vdn/config/segments/*SegmentID*

Request Body:

```
<segmentRange>
      <end>3000</end>
      <name>name</name>
      <desc>desc</desc>
</segmentRang>
```

Delete a Segment ID Range

You can delete a segment ID range.

Example 6-10. Delete a Segment ID Range

Request:

DELETE https://<vsm-ip>/api/2.0/vdn/config/segments/*SegmentID*

Working with Multicast Address Ranges

Specifying a multicast address range helps in spreading traffic across your network to avoid overloading a single multicast address.A virtualized network-ready host is assigned an IP address from this range.

Add a new Multicast Address Range

You can add a new multicast address range.

Example 6-11. Add a multicast address range

Request:

POST https://<vsm-ip>/api/2.0/vdn/config/multicasts

Request Body:

```
<multicastRanges>
      <multicastRange>
            <id>1</id>
            <name>name</name>
            <desc>desc</desc>
            <begin>239.1.1.1</begin>
            <end>239.3.3.3</end>
      </multicastRange>
      <multicastRange>
            ....
      </multicastRange>
            ....
</multicastRanges>
```

The address range is inclusive – the beginning and ending addresses are included.

Query all Multicast Address Ranges

You can retrieve all multicast address ranges.

Example 6-12. Get all multicast ranges

Request:

```
GET https://<vsm-ip>/api/2.0/vdn/config/multicasts
```

Response Body:

```
<multicastRanges>
      <multicastRange>
            <id>1</id>
            <name>name</name>
            <desc>desc</desc>
            <begin>239.1.1.1</begin>
            <end>239.3.3.3</end>
      </multicastRange>
      <multicastRange>
            ...
      </multicastRange>
            ...
</multicastRanges>
```

Get a Specific Multicast Address Range

You can retrieve a specific multicast address range.

Example 6-13. Get a multicast range

Request:

```
GET https://<vsm-ip>/api/2.0/vdn/config/multicasts/multicastAddressRangeID
```

Response Body:

```
<multicastRange>
      <id>1</id>
      <name>name</name>
      <desc>desc</desc>
      <begin>239.1.1.1</begin>
      <end>239.3.3.3</end>
</multicastRange>
```

Update a Multicast Address Range

You can update the name, description, or end address of a multicast address range.

Example 6-14. Update a multicast range

Request Header:

PUT https://<vsm-ip>/api/2.0/vdn/config/multicasts/*multicastAddressRangeID*

Request Body:

```
<<segmentRange>
      <end>3000</end>
      <name>name</name>
      <desc>desc</desc>
</segmentRang>
```

Delete a Multicast Address Range

You can delete a multicast address range.

Example 6-15. Delete multicast address range

Request:

DELETE https://<vsm-ip>/api/2.0/vdn/config/multicasts/<multicasts/multicasts/
multicastAddressRangeID

Working with Network Scopes

A network scope is the networking infrastructure within provider virtual datacenters.

Create a Network Scope

You must specify the clusters that are to be part of the network scope. You must have the VLAN ID, UUID of the vCenter Server, and vDS ID.

Example 6-16. Create a network scope

Request:

POST https://<vsm-ip>/api/2.0/vdn/scopes

Request Body:

```
<vdnScope>
      <clusters>
            <cluster><cluster><objectId>domain-c59</objectId></cluster></cluster>
      </clusters>
</vdnScope>
```

Edit a Network Scope

You can add a cluster to or delete a cluster from a network scope.

Example 6-17. Create a network scope

Request:

POST https://<vsm-ip>/api/2.0/vdn/scopes/*scopeID*?action=patch

Request Body:

```
<vdnScope>
      <objectId>{id}</objectId>
      <clusters>
            <cluster><cluster><objectId>domain-c59</objectId></cluster></cluster>
      </clusters>
</vdnScope>
```

Update Attributes on a Network Scope

You can update the attributes of a network scope.

Example 6-18. Update attributes of a network scope

Request:

PUT https://<vsm-ip>/api/2.0/vdn/scopes/*scopeID*/attributes

Request Body:

```
<vdnScope>
      <objectId>vdnScope-1</objectId>
      <name>new name</name>
      <description>new description</description>
</vdnScope>
```

Query existing Network Scopes

You can retrieve all existing network scopes.

Example 6-19. Get all network scopes

Request:

GET https://<vsm-ip>/api/2.0/vdn/scopes

Response Body:

```
<vdnScopes>
<vdnScope>
<objectId>vdnscope-2</objectId>
<type><typeName>VdnScope</typeName></type>
<name>My Name</name>
<description>My Description</description>
<revision>0</revision>
<objectTypeName>VdnScope</objectTypeName>
<extendedAttributes/>
<id>vdnscope-2</id>
<clusters>
<cluster>
<cluster>
<objectId>domain-c124</objectId>
<type><typeName>ClusterComputeResource</typeName></type>
<name>vxlan-cluster</name>
<scope><id>datacenter-2</id><objectTypeName>Datacenter</objectTypeName><name>dc1</name></scope>
<extendedAttributes/>
</cluster>
</cluster>
...
</clusters>
<virtualWireCount>10</virtualWireCount>
</vdnScope>
...
<vdnScope>...</vdnScope>
...
```

```
</vdnScopes>
```

Query a Specific Network Scope

You can retrieve a specific network scope.

Example 6-20. Get a network scope

Request:

```
GET https://<vsm-ip>/api/2.0/vdn/scopes/scopeID
```

Response Body:

```
<vdnScope>
<objectId>vdnscope-2</objectId>
<type><typeName>VdnScope</typeName></type>
<name>My Name</name>
<description>My description</description>
<revision>0</revision>
<objectTypeName>VdnScope</objectTypeName>
<extendedAttributes/>
<id>vdnscope-2</id>
<clusters>
<cluster>
<cluster>
<objectId>domain-c124</objectId>
<type><typeName>ClusterComputeResource</typeName></type>
<name>vxlan-cluster</name>
<scope><id>datacenter-2</id><objectTypeName>Datacenter</objectTypeName><name>dc1</name></scope>
<extendedAttributes/>
</cluster>
</cluster>
...
</clusters>
<virtualWireCount>10</virtualWireCount>
</vdnScope>
```

Delete a Network Scope

You can delete a network scope.

Example 6-21. Delete network scope

Request:

```
DELETE https://<vsm-ip>/api/2.0/vdn/scopes/scopeID
```

Working with Virtualized Networks

A VXLAN virtual wire is a collection of vDS port groups across multiple virtual distributes switches (vDS) within a network scope.

Create a VXLAN Virtual Wire

You can create a new VXLAN virtual wire on the specified network scope. You must have defined a segment ID range and a multicast address range before creating a VXLAN virtual wire.

The default value of the controlPlaneMode parameter is the value specified for the transport zone.

Example 6-22. Create a VXLAN virtual wire

Request:

POST https://<vsm-ip>/api/2.0/vdn/scopes/*scopeID*/virtualwires

Request Body:

```
<virtualWireCreateSpec>
    <name>virtual wire name</name>
    <description>virtual wire description</description>
    <tenantId>virtual wire tenant</tenantId>
    <controlPlaneMode>UNICAST_MODE</controlPlaneMode>...<!-- Optional. Default is the value specified for the transport
                zone. -->
</virtualWireCreateSpec>
```

Query all VXLAN Virtual Wires on a Network Scope

You can retrieve all VXLAN virtual wires on the specified network scope.

Example 6-23. Get all VXLAN virtual wires

Request:

```
GET https://<vsm-ip>/api/2.0/vdn/scopes/scopeID/virtualwires
Response Body:
<virtualWires>
    <sortedDataPage>
        <datapart class="virtualWire">
            <objectId>virtualwire-1</objectId>
            <name>vWire1</name>
            <description>virtual wire 1</description>
            <tenantId>virtual wire tenant</tenantId>
            <revision>0</revision>
            <vdnScopeId>vdnscope-7</vdnScopeId>
            <vdsContextWithBacking>
                <teaming>ETHER_CHANNEL</teaming>
                <switchId>dvs-81</switchId>
                <backingType>portgroup</backingType>
                <backingValue>dvportgroup-88</backingValue>
            </vdsContextWithBacking>
            <vdnId>5002</vdnId>
            <multicastAddr>239.0.0.3</multicastAddr>
        </datapart>
        ....
        <datapart class="virtualWire">
        ....
        </datapart>
        <pagingInfo>
            <pageSize>20</pageSize>
            <startIndex>0</startIndex>
            <totalCount>3</totalCount>
            <sortOrderAscending>false</sortOrderAscending>
        </pagingInfo>
    </sortedDataPage>
</virtualWires>
```

Query all VXLAN Virtual Wires on all Network Scopes

You can retrieve all VXLAN virtual wires across all network scopes.

Example 6-24. Get all VXLAN virtual wires on all network scopes

Request:

GET https://<vsm-ip>/api/2.0/vdn/virtualwires

Response Body:

```
</virtualWires>
    <sortedDataPage>
        <datapart class="virtualWire">
        <objectId>virtualwire-1</objectId>
        <name>vWire1</name>
        <description>virtual wire 1</description>
        <tenantId>virtual wire tenant</tenantId>
        <revision>0</revision>
        <vdnScopeId>vdnscope-7</vdnScopeId>
        <vdsContextWithBacking>
            <teaming>ETHER_CHANNEL</teaming>
            <switchId>dvs-81</switchId>
            <backingType>portgroup</backingType>
            <backingValue>dvportgroup-88</backingValue>
        </vdsContextWithBacking>
        <vdnId>5002</vdnId>
        <multicastAddr>239.0.0.3</multicastAddr>
        </datapart> ....
            <datapart class="virtualWire"> ....
        </datapart>
        <pagingInfo>
            <pageSize>20</pageSize>
            <startIndex>0</startIndex>
            <totalCount>3</totalCount>
            <sortOrderAscending>false</sortOrderAscending>
        </pagingInfo>
    </sortedDataPage>
</virtualWires>
```

Query a Specific VXLAN Virtual Wire

You can retrieve the definition for a VXLAN virtual wire.

Example 6-25. Get a VXLAN virtual wire definition

Request:

GET https://<vsm-ip>/api/2.0/vdn/virtualwires/*virtualWireID*

Response Body:

```
<virtualWire>
    <name>Test Virtual Wire</name>
    <description>Test Virtual Wire Description</description>
    <objectid>virtualwire-4</objectid>
    <vdnScopeId>vdnscope-3</vdnScopeId>
    <revision>1</revision>
    <vdsContextWithBacking>
        <teaming>ETHER_CHANNEL</teaming>
        <switchId>dvs-162</switchId>
        <backingType>PortGroup</backingType>
        <backingValue>pg-moid</backingValue>
    </vdsContextWithBacking>
    <vdnId>5002</vdnId>
    <multicastAddr>239.0.0.3</multicastAddr>
</virtualWire>
```

Modify Control Plane Mode

You can modify the control plane mode of a logical switch. The possible options are:

- **Multicast**: Multicast IP addresses on physical network is used for the control plane. This mode is
- recommended only when you are upgrading from older VXLAN deployments. Requires
- PIM/IGMP on physical network.
- n **Unicast** : The control plane is handled by an NSX controller. All unicast traffic leverages headend
- replication. No multicast IP addresses or special network configuration is required.
- n **Hybrid** : The optimized unicast mode. Offloads local traffic replication to physical network (L2
- multicast). This requires IGMP snooping on the first-hop switch, but does not require PIM. Firsthop
- switch handles traffic replication for the subnet.

Delete a VXLAN Virtual Wire

You can delete a VXLAN virtual Wire.

Example 6-26. Delete virtual wire

Request:

DELETE https://<vsm-ip>/api/2.0/vdn/virtualwires/*virtualWireID*

Managing the VXLAN Virtual Wire UDP Port

You can retrieve or update the UDP port.

Get UDP Port

You can retrieve the UDP port for the VXLAN virtual wire.

Example 6-27. Get UDP port

Request:

Get https://<vsm-ip>/api/2.0/vdn/config/vxlan/udp/port

Update UDP Port

You can change the UDP port for the VXLAN virtual wire. If not set, the port defaults to port 8472.

Example 6-28. Change UDP port

Request:

PUT https://<vsm-ip>/api/2.0/vdn/config/vxlan/udp/port/*port*

Querying Allocated Resources

You can retrieve a list of resources allocated to VXLAN virtual wires in your network.

Example 6-29. Get resources

Get segment IDs allocated to VXLAN virtual wires:

GET https://<vsm-ip>/api/2.0/vdn/config/resources/allocated?type=segmentId&pagesize={pageSize}&startindex={startIndex}

Get multicast address range allocated to VXLAN virtual wires:

```
GET https://<vsm-ip>/api/2.0/vdn/config/resources/allocated?type=multicastAddress&pagesize={pageSize}&startindex={startIndex}
```

where

- start index is an optional parameter which specifies the starting point for retrieving the resources. If this parameter is not specified, resources are retrieved from the beginning.
- page size is an optional parameter that limits the maximum number of entries returned by the API. The default value for this parameter is 256 and the valid range is 1-1024.

Testing Multicast Group Connectivity

You can perform a multicast group connectivity test in a network scope or VXLAN virtual wire.

Test Multicast Group Connectivity in a Network Scope

Example 6-30. Test multicast group connectivity in network scope

Request:

```
PUT https://<vsm-ip>/api/2.0/vdn/scopes/ScopeID/conn-check/multicast
```

Request Body:

```
<testParameters>
      <gateway>172.23.233.1</gateway>
      <packetSize>1600</packetSize>
      <expectedResponse>5</expectedResponse>
      <returnHopCount>true</returnHopCount>
      <returnRecordIp>true</returnRecordIp>
      <sourceHost>
      <hostId>host-9</hostId>
      <switchId>dvs-22</switchId>
      <vlanId>54</vlanId>
      <sourceHost>
      <destinationHost>
      <hostId>host-92</hostId>
      <switchId>dvs-22</switchId>
      <vlanId>54</vlanId>
      <destinationHost>
</testParameters>
```

Test Multicast Group Connectivity in a VXLAN Virtual Wire

Example 6-31. Test multicast group connectivity in virtual wire

Request:

```
PUT https://<vsm-ip>/api/2.0/vdn/scopes/virtualWireID/conn-check/multicast
```

Request Body:

```
<testParameters>
      <gateway>172.23.233.1</gateway>
      <packetSize>1600</packetSize>
      <expectedResponse>5</expectedResponse>
      <returnHopCount>true</returnHopCount>
      <returnRecordIp>true</returnRecordIp>
      <sourceHost>
      <hostId>host-9</hostId>
      <switchId>dvs-22</switchId>
      <vlanId>54</vlanId>
      <sourceHost>
      <destinationHost>
```

```
        <hostId>host-92</hostId>
        <switchId>dvs-22</switchId>
        <vlanId>54</vlanId>
        <destinationHost>
</testParameters>
```

Performing Ping Test

You can perform a point to point connectivity test between two hosts across which a VXLAN virtual wire spans.

Example 6-32. Perform point to point test

Request:

PUT https://<vsm-ip>/api/2.0/vdn/virtualwires/*virtualWireID*/conn-check/p2p

Request Body:

```
<testParameters>
        <gateway>172.23.233.1</gateway>
        <packetSize>1600</packetSize>
        <expectedResponse>5</expectedResponse>
        <returnHopCount>true</returnHopCount>
        <returnRecordIp>true</returnRecordIp>
        <sourceHost>
        <hostId>host-9</hostId>
        <switchId>dvs-22</switchId>
        <vlanId>54</vlanId>
        <sourceHost>
        <destinationHost>
        <hostId>host-92</hostId>
        <switchId>dvs-22</switchId>
        <vlanId>54</vlanId>
        <destinationHost>
</testParameters>
```

NSX Edge Logical Router Installation and Management 7

NSX Edge Logical Router provides East-West distributed routing with tenant IP address space and data path isolation. Virtual machines or workloads that reside on the same host on different subnets can communicate with one another without having to traverse a traditional routing interface. A logical router can have eight uplink interfaces and up to a thousand internal interfaces.

For information on retrieving objects IDs, see “” on page 33.

This chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See “Using the NSX REST API” on page 25 for details about basic authorization.

Installing a Logical Router

Before installing a logical router, you must prepare the hosts on the appropriate clusters. For more information, see “Working with Network Virtualization Components” on page 76.

A logical router can have eight uplink interfaces and up to a thousand internal interfaces.

The user specified configuration is stored in the database and Edge identifier is returned to the user. This identifier must be used for future configurations on the given Edge.

If any appliance(s) are specified and at-least one connected interface/vnic is specified, then the appliance(s) are deployed and configuration is applied to them.

Example 7-1. Install a logical router

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges
```

Request Body:

```
<edge>
<datacenterMoid>datacenter-2</datacenterMoid>
<type>distributedRouter</type>                <!-- Mandatory to create "distributedRouter" edge. When absent, defaults to
                        "gatewayServices" -->
<appliances>                                  <!-- Mandatory for "distributedRouter" edge. Atleast one appliance needs to be configured -->
<appliance>
<resourcePoolId>resgroup-20</resourcePoolId>
<datastoreId>datastore-23</datastoreId>
</appliance>
```

```
</appliances>
<mgmtInterface>                          <!-- Mandatory for "distributedRouter" edge -->
<connectedToId>dvportgroup-38</connectedToId>
<addressGroups>
<addressGroup>
<primaryAddress>10.112.196.165</primaryAddress>
<subnetMask>255.255.252.0</subnetMask>
</addressGroup>
</addressGroups>
</mgmtInterface>
<interfaces>                             <!-- Optional. Can be added later using modular APIs. Upto 999 interfaces supported. -->
<interface>
<type>uplink</type>
<mtu>1500</mtu>
<isConnected>true</isConnected>
<addressGroups>                  <!-- Supports one or more addressGroups -->
<addressGroup>                <!-- AddressGroup on "distributedRouter" edge can have only primary ipAddresses. Secondary addresses
                        not supported -->
<primaryAddress>192.168.10.1</primaryAddress>     <!-- "distributedRouter" edge only supports IPv4 addresses -->
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<connectedToId>dvportgroup-39</connectedToId>    <!-- "distributedRouter" edge does not support legacy portGroups -->
</interface>
<interface>
<type>internal</type>
<mtu>1500</mtu>
<isConnected>true</isConnected>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.20.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<connectedToId>dvportgroup-40</connectedToId>
</interface>
</interfaces>
</edge>
```

IMPORTANT The location header returns the edgeId of the installed router. You must use this ID to configure and manage this NSX Edge instance.

Query a Logical Router

Retrieves information about the specified router.

Example 7-2. Query a router

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}
```

Response Body:

```
<edgeSummaries>
<edge>
<id>edge-15</id>
<version>21</version>
<status>deployed</status>
<datacenterMoid>datacenter-2</datacenterMoid>
<datacenterName>Datacenter</datacenterName>
<tenant>default</tenant>
<name>vShield-edge-15</name>
<fqdn>vShield-edge-15</fqdn>
<enableAesni>true</enableAesni>
<enableFips>false</enableFips>
<vseLogLevel>info</vseLogLevel>
```

```
<appliances>
<applianceSize>compact</applianceSize>
<appliance>
<highAvailabilityIndex>0</highAvailabilityIndex>
<vcUuid>422f63b1-bb0e-ba50-3aae-4be1263db676</vcUuid>
<vmId>vm-62</vmId>
<resourcePoolId>resgroup-20</resourcePoolId>
<resourcePoolName>Resources</resourcePoolName>
<datastoreId>datastore-23</datastoreId>
<datastoreName>shahm-esx-storage</datastoreName>
<hostId>host-22</hostId>
<hostName>10.112.196.160</hostName>
<vmFolderId>group-v3</vmFolderId>
<vmFolderName>vm</vmFolderName>
<vmHostname>vShield-edge-15-0</vmHostname>
<vmName>vShield-edge-15-0</vmName>
<deployed>true</deployed>
<edgeId>edge-15</edgeId>
</appliance>
</appliances>
<cliSettings>
<remoteAccess>false</remoteAccess>
<userName>admin</userName>
</cliSettings>
<type>distributedRouter</type>
<mgmtInterface>
<label>vNic_0</label>
<name>mgmtInterface</name>
<addressGroups>
<addressGroup>
<primaryAddress>10.112.196.166</primaryAddress>
<subnetMask>255.255.252.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<index>0</index>
<connectedToId>dvportgroup-38</connectedToId>
<connectedToName>DvPortGroup1</connectedToName>
</mgmtInterface>
<interfaces>
<interface>
<label>vNic_1</label>
<name>interface1</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.10.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>uplink</type>
<isConnected>true</isConnected>
<index>1</index>
<connectedToId>dvportgroup-39</connectedToId>
<connectedToName>dvport-vlan-1</connectedToName>
</interface>
<interface>
<label>75649aea0000000a</label>
<name>interface10</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.20.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>internal</type>
<isConnected>true</isConnected>
```

```
<index>10</index>
<connectedToId>dvportgroup-40</connectedToId>
<connectedToName>dvport-vlan-2</connectedToName>
</interface>
<interface>
<label>75649aea0000000b</label>
<name>interface-11</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.50.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>internal</type>
<isConnected>true</isConnected>
<index>11</index>
<connectedToId>dvportgroup-37</connectedToId>
<connectedToName>DvSwitch2-DVUplinks-36</connectedToName>
</interface>
</interfaces>
<edgeAssistId>1969527530</edgeAssistId>
</edge>
```

Modify a Router

Replaces the configuration of the specified router.

Example 7-3. Modify router

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}
```

Request Body:

See Example 7-1.

Deleting a Router

You can delete a logical router instance. Appliances associated with the router instance are deleted as well.

Example 7-4. Delete a router

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>
```

Working with Interfaces

An NSX Edge router can have eight uplink interfaces and up to a thousand internal interfaces. It must have at least one internal interface before it can be deployed.

Working with Management Interfaces

Configure Management Interfaces

Configure management interfaces for an NSX Edge router.

Example 7-5. Configure management interfaces

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId/mgmtinterface

Request Body:

```
<mgmtInterface>
<addressGroups>
<addressGroup>
<primaryAddress>10.112.196.166</primaryAddress>
<subnetMask>255.255.252.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<connectedToId>dvportgroup-38</connectedToId>
</mgmtInterface>
```

Query Management Interfaces

Retrieves all management interfaces for the specified NSX Edge router.

Example 7-6. Query interfaces

Request:

GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId/mgmtinterface

Response Body:

```
<mgmtInterface>
<label>vNic_0</label>
<name>mgmtInterface</name>
<addressGroups>
<addressGroup>
<primaryAddress>10.112.196.166</primaryAddress>
<subnetMask>255.255.252.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<index>0</index>
<connectedToId>dvportgroup-38</connectedToId>
<connectedToName>DvPortGroup1</connectedToName>
</mgmtInterface>
```

Working with all Interfaces

An NSX Edge router can have up to 8 uplink interfaces.

Add Interfaces

Configures one or more interface for an NSX Edge Router. The specified configuration is stored in the database. If any appliance(s) is associated with this Edge Edge instance, the specified configuration is applied to the appliance as well.

You should not define a index for the new addition of interfaces. The indexes are system-generated To update the existing interfaces, include them in the XML with the system-generated indexes (can be obtained by a GET call).

Example 7-7. Add an interface

Request:

POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces/?action=patch

Request Body:

```
<interfaces>
<interface>
<name>interface1</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.10.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>uplink</type>
<isConnected>true</isConnected>
<connectedToId>dvportgroup-39</connectedToId>
</interface>
<interface>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.20.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>internal</type>
<isConnected>true</isConnected>
<connectedToId>dvportgroup-40</connectedToId>
</interface>
<interface>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.50.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>internal</type>
<isConnected>true</isConnected>
<connectedToId>dvportgroup-37</connectedToId>
</interface>
</interfaces>
```

Query Interfaces for a NSX Edge Router

Retrieves all interfaces for the specified Edge router.

Example 7-8. Retrieve all interfaces

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces
```

Response Body:

```
<interfaces>
<interface>
<label>vNic_1</label>
<name>interface1</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.10.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>uplink</type>
<isConnected>true</isConnected>
```

<index>1</index>
<connectedToId>dvportgroup-39</connectedToId>
<connectedToName>dvport-vlan-1</connectedToName>
</interface>
<interface>
<label>75649aea0000000a</label>
<name>interface10</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.20.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>internal</type>
<isConnected>true</isConnected>
<index>10</index>
<connectedToId>dvportgroup-40</connectedToId>
<connectedToName>dvport-vlan-2</connectedToName>
</interface>
<interface>
<label>75649aea0000000b</label>
<name>interface-11</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.50.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>internal</type>
<isConnected>true</isConnected>
<index>11</index>
<connectedToId>dvportgroup-37</connectedToId>
<connectedToName>DvSwitch2-DVUplinks-36</connectedToName>
</interface>
</interfaces>

Delete Interfaces

Deletes one or more interfaces for an NSX Edge Router. Stores the specified configuration in database. If any appliance(s) are associated with this edge, disconnects and deletes the interface.

Example 7-9. Delete interface

Request:

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces/?index=<index1>&index=<index2>

Delete all Interfaces

Deletes all interfaces for an NSX Edge Router. Stores the specified configuration in database. If any appliance(s) are associated with this edge, disconnects and deletes the interface.

Example 7-10. Delete all interfaces

Request:

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces

Manage an NSX Edge Router Interface

You can manage a specific NSX Edge router interface.

Retrieve Interface with Specific Index

Retrieves the interface with specified index for a Edge Edge.

Example 7-11. Get interface with specific index

Request:

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces/*index*

Response Body:

```
<interface>
<label>vNic_1</label>
<name>interface1</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.10.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>uplink</type>
<isConnected>true</isConnected>
<index>1</index>
<connectedToId>dvportgroup-39</connectedToId>
<connectedToName>dvport-vlan-1</connectedToName>
</interface>
```

Modify an Interface

Modifies the specified interface.

Example 7-12. Modify interface

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces/<index>

Response Body:

```
<interface>
<name>interface1</name>
<addressGroups>
<addressGroup>
<primaryAddress>192.168.10.1</primaryAddress>
<subnetMask>255.255.255.0</subnetMask>
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<type>uplink</type>
<isConnected>true</isConnected>
<connectedToId>dvportgroup-39</connectedToId>
</interface>
```

Delete Interface Configuration

Deletes the interface configuration and resets it to the factory default.

Example 7-13. Delete interface configuration

Request:

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/interfaces/*index*

Configure Routes

Configures globalConfig, staticRouting, OSPG, BGP, and IS-IS routes.

Example 7-14. Configure routes

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config

Request Body:

```
<routing>
  <routingGlobalConfig>
     <routerId>1.1.1.1</routerId>  <!-- Required when dynamic routing protocols like OSPF, BGP, IS-IS is configured -->
     <logging>                  <!-- Optional. When absent, enable=false and logLevel=INFO -->
       <enable>false</enable>
       <logLevel>info</logLevel>
     </logging>
     <ipPrefixes>   <!-- Optional. Required only if user wants to define redistribution rules in dynamic routing protocols like ospf, isis,
                         bgp -->
      <ipPrefix>
        <name>a</name>    <!-- All the defined ipPrefix must have unique names -->
        <ipAddress>10.112.196.160/24</ipAddress>
      </ipPrefix>
      <ipPrefix>
        <name>b</name>
        <ipAddress>192.168.10.0/24</ipAddress>
      </ipPrefix>
    </ipPrefixes>
  </routingGlobalConfig>
  <staticRouting>
   <staticRoutes>   <!-- Optional, if no static routes needs to be configured -->
    <route>
      <description>route1</description>
      <vnic>0</vnic>
      <network>3.1.1.0/22</network>
      <nextHop>172.16.1.14</nextHop>
      <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                         interface on which this route is configured -->
    </route>
    <route>
      <description>route2</description>
      <vnic>1</vnic>
      <network>4.1.1.0/22</network>
      <nextHop>10.112.196.118</nextHop>
      <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                         interface on which this route is configured -->
    </route>
   </staticRoutes>
   <defaultRoute>      <!-- Optional, if no default routes needs to be configured -->
    <description>defaultRoute</description>
    <vnic>0</vnic>
    <gatewayAddress>172.16.1.12</gatewayAddress>
    <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the interface
                         on which this route is configured -->
   </defaultRoute>
  </staticRouting>
 <ospf>            <!-- Optional, if no OSPF needs to be configured -->
  <enabled>true</enabled>      <!-- Optional. Defaults to true -->
```

```
<forwardingAddress>192.168.10.2</forwardingAddress>   <!-- ipAddress on one of the uplink interfaces -->
<protocolAddress>192.168.10.3</protocolAddress>     <!-- ipAddress on the same subnet as the forwardingAddress -->
<ospfAreas>
 <ospfArea>
  <areaId>100</areaId> <!-- Mandatory and unique. Valid values are 0-4294967295 -->
  <type>normal</type> <!-- Optional. Default is normal. Valid inputs are normal, stub -->
  <authentication>          <!-- Optional. When not specified, its "none" authentication. -->
    <type>password</type>   <!-- Valid values are none, password , md5 -->
    <value>vmware123</value>  <!-- Value as per the type of authentication -->
  </authentication>
 </ospfArea>
</ospfAreas>
<ospfInterfaces>
 <ospfInterface>
  <vnic>0</vnic>
  <areaId>100</areaId>
  <helloInterval>10</helloInterval> <!-- Optional. Default 10 sec. Valid values are 1-255-->
  <deadInterval>40</deadInterval>  <!-- Optional. Default 40 sec.  Valid values are 1-65535 -->
  <priority>128</priority> <!-- Optional. Default 128. Valid values are 0-255 -->
  <cost>10</cost> <!-- Optional. Auto based on interface speed. Valid values are 1-65535 -->
 </ospfInterface>
 </ospfInterfaces>
 <redistribution>
  <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
  <rules>
   <rule>
    <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                routingGlobalConfig->ipPrefixes -->
    <from>
     <isis>true</isis>          <!-- Optional. Defaults to false -->
     <ospf>false</ospf>         <!-- Optional. Defaults to false -->
     <bgp>false</bgp>           <!-- Optional. Defaults to false -->
     <static>false</static>     <!-- Optional. Defaults to false -->
     <connected>true</connected>  <!-- Optional. Defaults to false -->
    </from>
    <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
   </rule>
   <rule>
    <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                routingGlobalConfig->ipPrefixes -->
    <from>
     <isis>false</isis>          <!-- Optional. Defaults to false -->
     <ospf>false</ospf>         <!-- Optional. Defaults to false -->
     <bgp>true</bgp>           <!-- Optional. Defaults to false -->
     <static>false</static>     <!-- Optional. Defaults to false -->
     <connected>false</connected>  <!-- Optional. Defaults to false -->
    </from>
    <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
   </rule>
  </rules>
 </redistribution>
</ospf>
<bgp>       <!-- Optional, if no BGP needs to be configured -->
<enabled>true</enabled>     <!-- Optional. Default is true -->
<localAS>65535</localAS>          <!-- Valid values are : 0-65535 -->
<bgpNeighbours>
 <bgpNeighbour>
  <ipAddress>192.168.10.10</ipAddress>  <!-- Peer's IP. IPv4 only. Should not be same as any of interfaces's
                IPs,forwardingAddress,protocolAddress -->
  <forwardingAddress>192.168.1.10</forwardingAddress>   <!-- Address defined on one of the uplink interfaces's -->
  <protocolAddress>192.168.1.11</protocolAddress>       <!-- Address in the above same subnet as the forwardingAddress -->
  <remoteAS>65500</remoteAS>         <!-- Valid values are 1-65534 -->
  <weight>60</weight>                  <!-- Optional. Default is 60. Valid values are 0-65535 -->
  <holdDownTimer>180</holdDownTimer>      <!-- Optional. Default is 180 seconds. Valid values are : 2-65535. -->
  <keepAliveTimer>60</keepAliveTimer>     <!-- Optional. Default is 60 seconds. Valid values are : 1-65534. -->
  <password>vmware123</password>          <!-- Optional -->
  <bgpFilters>                        <!-- Optional -->
   <bgpFilter>
```

```
        <direction>in</direction>       <!-- Valid values are in/out -->
        <action>permit</action>         <!-- Valid values are permit/deny -->
        <network>10.0.0.0/8</network>   <!-- Valid values are CIDR networks. IPv4 only. IPv6 support not supported -->
        <ipPrefixGe>17</ipPrefixGe>   <!-- Optional. "Greater than or equal to" & used for filtering based on prefix length. Valid
                IPv4 prefixes -->
        <ipPrefixLe>32</ipPrefixLe>   <!-- Optional. "Less than or equal to" & used for filtering based on prefix length. Valid IPv4
                prefixes -->
      </bgpFilter>
    </bgpFilters>
  </bgpNeighbour>
 </bgpNeighbours>
 <redistribution>
   <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
   <rules>
    <rule>
     <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                routingGlobalConfig->ipPrefixes -->
     <from>
      <isis>true</isis>          <!-- Optional. Defaults to false -->
      <ospf>true</ospf>          <!-- Optional. Defaults to false -->
      <bgp>false</bgp>           <!-- Optional. Defaults to false -->
      <static>true</static>      <!-- Optional. Defaults to false -->
      <connected>false</connected>  <!-- Optional. Defaults to false -->
     </from>
     <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
    </rule>
    <rule>
     <from>
      <isis>false</isis>          <!-- Optional. Defaults to false -->
      <ospf>false</ospf>          <!-- Optional. Defaults to false -->
      <bgp>false</bgp>            <!-- Optional. Defaults to false -->
      <static>false</static>      <!-- Optional. Defaults to false -->
      <connected>true</connected>  <!-- Optional. Defaults to false -->
     </from>
     <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
    </rule>
   </rules>
  </redistribution>
 </bgp>
</routing>
```

Query Routes

Retrieves global, static, OSPF, BGP, and ISIS configurations.

Example 7-15. Retrieve routes

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
 <routing>
  <routingGlobalConfig>
    <routerId>1.1.1.1</routerId>
    <logging>
      <enable>false</enable>
      <logLevel>info</logLevel>
    </logging>
    <ipPrefixes>
     <ipPrefix>
      <name>a</name>
      <ipAddress>10.112.196.160/24</ipAddress>
     </ipPrefix>
     <ipPrefix>
      <name>b</name>
      <ipAddress>192.168.10.0/24</ipAddress>
```

```
      </ipPrefix>
     </ipPrefixes>
    </routingGlobalConfig>
    <staticRouting>
     <staticRoutes>
      <route>
       <description>route1</description>
       <vnic>0</vnic>
       <network>3.1.1.0/22</network>
       <nextHop>172.16.1.14</nextHop>
       <mtu>1500</mtu>
       <type>user</type>
      </route>
      <route>
       <description>route2</description>
       <vnic>1</vnic>
       <network>4.1.1.0/22</network>
       <nextHop>10.112.196.118</nextHop>
       <mtu>1500</mtu>
       <type>user</type>
      </route>
     </staticRoutes>
     <defaultRoute>
      <description>defaultRoute</description>
      <vnic>0</vnic>
      <gatewayAddress>172.16.1.12</gatewayAddress>
      <mtu>1500</mtu>
     </defaultRoute>
    </staticRouting>
    <ospf>
     <enabled>true</enabled>
     <forwardingAddress>192.168.10.2</forwardingAddress>
     <protocolAddress>192.168.10.3</protocolAddress>
     <ospfAreas>
      <ospfArea>
       <areaId>100</areaId>
       <type>normal</type>
       <authentication>
        <type>password</type>
        <value>vmware123</value>
       </authentication>
      </ospfArea>
     </ospfAreas>
     <ospfInterfaces>
      <ospfInterface>
       <vnic>0</vnic>
       <areaId>100</areaId>
       <helloInterval>10</helloInterval>
       <deadInterval>40</deadInterval>
       <priority>128</priority>
       <cost>10</cost>
      </ospfInterface>
     </ospfInterfaces>
     <redistribution>
      <enabled>true</enabled>
      <rules>
       <rule>
        <id>1</id>
        <prefixName>a</prefixName>
        <from>
         <isis>true</isis>
         <ospf>false</ospf>
         <bgp>false</bgp>
         <static>false</static>
         <connected>true</connected>
        </from>
        <action>deny</action>
       </rule>
```

```
        <rule>
          <id>0</id>
          <prefixName>b</prefixName>
          <from>
            <isis>false</isis>
            <ospf>false</ospf>
            <bgp>true</bgp>
            <static>false</static>
            <connected>false</connected>
          </from>
          <action>permit</action>
        </rule>
      </rules>
    </redistribution>
  </ospf>
  <bgp>
  <enabled>true</enabled>
  <localAS>65535</localAS>
  <bgpNeighbours>
    <bgpNeighbour>
      <ipAddress>192.168.10.10</ipAddress>
      <forwardingAddress>192.168.1.10</forwardingAddress>
      <protocolAddress>192.168.1.11</protocolAddress>
      <remoteAS>65500</remoteAS>
      <weight>60</weight>
      <holdDownTimer>180</holdDownTimer>
      <keepAliveTimer>60</keepAliveTimer>
      <password>vmware123</password>
      <bgpFilters>
        <bgpFilter>
          <direction>in</direction>
          <action>permit</action>
          <network>10.0.0.0/8</network>
          <ipPrefixGe>17</ipPrefixGe>
          <ipPrefixLe>32</ipPrefixLe>
        </bgpFilter>
        <bgpFilter>
          <direction>out</direction>
          <action>deny</action>
          <network>20.0.0.0/26</network>
        </bgpFilter>
      </bgpFilters>
    </bgpNeighbour>
  </bgpNeighbours>
  <redistribution>
   <enabled>true</enabled>
   <rules>
     <rule>
       <id>1</id>
       <prefixName>a</prefixName>
       <from>
         <isis>true</isis>
         <ospf>true</ospf>
         <bgp>false</bgp>
         <static>true</static>
         <connected>false</connected>
       </from>
       <action>deny</action>
     </rule>
     <rule>
       <id>0</id>
        <from>
          <isis>false</isis>
          <ospf>false</ospf>
          <bgp>false</bgp>
          <static>false</static>
          <connected>true</connected>
        </from>
```

```
        <action>permit</action>
      </rule>
    </rules>
  </redistribution>
 </bgp>
</routing>
```

Delete Routes

Deletes the routing configuration stored in the NSX Manager database and the default routes from the specified NSX Edge router.

Example 7-16. Delete routing

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config
```

Manage Global Routing Configuration

Configures the default gateway for static routes and dynamic routing details.

Specify Global Configuration

Example 7-17. Configure global route

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/global
```

Request Body:

```
<routingGlobalConfig>
    <routerId>1.1.1.1</routerId>  <!-- Required when dynamic routing protocols like OSPF, BGP, IS-IS is configured -->
    <logging>                  <!-- Optional. When absent, enable=false and logLevel=INFO -->
      <enable>false</enable>
      <logLevel>info</logLevel>
    </logging>
    <ipPrefixes>  <!-- Optional. Required only if user wants to define redistribution rules in dynamic routing protocols like ospf, isis,
                       bgp -->
     <ipPrefix>
      <name>a</name>   <!-- All the defined ipPrefix must have unique names -->
      <ipAddress>10.112.196.160/24</ipAddress>
     </ipPrefix>
     <ipPrefix>
      <name>b</name>
      <ipAddress>192.168.10.0/24</ipAddress>
     </ipPrefix>
    </ipPrefixes>
  </routingGlobalConfig>
```

Query Global Route

Retrieves routing information from the NSX Manager database for an edge which includes the following:

- Default route settings
- Static route configurations

Example 7-18. Query global route

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/global
```

<routingGlobalConfig>

Manage Static Routing

Add or query static and default routes for secified Edge.

Configure Static Routes

Configures static and default routes.

Example 7-19. Configure static routes

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/static
```

Request Body:

```
<staticRouting>
  <staticRoutes>
    <route>
      <description>route1</description>
      <vnic>0</vnic>
      <network>3.1.1.4/22</network>
      <nextHop>172.16.1.14</nextHop>
      <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                interface on which this route is configured -->
    </route>
    <route>
      <description>route2</description>
      <vnic>1</vnic>
      <network>4.1.1.4/22</network>
      <nextHop>10.112.196.118</nextHop>
      <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                interface on which this route is configured -->
    </route>
  </staticRoutes>
  <defaultRoute>
    <description>defaultRoute</description>
    <vnic>0</vnic>
    <gatewayAddress>172.16.1.12</gatewayAddress>
    <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the interface
                on which this route is configured -->
  </defaultRoute>
</staticRouting>
```

Query Static Routes

Retrieves static and default routes.

Example 7-20. Configure static routes

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/static
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
 <staticRouting>
  <staticRoutes>
    <route>
      <description>route1</description>
      <vnic>0</vnic>
      <network>3.1.1.4/22</network>
      <nextHop>172.16.1.14</nextHop>
      <mtu>1500</mtu>
      <type>user</type>
    </route>
```

```
    <route>
      <description>route2</description>
      <vnic>1</vnic>
      <network>4.1.1.4/22</network>
      <nextHop>10.112.196.118</nextHop>
      <mtu>1500</mtu>
      <type>user</type>
    </route>
  </staticRoutes>
  <defaultRoute>
    <description>defaultRoute</description>
    <vnic>0</vnic>
    <gatewayAddress>172.16.1.12</gatewayAddress>
    <mtu>1500</mtu>
  </defaultRoute>
</staticRouting>
```

Delete Static Routes

Deletes both static and default routing configuration stored in the NSX Manager database.

Example 7-21. Delete static routes

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/static
```

Manage OSPF Routes for NSX Edge

NSX Edge supports OSPF, an interior gateway protocol that routes IP packets only within a single routing domain. It gathers link state information from available routers and constructs a topology map of the network. The topology determines the routing table presented to the Internet Layer, which makes routing decisions based on the destination IP address found in IP packets.

OSPF routing policies provide a dynamic process of traffic load balancing between routes of equal cost. An OSPF network is divided into routing areas to optimize traffic. An area is a logical collection of OSPF networks, routers, and links that have the same area identification.

Areas are identified by an Area ID.

Configure OSPF

Example 7-22. Configure OSPF

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/ospf

Request Body:

```
<ospf>
 <enabled>true</enabled>      <!-- When not specified, it will be treated as false, When false, it will delete the existing config -->
 <ospfAreas>
  <ospfArea>
    <areaId>100</areaId> <!-- Mandatory and unique. Valid values are 0-4294967295 -->
    <type>normal</type> <!-- Optional. Default is normal. Valid inputs are normal, nssa -->
    <authentication>          <!-- Optional. When not specified, its "none" authentication. -->
      <type>password</type>   <!-- Valid values are none, password , md5 -->
      <value>vmware123</value>  <!-- Value as per the type of authentication -->
    </authentication>
  </ospfArea>
 </ospfAreas>
 <ospfInterfaces>
  <ospfInterface>
```

```
    <vnic>0</vnic>
    <areaId>100</areaId>
    <helloInterval>10</helloInterval> <!-- Optional. Default 10 sec. Valid values are 1-255-->
    <deadInterval>40</deadInterval>  <!-- Optional. Default 40 sec.  Valid values are 1-65535 -->
    <priority>128</priority> <!-- Optional. Default 128. Valid values are 0-255 -->
    <cost>10</cost> <!-- Optional. Auto based on interface speed. Valid values are 1-65535 -->
  </ospfInterface>
 </ospfInterfaces>
 <redistribution>
   <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
   <rules>
    <rule>
     <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
     <from>
      <isis>true</isis>          <!-- Optional. Defaults to false -->
      <ospf>false</ospf>         <!-- Optional. Defaults to false -->
      <bgp>false</bgp>           <!-- Optional. Defaults to false -->
      <static>false</static>     <!-- Optional. Defaults to false -->
      <connected>true</connected>  <!-- Optional. Defaults to false -->
     </from>
     <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
    </rule>
    <rule>
     <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
     <from>
      <isis>false</isis>         <!-- Optional. Defaults to false -->
      <ospf>false</ospf>         <!-- Optional. Defaults to false -->
      <bgp>true</bgp>            <!-- Optional. Defaults to false -->
      <static>false</static>     <!-- Optional. Defaults to false -->
      <connected>false</connected>  <!-- Optional. Defaults to false -->
     </from>
     <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
    </rule>
   </rules>
  </redistribution>
</ospf>
```

Query OSPF

Example 7-23. Query OSPF

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/ospf

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ospf>
 <enabled>true</enabled>
 <ospfAreas>
  <ospfArea>
    <areaId>100</areaId>
    <type>normal</type>
    <authentication>
      <type>password</type>
      <value>vmware123</value>
    </authentication>
  </ospfArea>
 </ospfAreas>
 <ospfInterfaces>
  <ospfInterface>
    <vnic>0</vnic>
    <areaId>100</areaId>
    <helloInterval>10</helloInterval>
```

```
      <deadInterval>40</deadInterval>
      <priority>128</priority>
      <cost>10</cost>
    </ospfInterface>
  </ospfInterfaces>
  <redistribution>
    <enabled>true</enabled>
    <rules>
      <rule>
        <id>1</id>
        <prefixName>a</prefixName>
        <from>
          <isis>true</isis>
          <ospf>false</ospf>
          <bgp>false</bgp>
          <static>false</static>
          <connected>true</connected>
        </from>
        <action>deny</action>
      </rule>
      <rule>
        <id>0</id>
        <prefixName>b</prefixName>
        <from>
          <isis>false</isis>
          <ospf>false</ospf>
          <bgp>true</bgp>
          <static>false</static>
          <connected>false</connected>
        </from>
        <action>permit</action>
      </rule>
    </rules>
  </redistribution>
</ospf>
```

Delete OSPF

Deletes OSPF routing.

Example 7-24. Delete OSPF

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/ospf
```

Manage ISIS Routes for NSX Edge

Intermediate System to Intermediate System (IS-IS) is a routing protocol designed to move information by determining the best route for datagrams through a packet-switched network. A two-level hierarchy is used to support large routing domains. A large domain may be divided into areas. Routing within an area is referred to as Level 1 routing. Routing between areas is referred to as Level 2 routing. A Level 2 Intermediate System (IS) keeps track of the paths to destination areas. A Level 1 IS keeps track of the routing within its own area. For a packet going to another area, a Level 1 IS sends the packet to the nearest Level 2 IS in its own area, regardless of what the destination area is. Then the packet travels via Level 2 routing to the destination area, where it may travel via Level 1 routing to the destination. This is referred to as Level-1-2.

Configure ISIS

Example 7-25. Configure ISIS

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/isis

Request Body:

```
<isis>
  <enabled>true</enabled>
  <systemId>0004.c150.f1c0</systemId>  <!-- Optional. 6 byte length & specified in HEX. When not specified, derived
                routingGlobalConfig.routerId -->
  <areaIds>   <!-- Atleast one is required. Max supported is 3 -->
    <areaId>49.0005.8000.ab7c.0000.ffe9.0001</areaId>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0002</areaId>   <!-- Variable length between 1 and 13 bytes & specified in HEX. -->
    <areaId>49.0005.8000.ab7c.0000.ffe9.0003</areaId>
  </areaIds>
  <isType>level-1-2</isType>  <!-- Optional. Default is 'level-1-2'. Valid values are level-1, level-2, level-1-2 -->
  <domainPassword>vshield</domainPassword>   <!-- Optional. Domain level authentication. Used when type is level-2 -->
  <areaPassword>edge</areaPassword>          <!-- Optional. Area level authentication. Used when type is level-1 -->
  <isisInterfaces>
   <isisInterface>
    <vnic>0</vnic>
    <meshGroup>10</meshGroup>           <!-- Optional. Valid values are : 0-4294967295 -->
    <helloInterval>10000</helloInterval>    <!-- Optional. Default is 10000 millisecond . Valid values are : 10-600000 -->
    <helloMultiplier>3</helloMultiplier> <!-- Optional. Default is 3. Valid values are : 2-100 -->
    <lspInterval>33</lspInterval>       <!-- Optional. Default is 33 milliseconds. Valid values are : 1-65535  -->
    <metric>10</metric>                 <!-- Optional. Default is 10. Valid values are : 1-16777215  -->
    <priority>64</priority>             <!-- Optional. Default is 64. Valid values are : 0-127 -->
    <circuitType>level-1-2</circuitType>  <!-- Optional. Valid values are level-1, level-2, level-1-2. If absent, 'type' from above is
                used -->
    <password>msr</password>            <!-- Optional. Per interface authentication -->
   </isisInterface>
  </isisInterfaces>
  <redistribution>
     <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
     <rules>
      <rule>
       <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                routingGlobalConfig->ipPrefixes -->
       <from>
        <isis>false</isis>          <!-- Optional. Defaults to false -->
        <ospf>true</ospf>         <!-- Optional. Defaults to false -->
        <bgp>false</bgp>          <!-- Optional. Defaults to false -->
        <static>true</static>     <!-- Optional. Defaults to false -->
        <connected>false</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
      <rule>
       <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                routingGlobalConfig->ipPrefixes -->
       <from>
        <isis>false</isis>          <!-- Optional. Defaults to false -->
        <ospf>false</ospf>         <!-- Optional. Defaults to false -->
        <bgp>true</bgp>           <!-- Optional. Defaults to false -->
        <static>false</static>     <!-- Optional. Defaults to false -->
        <connected>true</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
     </rules>
    </redistribution>
</isis>
```

Query ISIS

Example 7-26. Query ISIS

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/isis

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<isis>
  <enabled>true</enabled>
  <systemId>0004.c150.f1c0</systemId>
  <areaIds>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0001</areaId>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0002</areaId>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0003</areaId>
  </areaIds>
  <isType>level-1-2</isType>
  <domainPassword>vshield</domainPassword>
  <areaPassword>edge</areaPassword>
  <isisInterfaces>
   <isisInterface>
    <vnic>0</vnic>
    <meshGroup>10</meshGroup>
    <helloInterval>10000</helloInterval>
    <helloMultiplier>3</helloMultiplier>
    <lspInterval>33</lspInterval>
    <metric>10</metric>
    <priority>64</priority>
    <circuitType>level-1-2</circuitType>
    <password>msr</password>
   </isisInterface>
  </isisInterfaces>
  <redistribution>
   <enabled>true</enabled>
   <rules>
    <rule>
     <id>1</id>
     <prefixName>a</prefixName>
     <from>
      <isis>false</isis>
      <ospf>true</ospf>
      <bgp>false</bgp>
      <static>true</static>
      <connected>false</connected>
     </from>
     <action>deny</action>
    </rule>
    <rule>
     <id>0</id>
      <prefixName>b</prefixName>
      <from>
       <isis>false</isis>
       <ospf>false</ospf>
       <bgp>true</bgp>
       <static>false</static>
       <connected>true</connected>
      </from>
      <action>permit</action>
     </rule>
    </rules>
   </redistribution>
</isis>
```

Delete ISIS

Deletes ISIS routing.

Example 7-27. Delete ISIS

Request

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/isis

Manage BGP Routes for NSX Edge

Border Gateway Protocol (BGP) makes core routing decisions. It includes a table of IP networks or prefixes which designate network reachability among autonomous systems. An underlying connection between two BGP speakers is established before any routing information is exchanged. Keep alive messages are sent out by the BGP speakers in order to keep this relationship alive. Once the connection is established, the BGP speakers exchange routes and synchronize their tables.

Configure BGP

Example 7-28. Configure BGP

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/bgp

Request Body:

```
<bgp>
  <enabled>true</enabled>     <!-- Optional. Default is false -->
  <localAS>65534</localAS>          <!-- Valid values are : 1-65534 -->
  <bgpNeighbours>
    <bgpNeighbour>
      <ipAddress>192.168.1.10</ipAddress>  <!-- IPv4 only. IPv6 support not supported -->
      <remoteAS>65500</remoteAS>         <!-- Valid values are 0-65535 -->
      <weight>60</weight>                    <!-- Optional. Default is 60. Valid values are 0-65535 -->
      <holdDownTimer>180</holdDownTimer>      <!-- Optional. Default is 180 seconds. Valid values are : 2-65535. -->
      <keepAliveTimer>60</keepAliveTimer>     <!-- Optional. Default is 60 seconds. Valid values are : 1-65534. -->
      <password>vmware123</password>          <!-- Optional -->
      <bgpFilters>                           <!-- Optional -->
        <bgpFilter>
          <direction>in</direction>       <!-- Valid values are in/out -->
          <action>permit</action>         <!-- Valid values are permit/deny -->
          <network>10.0.0.0/8</network>   <!-- Valid values are CIDR networks. IPv4 only. IPv6 support not supported -->
          <ipPrefixGe>17</ipPrefixGe>   <!-- Optional. "Greater than or equal to" & used for filtering based on prefix length. Valid
                    IPv4 prefixes -->
          <ipPrefixLe>32</ipPrefixLe>   <!-- Optional. "Less than or equal to" & used for filtering based on prefix length. Valid IPv4
                    prefixes -->
        </bgpFilter>
      </bgpFilters>
    </bgpNeighbour>
  </bgpNeighbours>
  <redistribution>
     <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
     <rules>
      <rule>
        <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
        <from>
          <isis>true</isis>          <!-- Optional. Defaults to false -->
          <ospf>true</ospf>          <!-- Optional. Defaults to false -->
          <bgp>false</bgp>           <!-- Optional. Defaults to false -->
          <static>true</static>      <!-- Optional. Defaults to false -->
          <connected>false</connected>  <!-- Optional. Defaults to false -->
        </from>
        <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
      <rule>
        <from>
          <isis>false</isis>          <!-- Optional. Defaults to false -->
          <ospf>false</ospf>          <!-- Optional. Defaults to false -->
          <bgp>false</bgp>           <!-- Optional. Defaults to false -->
          <static>false</static>     <!-- Optional. Defaults to false -->
```

```
          <connected>true</connected>  <!-- Optional. Defaults to false -->
         </from>
         <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
        </rule>
       </rules>
    </redistribution>
</bgp>
```

Query BGP

Example 7-29. Query BGP

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/bgp

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<bgp>
  <enabled>true</enabled>
  <localAS>65535</localAS>
  <bgpNeighbours>
    <bgpNeighbour>
      <ipAddress>192.168.1.10</ipAddress>
      <remoteAS>65500</remoteAS>
      <weight>60</weight>
      <holdDownTimer>180</holdDownTimer>
      <keepAliveTimer>60</keepAliveTimer>
      <password>vmware123</password>
      <bgpFilters>
        <bgpFilter>
          <direction>in</direction>
          <action>permit</action>
          <network>10.0.0.0/8</network>
          <ipPrefixGe>17</ipPrefixGe>
          <ipPrefixLe>32</ipPrefixLe>
        </bgpFilter>
        <bgpFilter>
          <direction>out</direction>
          <action>deny</action>
          <network>20.0.0.0/26</network>
        </bgpFilter>
      </bgpFilters>
    </bgpNeighbour>
  </bgpNeighbours>
  <redistribution>
   <enabled>true</enabled>
   <rules>
    <rule>
      <id>1</id>
      <prefixName>a</prefixName>
      <from>
        <isis>true</isis>
        <ospf>true</ospf>
        <bgp>false</bgp>
        <static>true</static>
        <connected>false</connected>
      </from>
      <action>deny</action>
    </rule>
    <rule>
      <id>0</id>
        <from>
          <isis>false</isis>
          <ospf>false</ospf>
          <bgp>false</bgp>
```

```
          <static>false</static>
          <connected>true</connected>
        </from>
        <action>permit</action>
      </rule>
    </rules>
  </redistribution>
</bgp>
```

Delete BGP

Deletes BGP routing.

Example 7-30. Delete BGP

Request

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/bgp

Working with Bridging

You can create an L2 bridge between a logical switch and a VLAN, which enables you to migrate virtual workloads to physical devices with no impact on IP addresses. A logical network can leverage a physical gateway and access existing physical network and security resources by bridging the logical switch broadcast domain to the VLAN broadcast domain.

The L2 bridge runs on the host that has the NSX Edge logical router virtual machine. An L2 bridge instance maps to a single VLAN, but there can be multiple bridge instances. The logical router cannot be used as a gateway for devices connected to a bridge.

If High Availability is enabled on the Logical Router and the primary NSX Edge virtual machine goes down, the bridge is automatically moved over to the host with the secondary virtual machine. For this seamless migration to happen, VLAN must have been configured on the host that has the secondary NSX Edge virtual machine.

Configure a Bridge

Configures a bridge.

Example 7-31. Configure bridge

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/bridging/config

Request Body:

```
<bridges>
  <bridge>
    <name>test1</name>
    <virtualWire>virtualwire-1</virtualWire>
    <dvportGroup>dvportgroup-36</dvportGroup>
  </bridge>
 <bridge>
    <name>test2</name>
    <virtualWire>virtualwire-2</virtualWire>
    <dvportGroup>dvportgroup-37</dvportGroup>
  </bridge>
</bridges>
```

Query Bridge Configuration

Retrieves bridge configuration.

Query BGP

Example 7-32. Query bridges

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/bridging/config

Response Body:

```
<bridges>
<version>4</version>
<enabled>true</enabled>
<bridge>
<bridgeId>1</bridgeId>
<name>bridge1</name>
<virtualWire>dvportgroup-23</virtualWire>
<dvportGroup>dvportgroup-25</dvportGroup>
</bridge>
</bridges>
```

Delete Bridge Configuration

Deletes bridges.

Example 7-33. Delete bridges

Request

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/bridging/config

NSX Edge Services Gateway Installation, Upgrade, and Management

8

NSX Edge Services Gateway gives you access to all NSX Edge services such as firewall, NAT, DHCP, VPN, load balancing, and high availability. You can install multiple NSX Edge services gateway virtual appliances in a datacenter. Each NSX Edge virtual appliance can have a total of ten uplink and internal network interfaces.

The internal interfaces connect to secured port groups and act as the gateway for all protected virtual machines in the port group. The subnet assigned to the internal interface can be a publicly routed IP space or a NATed/routed RFC 1918 private space. Firewall rules and other NSX Edge services are enforced on traffic between network interfaces.

Uplink interfaces of NSX Edge connect to uplink port groups that have access to a shared corporate network or a service that provides access layer networking. Multiple external IP addresses can be configured for load balancer, site-to-site VPN, and NAT services.

After you install network virtualization components and one or more logical switches in your environment, you can secure internal networks by installing a Edge Edge Services gateway.

This chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Installing NSX Edge Services Gateway

The NSX Edge installation API copies the NSX Edge OVF from the Edge Manager to the specified datastore and deploys an NSXd Edge on the given datacenter. After the NSX Edge is installed, the virtual machine powers on and initializes according to the given network configuration. If an appliance is added, it is deployed with the specified configuration.

Installing an NSX Edge instance adds a virtual machine to the vCenter Server inventory, You must specify an IP address for the management interface, and you may name the NSX Edge instance.

The configuration you specify when you install an NSX Edge is stored in the database. If an appliance is added, the configuration is applied to it and it is deployed.

NOTE Do not use hidden/system resource pool IDs as they are not supported on the UI.

Example 8-1. Install Services Gateway

Request

```
POST https://<nsxmgr-ip>/api/4.0/edges/
```

Request Body

```
<edge>
<datacenterMoid>datacenter-2</datacenterMoid>
<name>org1-edge</name> <!-- optional. Default is vShield-<edgeId>. Used as a vm name on VC appended by "-<haIndex>" -->
<description>Description for the edge gateway</description> <!-- optional -->
<tenant>org1</tenant> <!-- optional. Will be used in syslog messages -->
<fqdn>org1edge1</fqdn> <!-- optional. Default is vShield-<edgeId>. Used to set hostanme on the vm. Appended by "-<haIndex>" -->
<vseLogLevel>info</vseLogLevel> <!-- optional. Default is info. Other possible values are EMERGENCY, ALERT, CRITICAL,
                    ERROR, WARNING, NOTICE, DEBUG -->
<enableAesni>false</enableAesni> <!-- optional. Default is true -->
<enableFips>true</enableFips> <!-- optional. Default is false -->
<appliances> <!-- maximum 2 appliances can be configured. Until one appliance is configured, none of the configured features
                    configured will serve the network -->
<applianceSize>compact</applianceSize> <!-- optional. Default is compact. Other possible values are large|xlarge|quadlarge -->
 <enableCoreDump>true</enableCoreDump>  <!-- optional. default is false. Enabling core-dump will deploy an extra disk for
                    core-dump files, which will consume 1GB for COMPACT, LARGE, and QUADLARGE, and 8G for XLARGE
                    Edge.-->
 <appliance>
 <resourcePoolId>resgroup-53</resourcePoolId>
 <datastoreId>datastore-29</datastoreId>
 <hostId>host-28</hostId> <!-- optional -->
 <vmFolderId>group-v38</vmFolderId> <!-- optional -->
 <customField> <!-- optional -->
 <key>system.service.vmware.vsla.main01</key>
 <value>string</value>
 </customField>
 <cpuReservation> <!-- optional -->
 <limit>2399</limit>
 <reservation>500</reservation>
 <shares>500</shares>
 </cpuReservation>
 <memoryReservation> <!-- optional -->
 <limit>5000</limit>
 <reservation>500</reservation>
 <shares>20480</shares>
 </memoryReservation>
 </appliance>
</appliances>
<vnics> <!-- mamimum 10 interfaces index:0-9 can be configured. Until one connected vnic is configured, none of the configured
                    features will serve the network -->
 <vnic>
 <index>0</index>
 <name>internal0</name> <!-- optional. System has default Names. format vNic0 ... vNic7 -->
 <type>internal</type> <!-- optional. Default is internal. Other possible value is "uplink" -->
 <portgroupId>dvportgroup-114</portgroupId> <!-- Possible values here are portgroupIds or virtualWire-id. portgroupId needs to be
                    defined if isConnected=true -->
```

```
<addressGroups>
<addressGroup> <!-- Vnic can be configured to have more than one addressGroup/subnets -->
<primaryAddress>192.168.3.1</primaryAddress> <!-- This is mandatory for an addressGroup -->
<secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
<ipAddress>192.168.3.2</ipAddress>
<ipAddress>192.168.3.3</ipAddress> <!-- Optional. This way multiple IP Addresses can be assigned to a vnic/interface -->
</secondaryAddresses>
<subnetMask>255.255.255.0</subnetMask> <!-- either subnetMask or subnetPrefixLength should be provided. If both then
        subnetprefixLength is ignored -->
</addressGroup>
<addressGroup> <!-- Vnic can be configured to have more than one addressGroup/subnets -->
<primaryAddress>192.168.4.1</primaryAddress> <!-- This is mandatory for an addressGroup -->
<secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
<ipAddress>192.168.4.2</ipAddress>
<ipAddress>192.168.4.3</ipAddress> <!-- Optional. This way multiple IP Addresses can be assigned to a vnic/interface -->
</secondaryAddresses>
<subnetPrefixLength>24</subnetPrefixLength>
</addressGroup>
<addressGroup> <!-- ipv6 addressGroup -->
<primaryAddress>ffff::1</primaryAddress> <!-- This is mandatory for an addressGroup -->
<secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
<ipAddress>ffff::2</ipAddress>
</secondaryAddresses>
<subnetPrefixLength>64</subnetPrefixLength> <!-- prefixLength valid values 1-128 -->
</addressGroup>
</addressGroups>
<macAddress> <!-- optional. When not specified, macAddresses will be managed by VC -->
<edgeVmHaIndex>0</edgeVmHaIndex>
<value>00:50:56:01:03:23</value> <!-- optional. User must ensure that macAddresses provided are unique withing the given layer 2
        domain. -->
</macAddress>
<fenceParameter> <!-- optional -->
<key>ethernet0.filter1.param1</key>
<value>1</value>
</fenceParameter>
<mtu>1500</mtu> <!-- optional. Default is 1500 -->
<enableProxyArp>false</enableProxyArp> <!-- optional. Default is false -->
<enableSendRedirects>true</enableSendRedirects> <!-- optional. Default is true -->
<isConnected>true</isConnected> <!-- optional. Default is false -->
<inShapingPolicy> <!-- optional -->
<averageBandwidth>200000000</averageBandwidth>
<peakBandwidth>200000000</peakBandwidth>
<burstSize>0</burstSize>
<enabled>true</enabled>
<inherited>false</inherited>
</inShapingPolicy>
<outShapingPolicy> <!-- optional -->
<averageBandwidth>400000000</averageBandwidth>
<peakBandwidth>400000000</peakBandwidth>
<burstSize>0</burstSize>
<enabled>true</enabled>
<inherited>false</inherited>
</outShapingPolicy>
</vnic>
</vnics>
<cliSettings> <!-- optional. Default user/pass is admin/default, and remoteAccess is false (i.e. disabled) -->
<userName>test</userName> <!-- When you change the userName, you are overwriting the current userName. -->
<password>test123!</password> <!-- The password should be atleast 12 characters long, must be a mix of alphabets, digits and
        special characters. Must contain at-least 1 uppercase, 1 lowercase, 1 special character and 1 digit. In addition, a
        character cannot be repeated 3 or more times consectively.-->
<remoteAccess>false</remoteAccess> <!-- remote Access specifies whether cli console access over ssh must be enabled. Relevant
        firewall rules to allow traffic on port 22 must be opened by user/client. Please note: it is advisable to restrict ssh
        access to Edge cli to only a limited ip addresses - so firewall rules must be opened cautiously. -->
</cliSettings>
<autoConfiguration> <!-- optional -->
<enabled>true</enabled> <!-- Optional. Default:true. If set to false, user should add the nat,firewall,routing config to control plane
        work for LB, VPN, etc -->
<rulePriority>high</rulePriority> <!-- Optional. Default is high. Other possible value is low -->
```

```
</autoConfiguration>
 <dnsClient>    <!-- optional. if the primary/secondary are specified and the DNS service not, the primary/secondary will to used as
                      the default of the DNS service. -->
   <primaryDns>10.117.0.1</primaryDns>
   <secondaryDns>10.117.0.2</secondaryDns>
   <domainName>vmware.com</domainName>
   <domainName>foo.com</domainName>
 </dnsClient>
 <queryDaemon>  <!-- optional. defined for the sake of communication between SLB VM and edge vm for GSLB feature. -->
   <enabled>true</enabled>  <!-- default to false-->
   <port>5666</port>    <!-- default to 5666 -->
 </queryDaemon>
</edge>
```

Upgrading vShield Edge 5.1.x or 5.5 to NSX Edge

Upgrades vShield Edge 5.1.x or 5.5 to NSX Edge. The appliances are upgraded and feature configurations are retained and upgraded

Example 8-2. Upgrade vShield Edge

Request:

```
POST https://<nsxmgr-ip>/api//4.0/edges/{edgeId}?action=upgrade
```

IMPORTANT The location header returns the edgeId of the upgraded NSX Edge. You must use this ID to configure and manage this Edge instance.

If vShield Edge in the previous release was installed using hidden/system resource pool IDs, the UI may show unusual behavior.

Query Installed Edges

You can retrieve a list of NSX Edges in your inventory or filter the results by datacenter or port group.

Example 8-3. Retrieve Edges

Retrieve all Edges Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/
```

Retrieve Edges by datacenter:

```
GET /api/4.0/edges/?datacenter=<datacenterMoid>
```

Retrieve Edges on specified tenant:

```
GET /api/4.0/edges/?tenant=<tenantId>
```

Retrieve Edges with one interface on specified port group:

```
GET /api/4.0/edges/?pg=<pgMoId>
```

Retrieve Edges with specified tenant and port group:

```
GET /api/4.0/edges/?tenant=<tenant>&pg=<pgMoId>
```

Example 8-4. Retrieve Edge details

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>
```

Response Body

```
<edge>
 <id>edge-79</id>
 <version>5</version>
 <description>testEdge</description>
 <status>deployed</status>
 <datacenterMoid>datacenter-2</datacenterMoid>
 <datacenterName>datacenterForEdge</datacenterName>
 <name>testEdge</name>
 <fqdn>testEdge</fqdn>
 <enableAesni>true</enableAesni>
 <enableFips>false</enableFips>
 <vseLogLevel>info</vseLogLevel>
 <edgeAssistId>1460487509</edgeAssistId>
 <vnics>
 <vnic>
 <index>0</index>
 <name>uplink-vnic-network-2581</name>
 <type>uplink</type>
 <portgroupId>network-2581</portgroupId>
 <portgroupName>Mgmt</portgroupName>
 <addressGroups>
 <addressGroup>
 <primaryAddress>192.168.3.1</primaryAddress>
 <secondaryAddresses>
 <ipAddress>192.168.3.2</ipAddress>
 <ipAddress>192.168.3.3</ipAddress>
 </secondaryAddresses>
 <subnetMask>255.255.255.0</subnetMask>
 </addressGroup>
 <addressGroup>
 <primaryAddress>192.168.4.1</primaryAddress>
 <secondaryAddresses>
 <ipAddress>192.168.4.2</ipAddress>
 <ipAddress>192.168.4.3</ipAddress>
 </secondaryAddresses>
 <subnetMask>255.255.255.0</subnetMask> <!-- GET will always have subnetMask field for ipv4 and subnetPrefixLength for ipv6
                    -->
 </addressGroup>
 <addressGroup>
 <primaryAddress>ffff::1</primaryAddress>
 <secondaryAddresses>
 <ipAddress>ffff::2</ipAddress>
 </secondaryAddresses>
 <subnetPrefixLength>64</subnetPrefixLength>
 </addressGroup>
 </addressGroups>
 <mtu>1500</mtu>
 <enableProxyArp>false</enableProxyArp>
 <enableSendRedirects>true</enableSendRedirects>
 <isConnected>true</isConnected>
 </vnic>
 .....
 </vnics>
 <appliances>
 <applianceSize>compact</applianceSize>
 <appliance>
 <highAvailabilityIndex>0</highAvailabilityIndex>
 <vcUuid>4208f392-1693-11db-6355-4affd859ef33</vcUuid>
 <vmId>vm-4021</vmId>
 <resourcePoolId>resgroup-2454</resourcePoolId>
 <resourcePoolName>Resources</resourcePoolName>
 <datastoreId>datastore-2457</datastoreId>
 <datastoreName>shahm-esx-storage</datastoreName>
 <hostId>host-2455</hostId>
 <hostName>10.112.196.160</hostName>
 <vmFolderId>group-v3</vmFolderId>
 <vmFolderName>vm</vmFolderName>
 <vmHostname>vShieldEdge-network-2264-0</vmHostname>
```

```
<vmName>vShield-edge-79-0</vmName>
<deployed>true</deployed>
<edgeId>edge-79</edgeId>
</appliance>
</appliances>
<cliSettings>
<remoteAccess>false</remoteAccess>
<userName>admin</userName>
</cliSettings>
<features>
<featureConfig/>
<firewall>
<version>1</version>
<enabled>true</enabled>
<defaultPolicy>
<action>deny</action>
<loggingEnabled>false</loggingEnabled>
</defaultPolicy>
<rules>
<rule>
<id>131078</id>
<ruleTag>131078</ruleTag>
<name>rule1</name>
<ruleType>user</ruleType>
<source>
<groupingObjectId>ipset-938</groupingObjectId>
</source>
<destination/>
<application>
<applicationId>application-666</applicationId>
</application>
<action>accept</action>
<enabled>true</enabled>
<loggingEnabled>false</loggingEnabled>
<matchTranslated>false</matchTranslated>
</rule>
....
</rules>
</firewall>
<routing>
<version>1</version>
<enabled>true</enabled>
<staticRouting>
<defaultRoute>
<vnic>0</vnic>
<gatewayAddress>10.112.3.253</gatewayAddress>
<description>defaultGw on the external interface</description>
</defaultRoute>
<staticRoutes>
<route>
<vnic>0</vnic>
<network>192.168.30.0/24</network>
<nextHop>10.112.2.41</nextHop>
<type>user</type>
</route>
...
</staticRoutes>
</staticRouting>
<ospf>
<enabled>false</enabled>
</ospf>
</routing>
<highAvailability>
<version>1</version>
<enabled>false</enabled>
<declareDeadTime>6</declareDeadTime>
<logging>
<enable>false</enable>
```

```
<logLevel>info</logLevel>
</logging>
</highAvailability>
<syslog>
<version>1</version>
<enabled>true</enabled>
<protocol>udp</protocol>
<serverAddresses>
<ipAddress>1.1.1.1</ipAddress>
<ipAddress>1.1.1.2</ipAddress>
</serverAddresses>
</syslog>
<ipsec>
<version>1</version>
<enabled>true</enabled>
<logging>
<enable>false</enable>
<logLevel>info</logLevel>
</logging>
<sites>
<site>
<enabled>true</enabled>
<name>site1</name>
<localId>10.112.2.40</localId>
<localIp>10.112.2.40</localIp>
<peerId>10.112.2.41</peerId>
<peerIp>10.112.2.41</peerIp>
<encryptionAlgorithm>aes256</encryptionAlgorithm>
<mtu>1500</mtu>
<enablePfs>true</enablePfs>
<dhGroup>dh2</dhGroup>
<localSubnets>
<subnet>192.168.10.0/24</subnet>
</localSubnets>
<peerSubnets>
<subnet>192.168.40.0/24</subnet>
</peerSubnets>
<psk>1234</psk>
<authenticationMode>psk</authenticationMode>
</site>
....
</sites>
<global>
<caCertificates/>
<crlCertificates/>
</global>
</ipsec>
<dhcp>
<version>1</version>
<enabled>false</enabled>
<staticBindings>
<staticBinding>
<autoConfigureDNS>true</autoConfigureDNS>
<bindingId>binding-1</bindingId>
<vmId>vm-2460</vmId>
<vnicId>1</vnicId>
<hostname>test</hostname>
<ipAddress>192.168.10.6</ipAddress>
<defaultGateway>192.168.10.1</defaultGateway>
<leaseTime>86400</leaseTime>
</staticBinding>
....
</staticBindings>
<ipPools>
<ipPool>
<autoConfigureDNS>true</autoConfigureDNS>
<poolId>pool-1</poolId>
<ipRange>192.168.10.2-192.168.10.5</ipRange>
```

```
<defaultGateway>192.168.10.1</defaultGateway>
<leaseTime>86400</leaseTime>
</ipPool>
....
</ipPools>
<logging>
<enable>false</enable>
<logLevel>info</logLevel>
</logging>
</dhcp>
<nat>
<version>1</version>
<enabled>true</enabled>
<natRules>
<natRule>
<ruleId>196610</ruleId>
<ruleTag>196610</ruleTag>
<ruleType>user</ruleType>
<action>dnat</action>
<vnic>1</vnic>
<originalAddress>10.112.196.162</originalAddress>
<translatedAddress>192.168.10.3</translatedAddress>
<loggingEnabled>false</loggingEnabled>
<enabled>true</enabled>
<protocol>tcp</protocol>
<originalPort>80</originalPort>
<translatedPort>80</translatedPort>
</natRule>
....
</natRules>
</nat>
<featureConfig/>
</features>
<autoConfiguration>
<enabled>true</enabled>
<rulePriority>high</rulePriority>
</autoConfiguration>
<dnsClient>
  <primaryDns>10.117.0.1</primaryDns>
  <secondaryDns>10.117.0.2</secondaryDns>
  <domainName>vmware.com</domainName>
  <domainName>foo.com</domainName>
</dnsClient>
 <queryDaemon>
   <enabled>true</enabled>
   <port>5666</port>
 </queryDaemon>
</edge>
```

Modifying NSX Edge Configuration

Replaces current NSX Edge configuration.

Example 8-5. Modify Edge configuration

Request:

```
PUT https://<nsxmgr-ip>/api//4.0/edges/{edgeId}
```

Request Body:

```
<edge>
 <id>edge-79</id>
 <description>testEdge</description>
 <datacenterMoid>datacenter-2</datacenterMoid>
 <name>testEdge</name>
```

```
<fqdn>testEdge</fqdn>
<enableAesni>true</enableAesni>
<enableFips>false</enableFips>
<vseLogLevel>info</vseLogLevel>
<vnics>
<vnic>
<index>0</index>
<name>uplink-vnic-network-2581</name>
<type>uplink</type>
<portgroupId>network-2581</portgroupId>
<addressGroups>
<addressGroup> <!-- Vnic can be configured to have more than one addressGroup/subnets -->
<primaryAddress>192.168.3.1</primaryAddress> <!-- This is mandatory for an addressGroup -->
<secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
<ipAddress>192.168.3.2</ipAddress>
<ipAddress>192.168.3.3</ipAddress> <!-- Optional. This way multiple IP Addresses can be assigned to a vnic/interface -->
</secondaryAddresses>
<subnetMask>255.255.255.0</subnetMask> <!-- either subnetMask or subnetPrefixLength should be provided. If both then
                subnetprefixLength is ignored -->
</addressGroup>
<addressGroup> <!-- Vnic can be configured to have more than one addressGroup/subnets -->
<primaryAddress>192.168.4.1</primaryAddress> <!-- This is mandatory for an addressGroup -->
<secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
<ipAddress>192.168.4.2</ipAddress>
<ipAddress>192.168.4.3</ipAddress> <!-- Optional. This way multiple IP Addresses can be assigned to a vnic/interface -->
</secondaryAddresses>
<subnetPrefixLength>24</subnetPrefixLength> <!-- subnetPrefixLength valid values for ipv4 1-32 -->
</addressGroup>
<addressGroup> <!-- ipv6 addressGroup -->
<primaryAddress>ffff::1</primaryAddress> <!-- This is mandatory for an addressGroup -->
<secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
<ipAddress>ffff::2</ipAddress>
</secondaryAddresses>
<subnetPrefixLength>64</subnetPrefixLength> <!-- subnetPrefixLength valid values 1-128 -->
</addressGroup>
</addressGroups>
<mtu>1500</mtu>
<enableProxyArp>false</enableProxyArp>
<enableSendRedirects>true</enableSendRedirects>
<isConnected>true</isConnected>
<inShapingPolicy> <!-- optional -->
<averageBandwidth>200000000</averageBandwidth>
<peakBandwidth>200000000</peakBandwidth>
<burstSize>0</burstSize>
<enabled>true</enabled>
<inherited>false</inherited>
</inShapingPolicy>
<outShapingPolicy> <!-- optional -->
<averageBandwidth>400000000</averageBandwidth>
<peakBandwidth>400000000</peakBandwidth>
<burstSize>0</burstSize>
<enabled>true</enabled>
<inherited>false</inherited>
</outShapingPolicy>
</vnic>
</vnic>
.....
</vnics>
<appliances>
<applianceSize>compact</applianceSize>
<appliance>
<resourcePoolId>resgroup-2454</resourcePoolId>
<datastoreId>datastore-2457</datastoreId>
<vmFolderId>group-v3</vmFolderId>
</appliance>
</appliances>
<cliSettings>
<remoteAccess>false</remoteAccess>
```

```
<userName>admin</userName>
</cliSettings>
<features>
<firewall>
<defaultPolicy>
<action>deny</action>
<loggingEnabled>false</loggingEnabled>
</defaultPolicy>
<rules>
<rule>
<id>131078</id>
<ruleTag>131078</ruleTag>
<name>rule1</name>
<ruleType>user</ruleType>
<source>
<groupingObjectId>ipset-938</groupingObjectId>
</source>
<destination/>
<application>
<applicationId>application-666</applicationId>
</application>
<action>accept</action>
<enabled>true</enabled>
<loggingEnabled>false</loggingEnabled>
<matchTranslated>false</matchTranslated>
</rule>
....
</rules>
</firewall>
<routing>
<staticRouting>
<defaultRoute>
<vnic>0</vnic>
<gatewayAddress>10.112.3.253</gatewayAddress>
<description>defaultGw on the external interface</description>
</defaultRoute>
<staticRoutes>
<route>
<vnic>0</vnic>
<network>192.168.30.0/24</network>
<nextHop>10.112.2.41</nextHop>
<type>user</type>
</route>
...
</staticRoutes>
</staticRouting>
<ospf>
<enabled>false</enabled>
</ospf>
</routing>
<highAvailability>
<enabled>false</enabled>
<declareDeadTime>6</declareDeadTime>
<logging>
<enable>false</enable>
<logLevel>info</logLevel>
</logging>
</highAvailability>
<syslog>
<protocol>udp</protocol>
<serverAddresses>
<ipAddress>1.1.1.1</ipAddress>
<ipAddress>1.1.1.2</ipAddress>
</serverAddresses>
</syslog>
<ipsec>
<enabled>true</enabled>
<logging>
```

```
<enable>false</enable>
<logLevel>info</logLevel>
</logging>
<sites>
<site>
<enabled>true</enabled>
<name>site1</name>
<localId>10.112.2.40</localId>
<localIp>10.112.2.40</localIp>
<peerId>10.112.2.41</peerId>
<peerIp>10.112.2.41</peerIp>
<encryptionAlgorithm>aes256</encryptionAlgorithm>
<mtu>1500</mtu>
<enablePfs>true</enablePfs>
<dhGroup>dh2</dhGroup>
<localSubnets>
<subnet>192.168.10.0/24</subnet>
</localSubnets>
<peerSubnets>
<subnet>192.168.40.0/24</subnet>
</peerSubnets>
<psk>1234</psk>
<authenticationMode>psk</authenticationMode>
</site>
....
</sites>
<global>
<caCertificates/>
<crlCertificates/>
</global>
</ipsec>
<dhcp>
<enabled>true</enabled>
<staticBindings>
<staticBinding>
<autoConfigureDNS>true</autoConfigureDNS>
<bindingId>binding-1</bindingId>
<vmId>vm-2460</vmId>
<vnicId>1</vnicId>
<hostname>test</hostname>
<ipAddress>192.168.10.6</ipAddress>
<defaultGateway>192.168.10.1</defaultGateway>
<leaseTime>86400</leaseTime>
</staticBinding>
....
</staticBindings>
<ipPools>
<ipPool>
<autoConfigureDNS>true</autoConfigureDNS>
<poolId>pool-1</poolId>
<ipRange>192.168.10.2-192.168.10.5</ipRange>
<defaultGateway>192.168.10.1</defaultGateway>
<leaseTime>86400</leaseTime>
</ipPool>
....
</ipPools>
<logging>
<enable>false</enable>
<logLevel>info</logLevel>
</logging>
</dhcp>
<nat>
<natRules>
<natRule>
<ruleId>196610</ruleId>
<ruleTag>196610</ruleTag>
<ruleType>user</ruleType>
<action>dnat</action>
```

```
<vnic>1</vnic>
<originalAddress>10.112.196.162</originalAddress>
<translatedAddress>192.168.10.3</translatedAddress>
<loggingEnabled>false</loggingEnabled>
<enabled>true</enabled>
<protocol>tcp</protocol>
<originalPort>80</originalPort>
<translatedPort>80</translatedPort>
</natRule>
....
</natRules>
</nat>
</features>
<autoConfiguration>
<enabled>true</enabled>
<rulePriority>high</rulePriority>
</autoConfiguration>
</edge>
```

where groupingObjectId can be cluster, network, etc.

Deleting NSX Edge

Deletes specified Edge from database. Associated appliances are also deleted.

Example 8-6. Delete Edge

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/{edgeId}
```

Configuring Edge Services in Async Mode

You can configure Edge to work in async mode. In the async mode, accepted commands return an Accepted status and a taskId. To know the status of the task, you can check the status of that taskId.

The advantage of the async mode is that APIs are returned very fast and actions like vm deployment, reboots, publish to Edge appliance, etc are done behind the scene under the taskId .

To configure async mode, ?async=true at the end of any 4.0 service configuration URL for POST, PUT, and DELETE calls. Without async mode, the location header in HTTP response has the resource ID whereas in async mode, location header has the job ID.

Query Async Job Status

Retrieves job status (SUCCESS/FAILED/QUEUED/RUNNING/ROLLBACK), URI of the resource, and ID of the resource as shown in output representation.

Example 8-7. Query job status

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/jobs/<jobId>
```

Response Body:

```
<edgeJob>
  <jobId>jobdata-2128</jobId>
  <message>Deploying vShield Edge Virtual Machine TestEdge11-0</message>
  <status>RUNNING</status>
  <result>
    <key>ResultURI</key>
    <value>/api/4.0/edges/edge-4</value>
```

```
    </result>
  <result>
    <key>edgeId</key>
    <value>edge-4</value>
  </result>
</edgeJob>
```

Query all Jobs

Example 8-8. Query all jobs

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeid}/jobs?status=all
```

Request Body:

```
<edgeJobs>
  <edgeJob>
     <jobId>jobdata-917</jobId>
     <status>COMPLETED</status>
     <result>
        <key>edgeId</key>
        <value>edge-4</value>
     </result>
  </edgeJob>
  <edgeJob>
     <jobId>jobdata-915</jobId>
     <status>COMPLETED</status>
     <result>
        <key>edgeId</key>
        <value>edge-4</value>
     </result>
   </edgeJob>
<edgeJob>
```

Query active Jobs

Example 8-9. Query active jobs

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeid}/jobs?status=active
```

Request Body:

```
<edgeJobs>
  <edgeJob>
     <jobId>jobdata-917</jobId>
     <message>Publishing configurations on vShield Edge Virtual Machine vm-65</message>
     <status>RUNNING</status>
     <result>
        <key>edgeId</key>
        <value>edge-4</value>
     </result>
  </edgeJob>
</edgeJobs>
```

Configuring Certificates

vShield Edge supports self-signed certificates, certificates signed by a Certification Authority (CA), and certificates generated and signed by a CA.

Working with Certificates

Allows you to manage self signed certificates.

Create Certificate

Creates a single or multiple certificates.

Example 8-10. Create self signed certificate

Request:

```
POST https://<vsm-ip>/api/2.0/services/truststore/certificate/<scopeId>
<trustObject>
      <pemEncoding></pemEncoding>
      <privateKey></privateKey>
      <passphrase></passphrase>
</trustObject>
```

Create Certificate or Certificate Chain for CSR

Imports a certificate or a certificate chain against a certificate signing request.

Example 8-11. Create certificate for CSR

Request:

```
POST https://<vsm-ip>/api/2.0/services/truststore/certificate?csrId=<csrId>
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<trustObject>
      <pemEncoding></pemEncoding>
</trustObject>
```

Query Certificates

Retrieves the certificate object for the specified certificate ID. If the certificate ID is a chain, multiple certificate objects are retrieved.

Example 8-12. Query specific certificate

Request:

```
GET https://<vsm-ip>/api/2.0/services/truststore/certificate/<certificateId>
```

Example 8-13. Query all certificates for a scope

Request:

```
GET https://<vsm-ip>/api/2.0/services/truststore/certificate/scope/<scopeId>
```

Delete Certificate

Deletes the specified certificate.

Example 8-14. Delete certificate

Request:

```
DELETE https://<vsm-ip>/api/2.0/services/truststore/certificate/<certificateId>
```

Working with Certificate Signing Requests (CSRs)

Allows you to manage CSRs.

Create CSR

Example 8-15. Create CSR

Request:

```
POST https://<vsm-ip>/api/2.0/services/truststore/csr/<scopeId>
```

Request Body:

```
<csr>
      <subject>
            <attribute>
                  <key>CN</key>
                  <value>VSM</value>
            </attribute>
            <attribute>
                  <key>O</key>
                  <value>VMware</value>
            </attribute>
            <attribute>
                  <key>OU</key>
                  <value>IN</value>
            </attribute>
            <attribute>
                  <key>C</key>
                  <value>IN</value>
            </attribute>
      </subject>
      <algorithm>RSA</algorithm>
      <keySize>1024</keySize>
</csr>
```

Create Self Signed Certificate for CSR

Example 8-16. Create self signed certificate for CSR

Request:

```
PUT https://<vsm-ip>/api/2.0/services/truststore/csr/<csrId>?noOfDays=<value>
```

Query CSRs

Retrieves specified CSR or all CSRs for specified scope.

Example 8-17. Query specific CSR

```
GET https://<vsm-ip>/api/2.0/services/truststore/csr/<csrId>
```

Example 8-18. Query CSRs for specific scope

```
GET https://<vsm-ip>/api/2.0/services/truststore/csr/scope/<scopeId>
```

Request Body:

```
<csrs>
      <csr>
```

```
            ...
        </csr>
        <csr>
            ...
        </csr>
        ...
</csrs>
```

Working with Certificate Revocation List (CRL)

Allows you to manage CRLs.

Create a CRL

Creates a CRL on the specified scope.

Example 8-19. Create CRL

Request:

```
POST https://<vsm-ip>/api/2.0/services/truststore/crl/<scopId>
Request Body:
<trustObject>
    <pemEncoding></pemEncoding>
</trustObject>
```

Query CRL

Retrieves all CRLs certificates for the specified certificate or scope.

Example 8-20. Query CRL

Retrieve certificate object for the specified certificate ID:

```
GET https://<vsm-ip>/api/2.0/services/truststore/crl/<crlId>
```

Retrieve all certificates for the specified scope:

```
GET https://<vsm-ip>/api/2.0/services/truststore/crl/scope/<scopeId>
```

Delete CRL

Deletes the specified CRL.

Example 8-21. Delete CRL

Request:

```
DELETE https://<vsm-ip>/api/2.0/services/truststore/crl/<crlId>
```

Working with NSX Edge Firewall

Edge Firewall provides perimeter security functionality including firewall, Network Address Translation (NAT) as well as Site to site IPSec and SSL VPN functionality. This solution is available in the virtual machine form factor and can be deployed in a High Availability mode.

Configure Firewall

Configures firewall for an Edge and stores the specified configuration in database. If any appliance(s) are associated with this edge, applies the configuration to these. While using this API, the user should send the globalConfig, defaultPolicy and the rules. If either of them are not sent, the previous config if any on those fields will be removed and will be changed to the system defaults.

Example 8-22. Configure firewall

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config

Request Body:

```
<?xml version="1.0"?>
<firewall>
<defaultPolicy>    <-- Optional. default is deny -->
<action>deny</action>
<loggingEnabled>false</loggingEnabled>    <!-- Optional. Defaults to false -->
</defaultPolicy>
<globalConfig>   <!-- Optional -->
<tcpPickOngoingConnections>false</tcpPickOngoingConnections>   <!-- Optional. Defaults to false -->
<tcpAllowOutOfWindowPackets>false</tcpAllowOutOfWindowPackets>    <!-- Optional. Defaults to false -->
<tcpSendResetForClosedVsePorts>true</tcpSendResetForClosedVsePorts>    <!-- Optional. Defaults to true -->
<dropInvalidTraffic>true</dropInvalidTraffic>    <!-- Optional. Defaults to true -->
<logInvalidTraffic>false</logInvalidTraffic>     <!-- Optional. Defaults to false -->
<tcpTimeoutOpen>30</tcpTimeoutOpen>       <!-- Optional. Defaults to 30 -->
<tcpTimeoutEstablished>3600</tcpTimeoutEstablished>   <!-- Optional. Defaults to 3600 -->
<tcpTimeoutClose>30</tcpTimeoutClose>   <!-- Optional. Defaults to 30 -->
<udpTimeout>60</udpTimeout>            <!-- Optional. Defaults to 60 -->
<icmpTimeout>10</icmpTimeout>          <!-- Optional. Defaults to 10 -->
<icmp6Timeout>10</icmp6Timeout>          <!-- Optional. Defaults to 10 -->
<ipGenericTimeout>120</ipGenericTimeout>    <!-- Optional. Defaults to 120 -->
</globalConfig>
<rules>
<rule>
<ruleTag>1</ruleTag>            <!-- Optional. This can be used to specify user controlled ids on VSE. The inputs here should be
                    1-65536. If not specified, VSM will generate ruleId -->
<name>rule1</name>                    <!-- Optional -->
<source>                          <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                    multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
<ipAddress>1.1.1.1</ipAddress> <!-- Possible formats are IP, IP1-IPn, CIDR. Can define multiple of these -->
</source>
<destination>                       <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<groupingObjectId>ipset-126</groupingObjectId>  <!-- Id of IPAddresses grouping Objects available to the edge. Can define
                    multiple of these -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                    multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
<ipAddress>192.168.10.0/24</ipAddress> <!-- Possible formats are IP, IP1-IPn, CIDR. Can define multiple of these -->
</destination>
<application>                       <!-- Optional. Default behaviour is like "any". applicationsetId or applicationgroupId can be used -->
<applicationId>application-155</applicationId>   <!-- Id of Service available to the edge. Can define multiple of these -->
<service> <!-- Can define multiple of these -->
  <protocol>tcp</protocol>
  <port>80</port>  <!-- Default is "any". Can define multiple of these -->
 <sourcePort>1500</sourcePort>  <!-- Default is "any". Can define multiple of these -->
</service>
</application>
<matchTranslated>true</matchTranslated>       <!-- Optional. Default behaviour is like "false" -->
<direction>in</direction>       <!-- Optional. Default behaviour is like "any". Possible values are in|out -->
<action>accept</action>                 <!-- Mandatory. Possible values are accept|deny -->
<enabled>true</enabled>                  <!-- Optional. Defaults to true -->
```

```
<loggingEnabled>true</loggingEnabled>     <!-- Optional. Defaults to false -->
<description>comments</description>       <!-- Optional -->
</rule>
<rule>
...
</rule>
.....
</rules>
</firewall>
```

---

where ruleId uniquely identifies a rule and should be specified only for rules that are being updated.

If ruleTag is specified, the rules on Edge are configured using this user input. Otherwise, Edge is configured using ruleIds generated by NSX Manager.

Query Firewall Configuration

Retrieves firewall configuration on specified Edge.

Example 8-23. Query firewall

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config
```

Response Body:

```
<firewall>
    <version>1</version>
    <enabled>true</enabled>
    <defaultPolicy>
      <action>deny</action>
      <loggingEnabled>false</loggingEnabled>
    </defaultPolicy>

   <globalConfig>
      <tcpPickOngoingConnections>false</tcpPickOngoingConnections>
      <tcpAllowOutOfWindowPackets>false</tcpAllowOutOfWindowPackets>
      <tcpSendResetForClosedVsePorts>true</tcpSendResetForClosedVsePorts>
      <dropInvalidTraffic>true</dropInvalidTraffic>
      <logInvalidTraffic>false</logInvalidTraffic>
      <tcpTimeoutOpen>30</tcpTimeoutOpen>
      <tcpTimeoutEstablished>3600</tcpTimeoutEstablished>
      <tcpTimeoutClose>30</tcpTimeoutClose>
      <udpTimeout>60</udpTimeout>
      <icmpTimeout>10</icmpTimeout>
       <icmp6Timeout>10</icmp6Timeout>
       <ipGenericTimeout>120</ipGenericTimeout>
    </globalConfig>
    <rules>
      <rule>
        <id>131079</id>
        <ruleTag>131079</ruleTag>
        <name>firewall</name>
        <ruleType>internal_high</ruleType>
        <source>
          <vnicGroupId>vse</vnicGroupId>
        </source>
        <action>accept</action>
        <enabled>true</enabled>
        <loggingEnabled>false</loggingEnabled>
        <description>firewall</description>
      </rule>
      <rule>
        <id>131080</id>
        <ruleTag>131080</ruleTag>
```

```
  <name>ipsec</name>
  <ruleType>internal_high</ruleType>
  <source>
    <groupingObjectId>ipset-934</groupingObjectId>
    <groupingObjectId>ipset-933</groupingObjectId>
  </source>
  <destination>
    <groupingObjectId>ipset-934</groupingObjectId>
    <groupingObjectId>ipset-933</groupingObjectId>
  </destination>
  <application>
    <applicationId>application-661</applicationId>
    <applicationId>application-662</applicationId>
  </application>
  <action>accept</action>
  <enabled>true</enabled>
  <loggingEnabled>false</loggingEnabled>
  <description>ipsec</description>
</rule>
<rule>
  <id>131077</id>
  <ruleTag>131077</ruleTag>
  <name>name1</name>
  <ruleType>user</ruleType>
  <source>
    <groupingObjectId>ipset-940</groupingObjectId>

    <ipAddress>1.1.1.1</ipAddress> <!-- IP -->
    <ipAddress>2.2.2.2/24</ipAddress> <!-- CIDR -->
    <ipAddress>1.1.1.1-1.1.1.10</ipAddress> <!-- IP Range -->
  </source>
  <destination>
    <groupingObjectId>ipset-941</groupingObjectId>

    <vnicGroupId>vse</vnicGroupId>
    <vnicGroupId>external</vnicGroupId>
  </destination>
  <application>   <!-- Optional. Default behaviour is "any:any". Can define multiple of these -->
    <applicationId>application-667</applicationId>

    <service> <!-- Optional. Can define multiple of these -->
      <protocol>tcp</protocol>
      <port>80</port>
     </service>
  </application>
  <action>deny</action>
  <direction>in</direction>
  <enabled>true</enabled>
  <loggingEnabled>false</loggingEnabled>
  <matchTranslated>true</matchTranslated>
</rule>
<rule>
  <id>131078</id>
  <ruleTag>131078</ruleTag>
  <name>name2</name>
  <ruleType>user</ruleType>
  <source>
    <groupingObjectId>ipset-938</groupingObjectId>
  </source>
  <destination/>
  <application>
    <applicationId>application-666</applicationId>
  </application>
  <action>accept</action>
  <enabled>true</enabled>
  <loggingEnabled>false</loggingEnabled>
  <matchTranslated>false</matchTranslated>
</rule>
```

```
    <rule>
      <id>131075</id>
      <ruleTag>131075</ruleTag>
      <name>default rule for ingress traffic</name>
      <ruleType>default_policy</ruleType>
      <action>deny</action>
      <enabled>true</enabled>
      <loggingEnabled>false</loggingEnabled>
      <description>default rule for ingress traffic</description>
    </rule>
  </rules>
</firewall>
```

Append Firewall Rules

Adds one or more rules below the existing rules in the rules table.

Example 8-24. Add firewall rule

POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/firewall/config/rules

Request Body:

```
<rules>
<rule>
<ruleTag>1</ruleTag>            <!-- Optional. This can be used to specify user controlled ids on VSE. The inputs here should be
                                1-65536. If not specified, VSM will generate ruleId -->
<name>rule1</name>                      <!-- Optional -->
<source>                                <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                                multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                                of these -->
</source>
<destination>                           <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<groupingObjectId>ipset-126</groupingObjectId>  <!-- Id of IPAddresses grouping Objects available to the edge. Can define
                                multiple of these -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                                multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                                of these -->
</destination>
<application>                           <!-- Optional. Default behaviour is like "any". applicationsetId or applicationgroupId can be used -->
<applicationId>application-155</applicationId>   <!-- Id of Service available to the edge. Can define multiple of these -->
</application>
<matchTranslated>true</matchTranslated>        <!-- Optional. Default behaviour is like "false" -->
<direction>in</direction>       <!-- Optional. Default behaviour is like "any". Possible values are in|out -->
<action>accept</action>                 <!-- Mandatory. Possible values are accept|deny -->
<enabled>true</enabled>                  <!-- Optional. Defaults to true -->
<loggingEnabled>true</loggingEnabled>      <!-- Optional. Defaults to false -->
<description>comments</description>        <!-- Optional -->
</rule>
<rule>
...
</rule>
```

Add a Firewall Rule Above a Specific Rule

You can add a rule above a specific rule by indicating its ruleID. If no user-rules exist in t he firewall rules table, you can specify ruleId=0. If you do not specify a ruleID or the specified ruleID does not exist, Edge Manager displays an error.

Example 8-25. Add a rule above a specific rule

Request:

POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/firewall/config/rules?aboveRuleId=<ruleId>

Request Body:

```
<rule>
<ruleTag>1</ruleTag>            <!-- Optional. This can be used to specify user controlled ids on VSE. The inputs here should be
                    1-65536. If not specified, VSM will generate ruleId -->
<name>rule1</name>                      <!-- Optional -->
<source>                        <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                    multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
</source>
<destination>                       <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<groupingObjectId>ipset-126</groupingObjectId>  <!-- Id of IPAddresses grouping Objects available to the edge. Can define
                    multiple of these -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                    multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
</destination>
<application>                       <!-- Optional. Default behaviour is like "any". applicationsetId or applicationgroupId can be used -->
<applicationId>application-155</applicationId>   <!-- Id of Service available to the edge. Can define multiple of these -->
</application>
<matchTranslated>true</matchTranslated>       <!-- Optional. Default behaviour is like "false" -->
<direction>in</direction>       <!-- Optional. Default behaviour is like "any". Possible values are in|out -->
<action>accept</action>                 <!-- Mandatory. Possible values are accept|deny -->
<enabled>true</enabled>                 <!-- Optional. Defaults to true -->
<loggingEnabled>true</loggingEnabled>     <!-- Optional. Defaults to false -->
<description>comments</description>       <!-- Optional -->
</rule>
```

Query Specific Rule

Example 8-26. Retrieve specific rule

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/firewall/config/rules/<ruleId>

Response Body:

```
<rule>
<name>new rule</name>
<source>
<vnicGroupId>vnic-index-5</vnicGroupId>
</source>
<destination>
<groupingObjectId>ipset-127</groupingObjectId>
</destination>
<action>accept</action>
<enabled>true</enabled>
<loggingEnabled>true</loggingEnabled>
<description/>
</rule>
```

Modify Firewall Rule

You can modify a rule by specifying its rule ID.

Example 8-27. .Update specific rule

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/firewall/config/rules/<ruleId>

Response Body:

```
<rule>
```

```
<ruleTag>1</ruleTag>            <!-- Optional. This can be used to specify user controlled ids on VSE. The inputs here should be
                    1-65536. If not specified, VSM will generate ruleId -->
<name>rule1</name>                    <!-- Optional -->
<source>                        <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                    multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
</source>
<destination>                       <!-- Optional. Default behaviour is like "any". ipsetId or predefined-vnicGroupIds can be used -->
<groupingObjectId>ipset-126</groupingObjectId>  <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
<vnicGroupId>vnic-index-5</vnicGroupId>  <!-- Possible values are "vnic-index-[0-9]", "vse", "external" or "internal". Can define
                    multiple of these -->
<groupingObjectId>ipset-128</groupingObjectId> <!-- Id of IPAddresses grouping Objects available to the edge. Can define multiple
                    of these -->
</destination>
<application>                       <!-- Optional. Default behaviour is like "any". applicationsetId or applicationgroupId can be used -->
<applicationId>application-155</applicationId>   <!-- Id of Service available to the edge. Can define multiple of these -->
</application>
<matchTranslated>true</matchTranslated>       <!-- Optional. Default behaviour is like "false" -->
<direction>in</direction>       <!-- Optional. Default behaviour is like "any". Possible values are in|out -->
<action>accept</action>                 <!-- Mandatory. Possible values are accept|deny -->
<enabled>true</enabled>                 <!-- Optional. Defaults to true -->
<loggingEnabled>true</loggingEnabled>     <!-- Optional. Defaults to false -->
<description>comments</description>       <!-- Optional -->
</rule>
```

Delete a Firewall Rule

Deletes the rule with the specified rule ID.

Example 8-28. Delete firewall rule

Request Body;

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/firewall/config/rules/<ruleId>
```

Delete Firewall Configuration

Deletes firewall configuration for Edge.

Example 8-29. Delete firewall configuration

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config
```

Manage Global Firewall Configuration

Global firewall configuration allows fine grained tuning of firewall behavior and its stateful session timeouts.

The default settings of these parameters are set for normal stateful firewall operation. Administrators are not expected to modify these default settings unless to support a specific custom scenario.

Query Global Firewall Configuration

Retrieves the firewall default policy for an edge.

Example 8-30. Query global firewall configuration

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config/global
```

Response Body:

```
<globalConfig>
<tcpPickOngoingConnections>false</tcpPickOngoingConnections>
<tcpAllowOutOfWindowPackets>false</tcpAllowOutOfWindowPackets>
<tcpSendResetForClosedVsePorts>true</tcpSendResetForClosedVsePorts>
<dropInvalidTraffic>true</dropInvalidTraffic>
<logInvalidTraffic>false</logInvalidTraffic>
<tcpTimeoutOpen>30</tcpTimeoutOpen>
<tcpTimeoutEstablished>3600</tcpTimeoutEstablished>
<tcpTimeoutClose>30</tcpTimeoutClose>
<udpTimeout>60</udpTimeout>
<icmpTimeout>10</icmpTimeout>
<icmp6Timeout>10</icmp6Timeout>
<ipGenericTimeout>120</ipGenericTimeout>
</globalConfig>
```

Modify Global Configuration

Configures firewall global config for an edge. Stores the specified configuration in database. If any appliance(s) are associated with this edge, applies the configuration to these. Does not change the defaultPolicy and rules.

Example 8-31. Modify global firewall configuration

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config/global
```

Response Body:

```
<globalConfig>   <!-- Optional -->
<tcpPickOngoingConnections>false</tcpPickOngoingConnections>   <!-- Optional. Defaults to false -->
<tcpAllowOutOfWindowPackets>false</tcpAllowOutOfWindowPackets>    <!-- Optional. Defaults to false -->
<tcpSendResetForClosedVsePorts>true</tcpSendResetForClosedVsePorts>    <!-- Optional. Defaults to true -->
<dropInvalidTraffic>true</dropInvalidTraffic>    <!-- Optional. Defaults to true -->
<logInvalidTraffic>false</logInvalidTraffic>     <!-- Optional. Defaults to false -->
<tcpTimeoutOpen>30</tcpTimeoutOpen>       <!-- Optional. Defaults to 30 -->
<tcpTimeoutEstablished>3600</tcpTimeoutEstablished>   <!-- Optional. Defaults to 3600 -->
<tcpTimeoutClose>30</tcpTimeoutClose>   <!-- Optional. Defaults to 30 -->
<udpTimeout>60</udpTimeout>            <!-- Optional. Defaults to 60 -->
<icmpTimeout>10</icmpTimeout>          <!-- Optional. Defaults to 10 -->
<icmp6Timeout>10</icmp6Timeout>          <!-- Optional. Defaults to 10 -->
<ipGenericTimeout>120</ipGenericTimeout>    <!-- Optional. Defaults to 120 -->
</globalConfig>
```

Manage Default Firewall Policy

Default firewall settings apply to traffic that does not match any of the user-defined firewall rules. The default Edge firewall policy blocks all incoming traffic.

Query Default Firewall Policy

Retrieves default firewall policy for the specified Edge.

Example 8-32. Query default firewall configuration

Request:

GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config/defaultpolicy

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallDefaultPolicy>
<action>ACCEPT</action>
<loggingEnabled>true</loggingEnabled>
</firewallDefaultPolicy>
```

Modify Default Firewall Policy

Configures default firewall policy for the specified Edge.

Example 8-33. Modify default firewall configuration

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config/defaultpolicy

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallDefaultPolicy>
<action>ACCEPT</action>
<loggingEnabled>true</loggingEnabled>
</firewallDefaultPolicy>
```

Query Firewall Statistics

Retrieves number of ongoing connections for the firewall configuration.

Example 8-34. Query firewall statistics

Request:

GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/statistics/dashboard/firewall?interval=<range>

Response Body:

```
<dashboardStatistics>
<meta>
<startTime>1336068000</startTime> <!-- in seconds -->
<endTime>1336100700</endTime> <!-- in seconds -->
<interval>300</interval>
</meta>

<data>
<firewall>
</firewall>
</data>

</dashboardStatistics>
```

where input range can be given in query parameter:

Default (when not specified): 60 mins (One hour)

This input is either 1 - 60 minutes or oneDay|oneWeek|oneMonth|oneYear'

Query Firewall Statistics for Rule

Retrieves statistics for a rule.

Example 8-35. Query statistics for a rule

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/statistics/{ruleId}
```

Response Body:

```
<firewallRuleStats>
<timestamp>1342317563</timestamp>
<connectionCount>0</connectionCount>
<packetCount>0</packetCount>
<byteCount>0</byteCount>
</firewallRuleStats>
```

Disable Firewall

Firewall can be disabled only on an xlarge Edge.

Example 8-36. Disable Firewall

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/firewall/config
```

Request Body:

```
<firewall><enabled>false</enabled></firewall>
```

Working with NAT

Configure NAT

NSX Edge provides network address translation (NAT) service to protect the IP addresses of internal (private) networks from the public network. You can configure NAT rules to provide access to services running on privately addressed virtual machines. There are two types of NAT rules that can be configured: SNAT and DNAT. When you post a NAT configuration, all the rules (both SNAT and DNAT) must be posted together. Otherwise, only the posted rules are retained, and unposted rules are deleted.

All SNAT and DNAT rules configured by using REST requests appear under the **NAT** tab for the appropriate Edge Edge in the Edge Manager user interface and in the vSphere Client plug-in.

Example 8-37. Configure SNAT and DNAT rules for a Edge Edge

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config

<nat>
    <natRules>
        <natRule>
            <ruleTag>65537</ruleTag>            <!-- Optional. Can be used to specify user-controlled ids on VSE. Valid inputs
                                65537-131072. If not specified, vShield manager will generate ruleId -->
            <action>dnat</action>
            <vnic>0</vnic>
            <originalAddress>10.112.196.116</originalAddress>
            <translatedAddress>172.16.1.10</translatedAddress>
            <loggingEnabled>true</loggingEnabled>   <!-- Optional. Default is false -->
            <enabled>true</enabled>             <!-- Optional. Default is true -->
            <description>my comments</description>  <!-- Optional -->
            <protocol>tcp</protocol>            <!-- Optional. Default is "any". This tag is not supported for SNAT rule -->
            <translatedPort>3389</translatedPort>   <!-- Optional. Default is "any". This tag is not supported for SNAT rule -->
            <originalPort>3389</originalPort>       <!-- Optional. Default is "any". This tag is not supported for SNAT rule -->
        </natRule>
        <natRule>
```

```
            <ruleTag>65538</ruleTag>            <!-- Optional. Can be used to specify user-controlled ids on VSE. Valid inputs
                                65537-131072. If not specified, VSM will generate ruleId -->
            <action>snat</action>
            <vnic>1</vnic>
            <originalAddress>172.16.1.10</originalAddress>
            <translatedAddress>10.112.196.116</translatedAddress>
            <loggingEnabled>false</loggingEnabled>  <!-- Optional. Default is "false" -->
            <enabled>true</enabled>             <!-- Optional. Default is "true" -->
            <description>no comments</description>  <!-- Optional. Default is "any" -->
        </natRule>
    </natRules>
</nat>
```

For the data path to work, you need to add firewall rules to allow the required traffic for IP addresses and port per the NAT rules.

Rules:

- You must add <icmpType> if you configure icmp as the protocol.
- The originalAddress and translatedAddress elements can be entered in either of these methods:
  - <ipAddress> specified as a single IP address, a hyphen-separated IP address range (for example, 192.168.10.1-192.168.10.2555) or a subnet in CIDR notation (198.168.10.1/24).
  - the keyword any
- The originalPort and translatedPort parameters can be entered in one of the following formats: the keyword any, the port number as an integer, or a range of port number, for example portX-portY.
- You can add multiple SNAT rules by entering multiple <type>snat</type> sections in the body.
- SNAT does not support port or protocol parameters.
- Logging is disabled by default. To enable logging, add an <enableLog> element set to true.

Query NAT Rules for a Edge Edge

Example 8-38. Query SNAT and DNAT rules for a Edge Edge

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<nat>
    <natRules>
        <natRule>
            <ruleTag>196609</ruleTag>
            <ruleId>196609</ruleId>
            <action>dnat</action>
            <vnic>0</vnic>
            <originalAddress>10.112.196.116</originalAddress>
            <translatedAddress>172.16.1.10</translatedAddress>
            <loggingEnabled>true</loggingEnabled>
            <enabled>true</enabled>
            <description>my comments</description>
            <protocol>tcp</protocol>
            <translatedPort>3389</translatedPort>
            <originalPort>3389</originalPort>
            <ruleType>user</ruleType>
        </natRule>
        <natRule>
            <ruleTag>196609</ruleTag>
            <ruleId>196609</ruleId>
            <action>snat</action>
            <vnic>1</vnic>
            <originalAddress>172.16.1.10</originalAddress>
            <translatedAddress>10.112.196.116</translatedAddress>
```

```
            <loggingEnabled>false</loggingEnabled>
            <enabled>true</enabled>
            <description>no comments</description>
            <protocol>any</protocol>
            <originalPort>any</originalPort>
            <translatedPort>any</translatedPort
            <ruleType>user</ruleType>

        </natRule>
    </natRules>
</nat>
```

Delete all NAT Rules

Deletes all SNAT and DNAT rules for a Edge Edge. The auto plumbed rules continue to exist.

Example 8-39. Delete NAT rules

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config
```

Add a NAT Rule above a Specific Rule

Adds a NAT rule above the specified rule ID. If no NAT rules exist in t he NAT rules table, you can specify ruleId=0. If you do not specify a ruleID or the specified ruleID does not exist, Edge Manager displays an error.

Example 8-40. Add a NAT rule above a specific rule

```
POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config/rules?aboveRuleId=<ruleId>
```

Request Body:

```
<natRule>
    <action>dnat</action>
    <vnic>0</vnic>
    <originalAddress>10.112.196.116</originalAddress>
    <translatedAddress>172.16.1.10</translatedAddress>
    <loggingEnabled>true</loggingEnabled>
    <enabled>true</enabled>
    <description>my comments</description>
    <protocol>tcp</protocol>
    <translatedPort>3389</translatedPort>
    <originalPort>3389</originalPort>
</natRule>
```

Append NAT Rules

Appends one or more rules to the bottom of the NAT rules table.

Example 8-41. Add NAT rules to the bottom of the rules table

```
POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config/rules
```

Response Body:

```
<natRules>
    <natRule>
        <action>dnat</action>
        <vnic>0</vnic>
        <originalAddress>10.112.196.116</originalAddress>
        <translatedAddress>172.16.1.10</translatedAddress>
        <loggingEnabled>true</loggingEnabled>
        <enabled>true</enabled>
        <description>my comments</description>
```

```
            <protocol>tcp</protocol>
            <translatedPort>3389</translatedPort>
            <originalPort>3389</originalPort>
        </natRule>
</natRules>
```

where vnic is the internal or uplink interface of the Edge Edge (0-9).

Modify a NAT Rule

Replaces the NAT rule with the specified rule ID.

Example 8-42. Replaces a NAT rule

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config/rules/ruleID
```

Response Body:

```
<natRule>
      <action>dnat</action>
      <vnic>0</vnic>
      <originalAddress>10.112.196.116</originalAddress>
      <translatedAddress>172.16.1.10</translatedAddress>
      <loggingEnabled>true</loggingEnabled>
      <enabled>true</enabled>
      <description>my comments</description>
      <protocol>tcp</protocol>
      <translatedPort>3389</translatedPort>
      <originalPort>3389</originalPort>
</natRule>
```

where vnic is the internal or uplink interface of the Edge Edge (0-9).

Delete a NAT Rule

Deletes the rule with the specified rule ID.

Example 8-43. Delete NAT rule

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/nat/config/rules/ruleID
```

Working with Routing

You can specify static and dynamic routing for each NSX Edge.

Dynamic routing provides the necessary forwarding information between layer 2 broadcast domains, thereby allowing you to decrease layer 2 broadcast domains and improve network efficiency and scale. NSX extends this intelligence to where the workloads reside for doing East-West routing. This allows more direct virtual machine to virtual machine communication without the costly or timely need to extend hops. At the same time, NSX also provides North-South connectivity, thereby enabling tenants to access public networks.

Configure Routes

Configures globalConfig, staticRouting, OSPG, BGP, and IS-IS.

Example 8-44. Configure routes

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config
<routing>
  <routingGlobalConfig>
     <routerId>1.1.1.1</routerId>  <!-- Required when dynamic routing protocols like OSPF, BGP, IS-IS is configured -->
```

```
    <logging>                   <!-- Optional. When absent, enable=false and logLevel=INFO -->
      <enable>false</enable>
      <logLevel>info</logLevel>
    </logging>
    <ipPrefixes>   <!-- Optional. Required only if user wants to define redistribution rules in dynamic routing protocols like ospf, isis,
                        bgp -->
     <ipPrefix>
      <name>a</name>    <!-- All the defined ipPrefix must have unique names -->
      <ipAddress>10.112.196.160/24</ipAddress>
     </ipPrefix>
     <ipPrefix>
      <name>b</name>
      <ipAddress>192.168.10.0/24</ipAddress>
     </ipPrefix>
    </ipPrefixes>
  </routingGlobalConfig>
  <staticRouting>
   <staticRoutes>   <!-- Optional, if no static routes needs to be configured -->
   <route>
     <description>route1</description>
     <vnic>0</vnic>
     <network>3.1.1.4/22</network>
     <nextHop>172.16.1.14</nextHop>
     <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                        interface on which this route is configured -->
   </route>
   <route>
     <description>route2</description>
     <vnic>1</vnic>
     <network>4.1.1.4/22</network>
     <nextHop>10.112.196.118</nextHop>
     <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                        interface on which this route is configured -->
   </route>
  </staticRoutes>
  <defaultRoute>      <!-- Optional, if no default routes needs to be configured -->
   <description>defaultRoute</description>
   <vnic>0</vnic>
   <gatewayAddress>172.16.1.12</gatewayAddress>
   <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the interface
                        on which this route is configured -->
  </defaultRoute>
 </staticRouting>
 <ospf>              <!-- Optional, if no OSPF needs to be configured -->
  <enabled>true</enabled>      <!-- Optional. Defaults to true -->
  <ospfAreas>
   <ospfArea>
    <areaId>100</areaId> <!-- Mandatory and unique. Valid values are 0-4294967295 -->
    <type>normal</type> <!-- Optional. Default is normal. Valid inputs are normal, nssa -->
    <authentication>          <!-- Optional. When not specified, its "none" authentication. -->
      <type>password</type>   <!-- Valid values are none, password , md5 -->
      <value>vmware123</value>  <!-- Value as per the type of authentication -->
    </authentication>
   </ospfArea>
  </ospfAreas>
  <ospfInterfaces>
   <ospfInterface>
    <vnic>0</vnic>
    <areaId>100</areaId>
    <helloInterval>10</helloInterval> <!-- Optional. Default 10 sec. Valid values are 1-255-->
    <deadInterval>40</deadInterval>  <!-- Optional. Default 40 sec.  Valid values are 1-65535 -->
    <priority>128</priority> <!-- Optional. Default 128. Valid values are 0-255 -->
    <cost>10</cost> <!-- Optional. Auto based on interface speed. Valid values are 1-65535 -->
   </ospfInterface>
   </ospfInterfaces>
   <redistribution>
    <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
    <rules>
```

```
      <rule>
        <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
        <from>
          <isis>true</isis>          <!-- Optional. Defaults to false -->
          <ospf>false</ospf>         <!-- Optional. Defaults to false -->
          <bgp>false</bgp>           <!-- Optional. Defaults to false -->
          <static>false</static>     <!-- Optional. Defaults to false -->
          <connected>true</connected>  <!-- Optional. Defaults to false -->
        </from>
        <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
      <rule>
        <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
        <from>
          <isis>false</isis>          <!-- Optional. Defaults to false -->
          <ospf>false</ospf>         <!-- Optional. Defaults to false -->
          <bgp>true</bgp>           <!-- Optional. Defaults to false -->
          <static>false</static>     <!-- Optional. Defaults to false -->
          <connected>false</connected>  <!-- Optional. Defaults to false -->
        </from>
        <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
    </rules>
  </redistribution>
 </ospf>
<isis>          <!-- Optional, if no ISIS needs to be configured -->
<enabled>true</enabled>   <!-- Optional. Defaults to true -->
<systemId>0004.c150.f1c0</systemId>  <!-- Optional. 6 byte length & specified in HEX. When not specified, derived
                    routingGlobalConfig.routerId -->
<areaIds>   <!-- Atleast one is required. Max supported is 3 -->
  <areaId>49.0005.8000.ab7c.0000.ffe9.0001</areaId>
  <areaId>49.0005.8000.ab7c.0000.ffe9.0002</areaId>   <!-- Variable length between 1 and 13 bytes & specified in HEX. -->
  <areaId>49.0005.8000.ab7c.0000.ffe9.0003</areaId>
</areaIds>
<isType>level-1-2</isType>  <!-- Optional. Default is 'level-1-2'. Valid values are level-1, level-2, level-1-2 -->
<domainPassword>vshield</domainPassword>   <!-- Optional. Domain level authentication. Used when type is level-2 -->
<areaPassword>edge</areaPassword>          <!-- Optional. Area level authentication. Used when type is level-1 -->
<isisInterfaces>
 <isisInterface>
  <vnic>1</vnic>
  <meshGroup>10</meshGroup>           <!-- Optional. Valid values are : 0-4294967295 -->
  <helloInterval>10000</helloInterval>    <!-- Optional. Default is 10000 millisecond . Valid values are : 10-600000 -->
  <helloMultiplier>3</helloMultiplier> <!-- Optional. Default is 3. Valid values are : 2-100 -->
  <lspInterval>33</lspInterval>        <!-- Optional. Default is 33 milliseconds. Valid values are : 1-65535  -->
  <metric>10</metric>                 <!-- Optional. Default is 10. Valid values are : 1-16777215  -->
  <priority>64</priority>             <!-- Optional. Default is 64. Valid values are : 0-127 -->
  <circuitType>level-1-2</circuitType>  <!-- Optional. Valid values are level-1, level-2, level-1-2. If absent, 'type' from above is
                    used -->
  <password>msr</password>            <!-- Optional. Per interface authentication -->
 </isisInterface>
</isisInterfaces>
<redistribution>
   <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
   <rules>
     <rule>
       <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
       <from>
         <isis>false</isis>          <!-- Optional. Defaults to false -->
         <ospf>true</ospf>         <!-- Optional. Defaults to false -->
         <bgp>false</bgp>           <!-- Optional. Defaults to false -->
         <static>true</static>     <!-- Optional. Defaults to false -->
         <connected>false</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
     </rule>
```

```
      <rule>
        <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
        <from>
          <isis>false</isis>          <!-- Optional. Defaults to false -->
          <ospf>false</ospf>          <!-- Optional. Defaults to false -->
          <bgp>true</bgp>             <!-- Optional. Defaults to false -->
          <static>false</static>      <!-- Optional. Defaults to false -->
          <connected>true</connected>  <!-- Optional. Defaults to false -->
        </from>
        <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
    </rules>
  </redistribution>
</isis>
<bgp>       <!-- Optional, if no BGP needs to be configured -->
 <enabled>true</enabled>     <!-- Optional. Default is true -->
 <localAS>1</localAS>         <!-- Valid values are : 0-65535 -->
 <bgpNeighbours>
   <bgpNeighbour>
     <ipAddress>192.168.1.10</ipAddress>  <!-- IPv4 only. IPv6 support not supported -->
     <remoteAS>65500</remoteAS>         <!-- Valid values are 0-65535 -->
     <weight>60</weight>                  <!-- Optional. Default is 60. Valid values are 0-65535 -->
     <holdDownTimer>180</holdDownTimer>      <!-- Optional. Default is 180 seconds. Valid values are : 2-65535 . -->
     <keepAliveTimer>60</keepAliveTimer>     <!-- Optional. Default is 60 seconds. Valid values are : 1-65534 . -->
     <password>vmware123</password>          <!-- Optional -->
     <bgpFilters>                          <!-- Optional -->
       <bgpFilter>
         <direction>in</direction>       <!-- Valid values are in/out -->
         <action>permit</action>         <!-- Valid values are permit/deny -->
         <network>10.0.0.0/8</network>   <!-- Valid values are CIDR networks. IPv4 only. IPv6 support not supported -->
         <ipPrefixGe>17</ipPrefixGe>   <!-- Optional. "Greater than or equal to" & used for filtering based on prefix length. Valid
                    IPv4 prefixes -->
         <ipPrefixLe>32</ipPrefixLe>   <!-- Optional. "Less than or equal to" & used for filtering based on prefix length. Valid IPv4
                    prefixes -->
       </bgpFilter>
     </bgpFilters>
   </bgpNeighbour>
  </bgpNeighbours>
  <redistribution>
    <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
    <rules>
     <rule>
       <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
       <from>
         <isis>true</isis>          <!-- Optional. Defaults to false -->
         <ospf>true</ospf>          <!-- Optional. Defaults to false -->
         <bgp>false</bgp>           <!-- Optional. Defaults to false -->
         <static>true</static>      <!-- Optional. Defaults to false -->
         <connected>false</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
     </rule>
     <rule>
       <from>
         <isis>false</isis>          <!-- Optional. Defaults to false -->
         <ospf>false</ospf>          <!-- Optional. Defaults to false -->
         <bgp>false</bgp>            <!-- Optional. Defaults to false -->
         <static>false</static>      <!-- Optional. Defaults to false -->
         <connected>true</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
     </rule>
    </rules>
  </redistribution>
</bgp>
```

```
</routing>
```

Query Routes

Example 8-45. Retrieve routes

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<staticRouting>
      <staticRoutes>
            <route>
                  <vnic>0</vnic>
                  <network>3.1.1.4/22</network>
                  <nextHop>172.16.1.14</nextHop>
                  <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default is MTU of the
                                       interface on which this route is configured -->
                  <type>user</type>
            </route>
            <route>
                  <vnic>1</vnic>
                  <network>4.1.1.4/22</network>
                  <nextHop>10.112.196.118</nextHop>
                  <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default is MTU of the
                                       interface on which this route is configured -->
                  <type>user</type>
            </route>
      </staticRoutes>
      <defaultRoute>
            <vnic>0</vnic>
            <gatewayAddress>172.16.1.12</gatewayAddress>
            <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default is MTU of the interface
                                 on which this route is configured -->
      </defaultRoute>
</staticRouting>
```

Delete Routes

Deletes the routing configuration stored in the NSX Manager database and the default routes from the specified NSX Edge appliance.

Example 8-46. Delete routing

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config
```

Manage Global Routing Configuration

Configures the default gateway for static routes and dynamic routing details.

Specify Global Configuration

Example 8-47. Configure global route

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/global
```

Request Body:

```
<routingGlobalConfig>
    <routerId>1.1.1.1</routerId>  <!-- Required when dynamic routing protocols like OSPF, BGP, IS-IS is configured -->
    <logging>                  <!-- Optional. When absent, enable=false and logLevel=INFO -->
      <enable>false</enable>
      <logLevel>info</logLevel>
    </logging>
    <ipPrefixes>  <!-- Optional. Required only if user wants to define redistribution rules in dynamic routing protocols like ospf, isis,
                       bgp -->
     <ipPrefix>
      <name>a</name>   <!-- All the defined ipPrefix must have unique names -->
      <ipAddress>10.112.196.160/24</ipAddress>
     </ipPrefix>
     <ipPrefix>
      <name>b</name>
      <ipAddress>192.168.10.0/24</ipAddress>
     </ipPrefix>
    </ipPrefixes>
  </routingGlobalConfig>
```

Query Global Route

Retrieves routing information from the NSX Manager database for an edge which includes the following:

- Default route settings
- Static route configurations

Example 8-48. Query global route

Request Body:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/global
```

Manage Static Routing

Add or query static and default routes for secified Edge.

Configure Static Routes

Configures static and default routes.

Example 8-49. Configure static routes

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/static
```

Request Body:

```
<staticRouting>
  <staticRoutes>
    <route>
      <description>route1</description>
      <vnic>0</vnic>
      <network>3.1.1.4/22</network>
      <nextHop>172.16.1.14</nextHop>
      <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                            interface on which this route is configured -->
    </route>
    <route>
      <description>route2</description>
      <vnic>1</vnic>
      <network>4.1.1.4/22</network>
      <nextHop>10.112.196.118</nextHop>
```

```
      <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the
                interface on which this route is configured -->
    </route>
  </staticRoutes>
  <defaultRoute>
    <description>defaultRoute</description>
    <vnic>0</vnic>
    <gatewayAddress>172.16.1.12</gatewayAddress>
    <mtu>1500</mtu>  <!-- Optional. Valid value:smaller than the MTU set on the interface. Default will be the MTU of the interface
                on which this route is configured -->
  </defaultRoute>
</staticRouting>
```

Query Static Routes

Retrieves static and default routes.

Example 8-50. Query static routes

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/static
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
 <staticRouting>
  <staticRoutes>
    <route>
      <description>route1</description>
      <vnic>0</vnic>
      <network>3.1.1.4/22</network>
      <nextHop>172.16.1.14</nextHop>
      <mtu>1500</mtu>
      <type>user</type>
    </route>
    <route>
      <description>route2</description>
      <vnic>1</vnic>
      <network>4.1.1.4/22</network>
      <nextHop>10.112.196.118</nextHop>
      <mtu>1500</mtu>
      <type>user</type>
    </route>
  </staticRoutes>
  <defaultRoute>
    <description>defaultRoute</description>
    <vnic>0</vnic>
    <gatewayAddress>172.16.1.12</gatewayAddress>
    <mtu>1500</mtu>
  </defaultRoute>
</staticRouting>
```

Delete Static Routes

Deletes both static and default routing configuration stored in the NSX Manager database.

Example 8-51. Delete static routes

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/static
```

Manage OSPF Routes for NSX Edge

NSX Edge supports OSPF, an interior gateway protocol that routes IP packets only within a single routing domain. It gathers link state information from available routers and constructs a topology map of the network. The topology determines the routing table presented to the Internet Layer, which makes routing decisions based on the destination IP address found in IP packets.

OSPF routing policies provide a dynamic process of traffic load balancing between routes of equal cost. An OSPF network is divided into routing areas to optimize traffic. An area is a logical collection of OSPF networks, routers, and links that have the same area identification.

Areas are identified by an Area ID.

Configure OSPF

Example 8-52. Configure OSPF

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/ospf

Request Body:

```
<ospf>
 <enabled>true</enabled>      <!-- When not specified, it will be treated as false, When false, it will delete the existing config -->
 <ospfAreas>
  <ospfArea>
    <areaId>100</areaId> <!-- Mandatory and unique. Valid values are 0-4294967295 -->
    <type>normal</type> <!-- Optional. Default is normal. Valid inputs are normal, nssa -->
    <authentication>          <!-- Optional. When not specified, its "none" authentication. -->
      <type>password</type>   <!-- Valid values are none, password , md5 -->
      <value>vmware123</value>  <!-- Value as per the type of authentication -->
    </authentication>
  </ospfArea>
 </ospfAreas>
 <ospfInterfaces>
  <ospfInterface>
    <vnic>0</vnic>
    <areaId>100</areaId>
    <helloInterval>10</helloInterval> <!-- Optional. Default 10 sec. Valid values are 1-255-->
    <deadInterval>40</deadInterval>  <!-- Optional. Default 40 sec.  Valid values are 1-65535 -->
    <priority>128</priority> <!-- Optional. Default 128. Valid values are 0-255 -->
    <cost>10</cost> <!-- Optional. Auto based on interface speed. Valid values are 1-65535 -->
  </ospfInterface>
 </ospfInterfaces>
 <redistribution>
   <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
   <rules>
    <rule>
      <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
      <from>
        <isis>true</isis>          <!-- Optional. Defaults to false -->
        <ospf>false</ospf>         <!-- Optional. Defaults to false -->
        <bgp>false</bgp>           <!-- Optional. Defaults to false -->
        <static>false</static>     <!-- Optional. Defaults to false -->
        <connected>true</connected>  <!-- Optional. Defaults to false -->
      </from>
      <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
    </rule>
    <rule>
      <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
      <from>
        <isis>false</isis>         <!-- Optional. Defaults to false -->
        <ospf>false</ospf>         <!-- Optional. Defaults to false -->
        <bgp>true</bgp>            <!-- Optional. Defaults to false -->
```

```
        <static>false</static>     <!-- Optional. Defaults to false -->
        <connected>false</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
     </rules>
   </redistribution>
</ospf>
```

Query OSPF

Example 8-53. Query OSPF

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/ospf

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ospf>
 <enabled>true</enabled>
 <ospfAreas>
  <ospfArea>
   <areaId>100</areaId>
   <type>normal</type>
   <authentication>
    <type>password</type>
    <value>vmware123</value>
   </authentication>
  </ospfArea>
 </ospfAreas>
 <ospfInterfaces>
  <ospfInterface>
   <vnic>0</vnic>
   <areaId>100</areaId>
   <helloInterval>10</helloInterval>
   <deadInterval>40</deadInterval>
   <priority>128</priority>
   <cost>10</cost>
  </ospfInterface>
 </ospfInterfaces>
 <redistribution>
   <enabled>true</enabled>
   <rules>
    <rule>
     <id>1</id>
     <prefixName>a</prefixName>
     <from>
      <isis>true</isis>
      <ospf>false</ospf>
      <bgp>false</bgp>
      <static>false</static>
      <connected>true</connected>
     </from>
     <action>deny</action>
    </rule>
    <rule>
     <id>0</id>
     <prefixName>b</prefixName>
     <from>
      <isis>false</isis>
      <ospf>false</ospf>
      <bgp>true</bgp>
      <static>false</static>
      <connected>false</connected>
     </from>
```

```
      <action>permit</action>
    </rule>
  </rules>
 </redistribution>
</ospf>
```

Delete OSPF

Deletes OSPF routing.

Example 8-54. Delete OSPF

Request

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/ospf

Manage ISIS Routes for NSX Edge

Intermediate System to Intermediate System (IS-IS) is a routing protocol designed to move information by determining the best route for datagrams through a packet-switched network. A two-level hierarchy is used to support large routing domains. A large domain may be divided into areas. Routing within an area is referred to as Level 1 routing. Routing between areas is referred to as Level 2 routing. A Level 2 Intermediate System (IS) keeps track of the paths to destination areas. A Level 1 IS keeps track of the routing within its own area. For a packet going to another area, a Level 1 IS sends the packet to the nearest Level 2 IS in its own area, regardless of what the destination area is. Then the packet travels via Level 2 routing to the destination area, where it may travel via Level 1 routing to the destination. This is referred to as Level-1-2.

Configure ISIS

Example 8-55. Configure ISIS

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/isis

Request Body:

```
<isis>
  <enabled>true</enabled>
  <systemId>0004.c150.f1c0</systemId>  <!-- Optional. 6 byte length & specified in HEX. When not specified, derived
                routingGlobalConfig.routerId -->
  <areaIds>   <!-- Atleast one is required. Max supported is 3 -->
    <areaId>49.0005.8000.ab7c.0000.ffe9.0001</areaId>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0002</areaId>   <!-- Variable length between 1 and 13 bytes & specified in HEX. -->
    <areaId>49.0005.8000.ab7c.0000.ffe9.0003</areaId>
  </areaIds>
  <isType>level-1-2</isType>  <!-- Optional. Default is 'level-1-2'. Valid values are level-1, level-2, level-1-2 -->
  <domainPassword>vshield</domainPassword>   <!-- Optional. Domain level authentication. Used when type is level-2 -->
  <areaPassword>edge</areaPassword>          <!-- Optional. Area level authentication. Used when type is level-1 -->
  <isisInterfaces>
   <isisInterface>
    <vnic>0</vnic>
    <meshGroup>10</meshGroup>           <!-- Optional. Valid values are : 0-4294967295 -->
    <helloInterval>10000</helloInterval>    <!-- Optional. Default is 10000 millisecond . Valid values are : 10-600000 -->
    <helloMultiplier>3</helloMultiplier> <!-- Optional. Default is 3. Valid values are : 2-100 -->
    <lspInterval>33</lspInterval>       <!-- Optional. Default is 33 milliseconds. Valid values are : 1-65535  -->
    <metric>10</metric>                 <!-- Optional. Default is 10. Valid values are : 1-16777215  -->
    <priority>64</priority>             <!-- Optional. Default is 64. Valid values are : 0-127 -->
    <circuitType>level-1-2</circuitType>  <!-- Optional. Valid values are level-1, level-2, level-1-2. If absent, 'type' from above is
                used -->
    <password>msr</password>            <!-- Optional. Per interface authentication -->
   </isisInterface>
  </isisInterfaces>
```

```
  <redistribution>
     <enabled>true</enabled>   <!-- Optional. Defaults to false. -->
     <rules>
      <rule>
       <prefixName>a</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
       <from>
        <isis>false</isis>          <!-- Optional. Defaults to false -->
        <ospf>true</ospf>          <!-- Optional. Defaults to false -->
        <bgp>false</bgp>           <!-- Optional. Defaults to false -->
        <static>true</static>      <!-- Optional. Defaults to false -->
        <connected>false</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
      <rule>
       <prefixName>b</prefixName>   <!-- Optional. Default is "any". prefixName used here should be defined in the
                    routingGlobalConfig->ipPrefixes -->
       <from>
        <isis>false</isis>          <!-- Optional. Defaults to false -->
        <ospf>false</ospf>          <!-- Optional. Defaults to false -->
        <bgp>true</bgp>            <!-- Optional. Defaults to false -->
        <static>false</static>     <!-- Optional. Defaults to false -->
        <connected>true</connected>  <!-- Optional. Defaults to false -->
       </from>
       <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
     </rules>
    </redistribution>
</isis>
```

Query ISIS

Example 8-56. Query ISIS

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/isis

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<isis>
  <enabled>true</enabled>
  <systemId>0004.c150.f1c0</systemId>
  <areaIds>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0001</areaId>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0002</areaId>
    <areaId>49.0005.8000.ab7c.0000.ffe9.0003</areaId>
  </areaIds>
  <isType>level-1-2</isType>
  <domainPassword>vshield</domainPassword>
  <areaPassword>edge</areaPassword>
  <isisInterfaces>
   <isisInterface>
    <vnic>0</vnic>
    <meshGroup>10</meshGroup>
    <helloInterval>10000</helloInterval>
    <helloMultiplier>3</helloMultiplier>
    <lspInterval>33</lspInterval>
    <metric>10</metric>
    <priority>64</priority>
    <circuitType>level-1-2</circuitType>
    <password>msr</password>
   </isisInterface>
  </isisInterfaces>
  <redistribution>
```

```
    <enabled>true</enabled>
    <rules>
      <rule>
        <id>1</id>
        <prefixName>a</prefixName>
        <from>
          <isis>false</isis>
          <ospf>true</ospf>
          <bgp>false</bgp>
          <static>true</static>
          <connected>false</connected>
        </from>
        <action>deny</action>
      </rule>
      <rule>
        <id>0</id>
          <prefixName>b</prefixName>
          <from>
            <isis>false</isis>
            <ospf>false</ospf>
            <bgp>true</bgp>
            <static>false</static>
            <connected>true</connected>
          </from>
          <action>permit</action>
        </rule>
      </rules>
    </redistribution>
</isis>
```

Delete ISIS

Deletes ISIS routing.

Example 8-57. Delete ISIS

Request

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/isis

Manage BGP Routes for NSX Edge

Border Gateway Protocol (BGP) makes core routing decisions. It includes a table of IP networks or prefixes which designate network reachability among autonomous systems. An underlying connection between two BGP speakers is established before any routing information is exchanged. Keep alive messages are sent out by the BGP speakers in order to keep this relationship alive. Once the connection is established, the BGP speakers exchange routes and synchronize their tables.

Configure BGP

Example 8-58. Configure BGP

Request

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/bgp

Request Body:

```
<bgp>
  <enabled>true</enabled>     <!-- Optional. Default is false -->
  <localAS>65534</localAS>          <!-- Valid values are : 1-65534 -->
  <bgpNeighbours>
    <bgpNeighbour>
      <ipAddress>192.168.1.10</ipAddress>  <!-- IPv4 only. IPv6 support not supported -->
```

```
      <remoteAS>65500</remoteAS>        <!-- Valid values are 0-65535 -->
      <weight>60</weight>               <!-- Optional. Default is 60. Valid values are 0-65535 -->
      <holdDownTimer>180</holdDownTimer>     <!-- Optional. Default is 180 seconds. Valid values are : 2-65535. -->
      <keepAliveTimer>60</keepAliveTimer>    <!-- Optional. Default is 60 seconds. Valid values are : 1-65534. -->
      <password>vmware123</password>         <!-- Optional -->
      <bgpFilters>                      <!-- Optional -->
        <bgpFilter>
          <direction>in</direction>      <!-- Valid values are in/out -->
          <action>permit</action>        <!-- Valid values are permit/deny -->
          <network>10.0.0.0/8</network>  <!-- Valid values are CIDR networks. IPv4 only. IPv6 support not supported -->
          <ipPrefixGe>17</ipPrefixGe>  <!-- Optional. "Greater than or equal to" & used for filtering based on prefix length. Valid
                IPv4 prefixes -->
          <ipPrefixLe>32</ipPrefixLe>  <!-- Optional. "Less than or equal to" & used for filtering based on prefix length. Valid IPv4
                prefixes -->
        </bgpFilter>
      </bgpFilters>
    </bgpNeighbour>
  </bgpNeighbours>
  <redistribution>
     <enabled>true</enabled>  <!-- Optional. Defaults to false. -->
     <rules>
      <rule>
        <prefixName>a</prefixName>  <!-- Optional. Default is "any". prefixName used here should be defined in the
                routingGlobalConfig->ipPrefixes -->
        <from>
          <isis>true</isis>         <!-- Optional. Defaults to false -->
          <ospf>true</ospf>         <!-- Optional. Defaults to false -->
          <bgp>false</bgp>          <!-- Optional. Defaults to false -->
          <static>true</static>     <!-- Optional. Defaults to false -->
          <connected>false</connected>  <!-- Optional. Defaults to false -->
        </from>
        <action>deny</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
      <rule>
        <from>
          <isis>false</isis>        <!-- Optional. Defaults to false -->
          <ospf>false</ospf>        <!-- Optional. Defaults to false -->
          <bgp>false</bgp>          <!-- Optional. Defaults to false -->
          <static>false</static>    <!-- Optional. Defaults to false -->
          <connected>true</connected>  <!-- Optional. Defaults to false -->
        </from>
        <action>permit</action>     <!-- Mandatory. Valid values are deny|permit -->
      </rule>
     </rules>
    </redistribution>
</bgp>
```

Query BGP

Example 8-59. Query BGP

Request

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/bgp

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<bgp>
  <enabled>true</enabled>
  <localAS>65535</localAS>
  <bgpNeighbours>
    <bgpNeighbour>
      <ipAddress>192.168.1.10</ipAddress>
      <remoteAS>65500</remoteAS>
      <weight>60</weight>
      <holdDownTimer>180</holdDownTimer>
```

```
      <keepAliveTimer>60</keepAliveTimer>
      <password>vmware123</password>
      <bgpFilters>
        <bgpFilter>
          <direction>in</direction>
          <action>permit</action>
          <network>10.0.0.0/8</network>
          <ipPrefixGe>17</ipPrefixGe>
          <ipPrefixLe>32</ipPrefixLe>
        </bgpFilter>
        <bgpFilter>
          <direction>out</direction>
          <action>deny</action>
          <network>20.0.0.0/26</network>
        </bgpFilter>
      </bgpFilters>
    </bgpNeighbour>
  </bgpNeighbours>
  <redistribution>
    <enabled>true</enabled>
    <rules>
      <rule>
        <id>1</id>
        <prefixName>a</prefixName>
        <from>
          <isis>true</isis>
          <ospf>true</ospf>
          <bgp>false</bgp>
          <static>true</static>
          <connected>false</connected>
        </from>
        <action>deny</action>
      </rule>
      <rule>
        <id>0</id>
          <from>
            <isis>false</isis>
            <ospf>false</ospf>
            <bgp>false</bgp>
            <static>false</static>
            <connected>true</connected>
          </from>
          <action>permit</action>
        </rule>
      </rules>
    </redistribution>
</bgp>
```

Delete BGP

Deletes BGP routing.

Example 8-60. Delete BGP

Request

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/routing/config/bgp
```

Working with Load Balancer

The NSX Edge load balancer enables network traffic to follow multiple paths to a specific destination. It distributes incoming service requests evenly among multiple servers in such a way that the load distribution is transparent to users. Load balancing thus helps in achieving optimal resource utilization, maximizing throughput, minimizing response time, and avoiding overload. NSX Edge provides load balancing up to Layer 7.

You map an external, or public, IP address to a set of internal servers for load balancing. The load balancer accepts TCP, HTTP, or HTTPS requests on the external IP address and decides which internal server to use. Port 8090 is the default listening port for TCP, port 80 is the default port for HTTP, and port 443 is the default port for HTTPs.

Configure Load Balancer

The input contains five parts: application profile, virtual server, pool, monitor and application rule.

Example 8-61. Configure load balancer

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config

Request Body:

```
<loadBalancer>
  <enabled>true</enabled>                                  <!-- optional, default is true -->
  <enableServiceInsertion>false</enableServiceInsertion>          <!-- optional, default is false-->
  <accelerationEnabled>true</accelerationEnabled>          <!-- optional, default is false-->
  <logging>                                          <!-- optional, default is false/INFO -->
    <enable>true</enable>
    <logLevel>debug</logLevel>              <!-- valid values include: emergency, alert, critical, error, warning, notice, info,
                    debug -->
  </logging>
  <virtualServer>                                    <!-- 0-64 virtualServer items could be added -->
    <virtualServerId>virtualServer-1</virtualServerId>          <!-- optional, virtualServerId should match virtualServer-X pattern -->
    <name>http_vip</name>                             <!-- required, unique virtualServer name per edge -->
    <description>http virtualServer</description>             <!-- optional -->
    <enabled>true</enabled>                           <!-- optional, default is true -->
    <ipAddress>10.117.35.172</ipAddress>                    <!-- required, a valid Edge vNic ip address(ipv4/ipv6) -->
    <protocol>http</protocol>                         <!-- required, valid values are http/https/tcp -->
    <port>80</port>                                  <!-- required, 1~65535 -->
    <connectionLimit>123</connectionLimit>                  <!-- optional, default is 0 -->
    <connectionRateLimit>123</connectionRateLimit>          <!-- optional, default is null -->
    <applicationProfileId>applicationProfile-1</applicationProfileId> <!-- required, a valid applicationProfileId -->
    <defaultPoolId>pool-1</defaultPoolId>                 <!-- optional, a valid poolId -->
    <enableServiceInsertion>false</enableServiceInsertion>      <!-- optional, default is false -->
    <accelerationEnabled>true</accelerationEnabled>          <!-- optional, default is false -->
    <!-- <vendorProfile> -->
    <!--   <vendorTemplateId>577</vendorTemplateId> -->        <!-- required, a valid vendorTemplateId -->
    <!--   <vendorTemplateName>F5</vendorTemplateName> -->     <!-- optional -->
    <!--   <profileAttributes> -->                    <!-- optional -->
    <!--     <attribute> -->
    <!--       <key>abcd</key> -->
    <!--       <name>abcd</name> -->
    <!--       <value>1234</value> -->
    <!--     </attribute> -->
    <!--   </profileAttributes> -->
    <!-- </vendorProfile> -->                          <!-- optional, it is required when per virtualServer enableServiceInsertion flag
                    and global enabledServiceInsertion flag are set to true, the VIP would be offloaded to vendor devices instead of
                    Edge -->
  </virtualServer>
  <virtualServer>
    <virtualServerId>virtualServer-2</virtualServerId>
    <name>https_vip</name>
    <description>https virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.172</ipAddress>
    <protocol>https</protocol>
```

```
  <port>443</port>
  <connectionLimit>123</connectionLimit>
  <connectionRateLimit>123</connectionRateLimit>
  <applicationProfileId>applicationProfile-2</applicationProfileId>
  <defaultPoolId>pool-2</defaultPoolId>
  <enableServiceInsertion>false</enableServiceInsertion>
  <accelerationEnabled>false</accelerationEnabled>
 </virtualServer>
 <virtualServer>
  <virtualServerId>virtualServer-3</virtualServerId>
  <name>tcp_transparent_vip</name>
  <description>tcp virtualServer</description>
  <enabled>true</enabled>
  <ipAddress>10.117.35.172</ipAddress>
  <protocol>tcp</protocol>
  <port>1234</port>
  <connectionLimit>123</connectionLimit>
  <applicationProfileId>applicationProfile-3</applicationProfileId>
  <defaultPoolId>pool-3</defaultPoolId>
  <enableServiceInsertion>false</enableServiceInsertion>
  <accelerationEnabled>true</accelerationEnabled>
 </virtualServer>
 <virtualServer>
  <virtualServerId>virtualServer-4</virtualServerId>
  <name>tcp_snat_vip</name>
  <description>tcp snat virtualServer</description>
  <enabled>true</enabled>
  <ipAddress>10.117.35.172</ipAddress>
  <protocol>tcp</protocol>
  <port>1235</port>
  <connectionLimit>123</connectionLimit>
  <applicationProfileId>applicationProfile-3</applicationProfileId>
  <defaultPoolId>pool-4</defaultPoolId>
  <enableServiceInsertion>false</enableServiceInsertion>
  <accelerationEnabled>true</accelerationEnabled>
 </virtualServer>
 <applicationProfile>
  <applicationProfileId>applicationProfile-1</applicationProfileId>
  <name>http_application_profile</name>
  <insertXForwardedFor>true</insertXForwardedFor>
  <sslPassthrough>true</sslPassthrough>
  <persistence>
   <method>cookie</method>                          <!-- required, cookie is used for http protocol, ssl_sessionid for https -->
   <cookieName>JSESSIONID</cookieName>                    <!-- optional, required when method is cookie -->
   <cookieMode>insert</cookieMode>                     <!-- optional, valid values are insert/prefix/app, required when method is
                cookie -->
  </persistence>
 </applicationProfile>
 <applicationProfile>
  <applicationProfileId>applicationProfile-2</applicationProfileId> <!-- optional, it should match "applicationProfile-X" patter and
                required when it is referenced -->
  <name>https_application_profile</name>                  <!-- required -->
  <insertXForwardedFor>true</insertXForwardedFor>           <!-- optional, default is false -->
  <sslPassthrough>true</sslPassthrough>                  <!-- optional, default is false -->
  <persistence>                                  <!-- optional -->
   <method>ssl_sessionid</method>                     <!-- required, valid values are ssl_sessionid, cookie, sourceip,  msrdp -->
  </persistence>
 </applicationProfile>
 <applicationProfile>
  <applicationProfileId>applicationProfile-3</applicationProfileId>
  <name>tcp_application_profile</name>
  <insertXForwardedFor>false</insertXForwardedFor>
  <sslPassthrough>true</sslPassthrough>
 </applicationProfile>
 <pool>                                         <!-- 0-64 pool items could be added -->
  <poolId>pool-1</poolId>                           <!-- optional, it should match "pool-X" pattern, this item is required when it
                has reference -->
  <name>pool-http</name>                            <!-- required, unique pool name per edge -->
```

```
  <description>pool-http</description>                    <!-- optional -->
  <transparent>false</transparent>                        <!-- optional, default is false -->
  <algorithm>round-robin</algorithm>                      <!-- optional, valid values are round-robin, ip-hash, uri, leastconn, default
                    is round-robin -->
  <monitorId>monitor-1</monitorId>                        <!-- optional, it should be a valid monitorId, it is an array -->
  <member>                                                <!-- 0-32 pool member items could be added -->
   <memberId>member-1</memberId>                          <!-- optional, it should match "member-X" pattern, this item is required
                    when it has reference -->
   <ipAddress>192.168.101.201</ipAddress>                 <!-- optional, a valid ip address(ipv4/ipv6), it is required when
                    groupingObjectId is not specified -->
   <!-- <groupingObjectId>vm-24</groupingObjectId> -->     <!-- optional, groupingObject id such as vm-24, network-25,
                    dvportgroup-26 -->
   <weight>1</weight>                                     <!-- optional, default is 1 -->
   <port>80</port>                                        <!-- required -->
   <minConn>10</minConn>                                  <!-- optional, default is 0 -->
   <maxConn>100</maxConn>                                 <!-- optional, default is 0 -->
   <name>m1</name>                                        <!-- optional, it is required when it is used in ACL rule -->
  </member>
  <member>
   <memberId>member-2</memberId>
   <ipAddress>192.168.101.202</ipAddress>
   <weight>1</weight>
   <port>80</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m2</name>
   <condition>enabled</condition>                         <!-- optional, default is enabled, valid values are enabled/disabled -->
  </member>
 </pool>
 <pool>
  <poolId>pool-2</poolId>
  <name>pool-https</name>
  <description>pool-https</description>
  <transparent>false</transparent>
  <algorithm>round-robin</algorithm>
  <monitorId>monitor-2</monitorId>
  <member>
   <memberId>member-3</memberId>
   <ipAddress>192.168.101.201</ipAddress>
   <weight>1</weight>
   <port>443</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m3</name>
  </member>
  <member>
   <memberId>member-4</memberId>
   <ipAddress>192.168.101.202</ipAddress>
   <weight>1</weight>
   <port>443</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m4</name>
  </member>
 </pool>
 <pool>
  <poolId>pool-3</poolId>
  <name>pool-tcp</name>
  <description>pool-tcp</description>
  <transparent>true</transparent>
  <algorithm>round-robin</algorithm>
  <monitorId>monitor-3</monitorId>
  <member>
   <memberId>member-5</memberId>
   <ipAddress>192.168.101.201</ipAddress>
   <weight>1</weight>
   <port>1234</port>
   <minConn>10</minConn>
```

```
    <maxConn>100</maxConn>
    <name>m5</name>
    <monitorPort>80</monitorPort>
   </member>
   <member>
    <memberId>member-6</memberId>
    <ipAddress>192.168.101.202</ipAddress>
    <weight>1</weight>
    <port>1234</port>
    <minConn>10</minConn>
    <maxConn>100</maxConn>
    <name>m6</name>
    <monitorPort>80</monitorPort>
   </member>
  </pool>
  <pool>
   <poolId>pool-4</poolId>
   <name>pool-tcp-snat</name>
   <description>pool-tcp-snat</description>
   <transparent>false</transparent>
   <algorithm>round-robin</algorithm>
   <monitorId>monitor-3</monitorId>
   <member>
    <memberId>member-7</memberId>
    <ipAddress>192.168.101.201</ipAddress>
    <weight>1</weight>
    <port>1234</port>
    <minConn>10</minConn>
    <maxConn>100</maxConn>
    <name>m7</name>
    <monitorPort>80</monitorPort>
   </member>
   <member>
    <memberId>member-8</memberId>
    <ipAddress>192.168.101.202</ipAddress>
    <weight>1</weight>
    <port>1234</port>
    <minConn>10</minConn>
    <maxConn>100</maxConn>
    <name>m8</name>
    <monitorPort>80</monitorPort>
   </member>
  </pool>
  <monitor>
   <monitorId>monitor-1</monitorId>                    <!-- optional, this item should follow "monitor-X" pattern, it is required
                when it is referenced -->
   <type>http</type>                                  <!-- required, valid values are http/https/tcp -->
   <interval>5</interval>                              <!-- optional, default is 5 -->
   <timeout>15</timeout>                                <!-- optional, default is 15 -->
   <maxRetries>3</maxRetries>                            <!-- optional, default is 3 -->
   <method>GET</method>                                  <!-- optional, valid value is
                OPTIONS/GET/HEAD/POST/PUT/DELETE/TRACE/CONNECT -->
   <url>/</url>                                       <!-- optional -->
   <name>http-monitor</name>                             <!-- required -->
   <!-- <expected>HTTP/1</expected> -->                    <!-- optional, Expected response string. Default is "HTTP/1" for http(s)
                protocol -->
   <!-- <send>hello</send> -->                          <!-- optional, URL encoded http POST data for http(s) protocol -->
   <!-- <receive>ok</received> -->                       <!-- optional, String to expect in the content for http(s) protocol -->
   <!-- <extension>no-body
max-age=3h
content-type=Application/xml</extension> -->                <!-- optional, advanced setting for monitor to fill more customized
                parameters -->

  </monitor>
  <monitor>
   <monitorId>monitor-2</monitorId>
   <type>https</type>
   <interval>5</interval>
```

```
    <timeout>15</timeout>
    <maxRetries>3</maxRetries>
    <method>GET</method>
    <url>/</url>
    <name>https-monitor</name>
  </monitor>
  <monitor>
    <monitorId>monitor-3</monitorId>
    <type>tcp</type>
    <interval>5</interval>
    <timeout>15</timeout>
    <maxRetries>3</maxRetries>
    <name>tcp-monitor</name>
  </monitor>
</loadBalancer>configuration example2 to show HTTP/HTTPS Redirection, SSL Offloading, Content Switching, HTTP
                    HealthMonitor

<loadBalancer>
  <enabled>true</enabled>
  <accelerationEnabled>true</accelerationEnabled>
  <logging>
    <enable>true</enable>
    <logLevel>debug</logLevel>
  </logging>
  <applicationRule>
    <applicationRuleId>applicationRule-1</applicationRuleId>          <!-- optional, it should follow "applicationRule-X" pattern,
                    required when it is referenced -->
    <name>traffic_ctrl_rule</name>                                    <!-- required, unique applicationRule name per Edge -->
    <script>acl srv1_full srv_conn(pool-http/m1) gt 50
acl srv2_full srv_conn(pool-http/m2) gt 50
use_backend pool-backup if srv1_full or srv2_full</script>            <!-- required, one ACL rule -->
  </applicationRule>
  <applicationRule>
    <applicationRuleId>applicationRule-2</applicationRuleId>
    <name>redirection_rule</name>
    <script>acl google_page url_beg /google
redirect location https://www.google.com/ if google_page</script>
  </applicationRule>
  <applicationRule>
    <applicationRuleId>applicationRule-3</applicationRuleId>
    <name>l7_rule</name>
    <script>acl backup_page url_beg /backup
use_backend pool-backup if backup_page</script>
  </applicationRule>
  <virtualServer>
    <virtualServerId>virtualServer-1</virtualServerId>
    <name>http_redirection_vip</name>
    <description>http redirection virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.171</ipAddress>
    <protocol>http</protocol>
    <port>80</port>
    <connectionLimit>123</connectionLimit>
    <connectionRateLimit>123</connectionRateLimit>
    <applicationProfileId>applicationProfile-1</applicationProfileId>
    <enableServiceInsertion>false</enableServiceInsertion>
    <accelerationEnabled>true</accelerationEnabled>
  </virtualServer>
  <virtualServer>
    <virtualServerId>virtualServer-2</virtualServerId>
    <name>https_vip</name>
    <description>https virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.171</ipAddress>
    <protocol>https</protocol>
    <port>443</port>
    <connectionLimit>123</connectionLimit>
    <connectionRateLimit>123</connectionRateLimit>
```

```
  <defaultPoolId>pool-1</defaultPoolId>
  <applicationProfileId>applicationProfile-2</applicationProfileId>
  <applicationRuleId>applicationRule-1</applicationRuleId>          <!-- optional, it is applicationRuleId list, each item should be a
                        valid applicationRuleId -->
  <applicationRuleId>applicationRule-2</applicationRuleId>
  <applicationRuleId>applicationRule-3</applicationRuleId>
  <enableServiceInsertion>false</enableServiceInsertion>
  <accelerationEnabled>true</accelerationEnabled>
 </virtualServer>
 <applicationProfile>
  <applicationProfileId>applicationProfile-1</applicationProfileId>
  <name>https_redirection_application_profile</name>
  <insertXForwardedFor>false</insertXForwardedFor>
  <sslPassthrough>false</sslPassthrough>
  <httpRedirect>                                    <!-- optional -->
   <to>https://10.117.35.171</to>                        <!-- required, a uri -->
  </httpRedirect>
 </applicationProfile>
 <applicationProfile>
  <applicationProfileId>applicationProfile-2</applicationProfileId>
  <name>ssl_offloading_application_profile</name>
  <insertXForwardedFor>false</insertXForwardedFor>
  <!-- <serverSslEnabled>true</serverSslEnabled> -->             <!-- optional, default is true, it is a switch flag to enable/disable
                        serverSsl offloading -->
  <sslPassthrough>false</sslPassthrough>
  <clientSsl>                                     <!-- optional -->
    <clientAuth>ignore</clientAuth>                       <!-- optional, valid values are ignore/required -->
    <ciphers>AES:ALL:!aNULL:!eNULL:+RC4:@STRENGTH</ciphers>      <!-- required, ciphers -->
    <serviceCertificate>certificate-4</serviceCertificate>       <!-- required, a serviceCertificate List -->
    <caCertificate>certificate-3</caCertificate>                 <!-- required, a ca list -->
    <crlCertificate>crl-1</crlCertificate>                    <!-- optional, a crl list -->
  </clientSsl>
  <!--
  <serverSsl>
    <ciphers>AES:ALL:!aNULL:!eNULL:+RC4:@STRENGTH</ciphers>
    <serviceCertificate>certificate-4</serviceCertificate>
    <caCertificate>certificate-3</caCertificate>
    <crlCertificate>crl-1</crlCertificate>
  </serverSsl>
  -->
 </applicationProfile>
 <pool>
  <poolId>pool-1</poolId>
  <name>pool-http</name>
  <description>pool-http</description>
  <transparent>false</transparent>
  <algorithm>round-robin</algorithm>
  <monitorId>monitor-1</monitorId>
  <member>
   <memberId>member-1</memberId>
   <ipAddress>192.168.101.101</ipAddress>
   <weight>1</weight>
   <port>80</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m1</name>
  </member>
  <member>
   <memberId>member-2</memberId>
   <ipAddress>192.168.101.102</ipAddress>
   <weight>1</weight>
   <port>80</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m2</name>
  </member>
 </pool>
 <pool>
```

```
    <poolId>pool-2</poolId>
    <name>pool-backup</name>
    <description>pool backup</description>
    <transparent>false</transparent>
    <algorithm>round-robin</algorithm>
    <monitorId>monitor-1</monitorId>
    <member>
      <memberId>member-3</memberId>
      <ipAddress>192.168.102.101</ipAddress>
      <weight>1</weight>
      <port>80</port>
      <name>m3</name>
    </member>
    <member>
      <memberId>member-4</memberId>
      <ipAddress>192.168.102.102</ipAddress>
      <weight>1</weight>
      <port>80</port>
      <name>m4</name>
    </member>
  </pool>
  <monitor>
    <monitorId>monitor-1</monitorId>
    <type>http</type>
    <interval>5</interval>
    <timeout>15</timeout>
    <maxRetries>3</maxRetries>
    <method>GET</method>
    <url>/</url>
    <name>http-monitor</name>
  </monitor>
</loadBalancer>
```

For the data path to work, you need to add firewall rules to allow required traffic as per the load balancer configuration.

Query Load Balancer Configuration

Gets current load balancer configuration.

Example 8-62. Retrieve load balancer configuration

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config
```

Response Body:

See Example 8-61.

Delete Load Balancer Configuration

Example 8-63. Delete load balancer configuration

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config
```

Manage Application profiles

You create an application profile to define the behavior of a particular type of network traffic. After configuring a profile, you associate the profile with a virtual server. The virtual server then processes traffic according to the values specified in the profile. Using profiles enhances your control over managing network traffic, and makes traffic-management tasks easier and more efficient.

Append Application Profile

Adds an application profile.

Example 8-64. Append profile

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationprofiles
```

Request Body:

```
<applicationProfile>
   <name>http_application_profile_2</name>
   <insertXForwardedFor>true</insertXForwardedFor>
   <sslPassthrough>true</sslPassthrough>
   <persistence>
    <method>cookie</method>
    <cookieName>JSESSIONID</cookieName>
    <cookieMode>insert</cookieMode>
   </persistence>
 </applicationProfile>
```

Modify Application Profile

Modifies an application profile.

Example 8-65. Modify profile

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationprofiles/{applicationProfileId}
```

Request Body:

```
<applicationProfile>
   <name>http_application_profile_2</name>
   <insertXForwardedFor>true</insertXForwardedFor>
   <sslPassthrough>true</sslPassthrough>
   <persistence>
    <method>cookie</method>
    <cookieName>JSESSIONID</cookieName>
    <cookieMode>insert</cookieMode>
   </persistence>
 </applicationProfile>
```

Query Application Profile

Retrieves an application profile.

Example 8-66. Query profile

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationprofiles/{applicationProfileId}
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<applicationProfile>
  <applicationProfileId>applicationProfile-5</applicationProfileId>
  <persistence>
    <method>cookie</method>
    <cookieName>JSESSIONID</cookieName>
    <cookieMode>insert</cookieMode>
  </persistence>
  <name>http_application_profile_2</name>
  <insertXForwardedFor>true</insertXForwardedFor>
  <sslPassthrough>true</sslPassthrough>
</applicationProfile>
```

Query all Application Profiles

Retrieves all application profiles on Edge.

Example 8-67. Query profiles

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationprofiles/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<loadBalancer>
  <applicationProfile>
    <applicationProfileId>applicationProfile-1</applicationProfileId>
    <persistence>
      <method>cookie</method>
      <cookieName>JSESSIONID</cookieName>
      <cookieMode>insert</cookieMode>
    </persistence>
    <name>http_application_profile</name>
    <insertXForwardedFor>true</insertXForwardedFor>
    <sslPassthrough>true</sslPassthrough>
  </applicationProfile>
  <applicationProfile>
    <applicationProfileId>applicationProfile-2</applicationProfileId>
    <persistence>
      <method>ssl_sessionid</method>
    </persistence>
    <name>https_application_profile</name>
    <insertXForwardedFor>true</insertXForwardedFor>
    <sslPassthrough>true</sslPassthrough>
  </applicationProfile>
  <applicationProfile>
    <applicationProfileId>applicationProfile-3</applicationProfileId>
    <name>tcp_application_profile</name>
    <insertXForwardedFor>false</insertXForwardedFor>
    <sslPassthrough>true</sslPassthrough>
  </applicationProfile>
</loadBalancer>
```

Delete Application Profile

Deletes an application profile.

Example 8-68. Delete profile

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationprofiles/{applicationProfileId}
```

Delete all Application Profiles

Deletes all application profile.

Example 8-69. Delete profiles

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationprofiles

Manage Application Rules

You can write an application rule to directly manipulate and manage IP application traffic.

Append Application Rule

Adds an application rule.

Example 8-70. Append rule

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationrules

Request Body:

```
<applicationRule>
   <name>redirection_rule</name>
   <script>acl vmware_page url_beg /vmware
redirect location https://www.vmware.com/ if vmware_page</script>
 </applicationRule>
```

Modify Application Rule

Modifies an application rule.

Example 8-71. Modify rule

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationrules/{applicationruleId}

Request Body:

See Example 8-70.

Query Application Rule

Retrieves an application rule.

Example 8-72. Query rule

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationrules/{applicationruleId}

Response Body:

See Example 8-70.

Query all Application Rules

Retrieves all application rules on Edge.

Example 8-73. Query rules

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationrules/{applicationruleId}

Delete Application Rule

Deletes an application rule.

Example 8-74. Delete rule

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationrules/{applicationruleId}

Delete all Application Rules

Deletes all application rules.

Example 8-75. Delete rules

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/applicationrules

Manage Load Balancer Monitors

You create a service monitor to define health check parameters for a particular type of network traffic. When you associate a service monitor with a pool, the pool members are monitored according to the service monitor parameters.

Append Monitor

Adds a load balancer monitor.

Example 8-76. Append monitor

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/monitors

Request Body:

```
<monitor>
   <type>http</type>
   <interval>5</interval>
   <timeout>15</timeout>
   <maxRetries>3</maxRetries>
   <method>GET</method>
   <url>/</url>
   <name>http-monitor-2</name>
 </monitor>
```

Modify Monitor

Modifies a load balancer monitor.

Example 8-77. Modify monitor

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/monitors/{monitorId}

Request Body:

```
<monitor>
   <type>http</type>
   <interval>5</interval>
   <timeout>15</timeout>
   <maxRetries>3</maxRetries>
   <method>GET</method>
   <url>/</url>
   <name>http-monitor-2</name>
  </monitor>
```

Query Monitor

Retrieves a load balancer monitor.

Example 8-78. Query monitor

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/monitors{monitorId}

Response Body:

```
<monitor>
   <type>http</type>
   <interval>5</interval>
   <timeout>15</timeout>
   <maxRetries>3</maxRetries>
   <method>GET</method>
   <url>/</url>
   <name>http-monitor-2</name>
  </monitor>
```

Query all Monitors

Retrieves all load balancer monitors.

Example 8-79. Query monitors

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/monitors

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<loadBalancer>
  <monitor>
   <monitorId>monitor-1</monitorId>
   <type>http</type>
   <interval>5</interval>
   <timeout>15</timeout>
   <maxRetries>3</maxRetries>
   <method>GET</method>
   <url>/</url>
   <name>http-monitor</name>
  </monitor>
  <monitor>
   <monitorId>monitor-2</monitorId>
   <type>https</type>
   <interval>5</interval>
   <timeout>15</timeout>
   <maxRetries>3</maxRetries>
   <method>GET</method>
   <url>/</url>
```

```
    <name>https-monitor</name>
  </monitor>
  <monitor>
    <monitorId>monitor-3</monitorId>
    <type>tcp</type>
    <interval>5</interval>
    <timeout>15</timeout>
    <maxRetries>3</maxRetries>
    <name>tcp-monitor</name>
  </monitor>
</loadBalancer>
```

Delete Monitor

Deletes a load balancer monitor.

Example 8-80. Delete monitor

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/monitors/{monitorId}
```

Delete all Monitors

Deletes all load balancer monitors.

Example 8-81. Delete monitors

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/monitors
```

Manage Virtual Servers

You can add an NSX Edge internal or uplink interface as a virtual server.

Append Virtual Server

Adds a virtual server.

Example 8-82. Append virtual server

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/virtualservers
```

Request Body:

```
<virtualServer>
    <name>http_vip_2</name>
    <description>http virtualServer 2</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.172</ipAddress>
    <protocol>http</protocol>
    <port>82</port>
    <connectionLimit>123</connectionLimit>
    <connectionRateLimit>123</connectionRateLimit>
    <applicationProfileId>applicationProfile-1</applicationProfileId>
    <defaultPoolId>pool-1</defaultPoolId>
    <enableServiceInsertion>false</enableServiceInsertion>
    <accelerationEnabled>true</accelerationEnabled>
  </virtualServer>
```

Query a Virtual Server

Retrieves specified virtual server details.

Example 8-83. Query virtual server

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/virtualservers/*virtualserverID*

Response Body:

See Example 8-82.

Query all Virtual Servers

Retrieves all virtual servers.

Example 8-84. Query virtual servers

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/virtualservers

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<loadBalancer>
  <virtualServer>
    <virtualServerId>virtualServer-1</virtualServerId>
    <name>http_vip</name>
    <description>http virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.172</ipAddress>
    <protocol>http</protocol>
    <port>80</port>
    <connectionLimit>123</connectionLimit>
    <connectionRateLimit>123</connectionRateLimit>
    <defaultPoolId>pool-1</defaultPoolId>
    <applicationProfileId>applicationProfile-1</applicationProfileId>
    <enableServiceInsertion>false</enableServiceInsertion>
    <accelerationEnabled>true</accelerationEnabled>
  </virtualServer>
  <virtualServer>
    <virtualServerId>virtualServer-2</virtualServerId>
    <name>https_vip</name>
    <description>https virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.172</ipAddress>
    <protocol>https</protocol>
    <port>443</port>
    <connectionLimit>123</connectionLimit>
    <connectionRateLimit>123</connectionRateLimit>
    <defaultPoolId>pool-2</defaultPoolId>
    <applicationProfileId>applicationProfile-2</applicationProfileId>
    <enableServiceInsertion>false</enableServiceInsertion>
    <accelerationEnabled>false</accelerationEnabled>
  </virtualServer>
  <virtualServer>
    <virtualServerId>virtualServer-3</virtualServerId>
    <name>tcp_transparent_vip</name>
    <description>tcp virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.172</ipAddress>
    <protocol>tcp</protocol>
    <port>1234</port>
    <connectionLimit>123</connectionLimit>
```

```
    <defaultPoolId>pool-3</defaultPoolId>
    <applicationProfileId>applicationProfile-3</applicationProfileId>
    <enableServiceInsertion>false</enableServiceInsertion>
    <accelerationEnabled>true</accelerationEnabled>
  </virtualServer>
  <virtualServer>
    <virtualServerId>virtualServer-4</virtualServerId>
    <name>tcp_snat_vip</name>
    <description>tcp snat virtualServer</description>
    <enabled>true</enabled>
    <ipAddress>10.117.35.172</ipAddress>
    <protocol>tcp</protocol>
    <port>1235</port>
    <connectionLimit>123</connectionLimit>
    <defaultPoolId>pool-4</defaultPoolId>
    <applicationProfileId>applicationProfile-3</applicationProfileId>
    <enableServiceInsertion>false</enableServiceInsertion>
    <accelerationEnabled>true</accelerationEnabled>
  </virtualServer>
</loadBalancer>
```

Delete a Virtual Server

Deletes specified virtual server.

Example 8-85. Delete virtual server

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/virtualservers/*virtualserverID*

Delete all Virtual Server

Deletes all virtual servers.

Example 8-86. Delete all virtual server

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/virtualservers

Manage Backend Pools

You can add a server pool to manage and share backend servers flexibly and efficiently. A pool manages load balancer distribution methods and has a service monitor attached to it for health check parameters.

Append Backend Pool

Adds a load balancer server pool to the specified NSX Edge.

Example 8-87. Append backend pool

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/pools

Request Body:

```
<pool>
  <name>pool-tcp-snat-2</name>
  <description>pool-tcp-snat-2</description>
  <transparent>false</transparent>
  <algorithm>round-robin</algorithm>
```

```
  <monitorId>monitor-3</monitorId>
  <member>
   <ipAddress>192.168.101.201</ipAddress>
   <weight>1</weight>
   <port>1234</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m5</name>
   <monitorPort>80</monitorPort>
  </member>
  <member>
   <ipAddress>192.168.101.202</ipAddress>
   <weight>1</weight>
   <port>1234</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m6</name>
   <monitorPort>80</monitorPort>
  </member>
 </pool>
```

Modify a Backend Pool

Updates the specified pool.

Example 8-88. Modify backend pool

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/pools/*poolID*

Request Body:

```
<pool>
  <name>pool-tcp-snat-2</name>
  <description>pool-tcp-snat-3</description>
  <transparent>false</transparent>
  <algorithm>round-robin</algorithm>
  <monitorId>monitor-3</monitorId>
  <member>
   <ipAddress>192.168.101.201</ipAddress>
   <weight>1</weight>
   <port>1234</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m5</name>
   <monitorPort>80</monitorPort>
  </member>
  <member>
   <ipAddress>192.168.101.202</ipAddress>
   <weight>1</weight>
   <port>1234</port>
   <minConn>10</minConn>
   <maxConn>100</maxConn>
   <name>m6</name>
   <monitorPort>80</monitorPort>
  </member>
 </pool>
```

Query Backend Pool Details

Retrieves information about the specified pool.

Example 8-89. Get backend pool details

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/pools/*poolID*

Response Body:

See Example Example 8-88.

Query all Backend Pools

Gets all backend pools configured for the specified NSX Edge.

Example 8-90. Query all backend pools

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/pools

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<loadBalancer>
 <pool>
  <type>slb</type>
  <poolId>pool-1</poolId>
  <name>pool-http</name>
  <description>pool-http</description>
  <algorithm>round-robin</algorithm>
  <transparent>true</transparent>
  <monitorId>monitor-1</monitorId>
  <member>
   <memberId>member-1</memberId>
   <ipAddress>192.168.101.201</ipAddress>
   <weight>1</weight>
   <port>80</port>
   <maxConn>100</maxConn>
   <minConn>10</minConn>
   <condition>enabled</condition>
   <name>m1</name>
  </member>
  <member>
   <memberId>member-2</memberId>
   <ipAddress>192.168.101.202</ipAddress>
   <weight>1</weight>
   <port>80</port>
   <maxConn>100</maxConn>
   <minConn>10</minConn>
   <condition>enabled</condition>
   <name>m2</name>
  </member>
 </pool>
 <pool>
  <type>slb</type>
  <poolId>pool-2</poolId>
  <name>pool-https</name>
  <description>pool-https</description>
  <algorithm>round-robin</algorithm>
  <transparent>false</transparent>
  <monitorId>monitor-2</monitorId>
  <member>
   <memberId>member-11</memberId>
   <ipAddress>192.168.101.201</ipAddress>
   <weight>1</weight>
   <port>443</port>
   <maxConn>100</maxConn>
```

```
    <minConn>10</minConn>
    <condition>enabled</condition>
    <name>m3</name>
   </member>
   <member>
    <memberId>member-4</memberId>
    <ipAddress>192.168.101.202</ipAddress>
    <weight>1</weight>
    <port>443</port>
    <maxConn>100</maxConn>
    <minConn>10</minConn>
    <condition>enabled</condition>
    <name>m4</name>
   </member>
  </pool>
  <pool>
   <type>slb</type>
   <poolId>pool-3</poolId>
   <name>pool-tcp</name>
   <description>pool-tcp</description>
   <algorithm>round-robin</algorithm>
   <transparent>true</transparent>
   <monitorId>monitor-3</monitorId>
   <member>
    <memberId>member-5</memberId>
    <ipAddress>192.168.101.201</ipAddress>
    <weight>1</weight>
    <monitorPort>80</monitorPort>
    <port>1234</port>
    <maxConn>100</maxConn>
    <minConn>10</minConn>
    <condition>enabled</condition>
    <name>m5</name>
   </member>
   <member>
    <memberId>member-6</memberId>
    <ipAddress>192.168.101.202</ipAddress>
    <weight>1</weight>
    <monitorPort>80</monitorPort>
    <port>1234</port>
    <maxConn>100</maxConn>
    <minConn>10</minConn>
    <condition>enabled</condition>
    <name>m6</name>
   </member>
  </pool>
  <pool>
   <type>slb</type>
   <poolId>pool-4</poolId>
   <name>pool-tcp-snat</name>
   <description>pool-tcp-snat</description>
   <algorithm>round-robin</algorithm>
   <transparent>false</transparent>
   <monitorId>monitor-3</monitorId>
   <member>
    <memberId>member-7</memberId>
    <ipAddress>192.168.101.201</ipAddress>
    <weight>1</weight>
    <monitorPort>80</monitorPort>
    <port>1234</port>
    <maxConn>100</maxConn>
    <minConn>10</minConn>
    <condition>enabled</condition>
    <name>m7</name>
   </member>
   <member>
    <memberId>member-8</memberId>
    <ipAddress>192.168.101.202</ipAddress>
```

```
    <weight>1</weight>
    <monitorPort>80</monitorPort>
    <port>1234</port>
    <maxConn>100</maxConn>
    <minConn>10</minConn>
    <condition>enabled</condition>
    <name>m8</name>
   </member>
  </pool>
</loadBalancer>
```

Delete a Backend Pool

Deletes the specified pool.

Example 8-91. Delete backend pool

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/pools/*poolID*

Delete all Backend Pools

Deletes all backend pools configured for the specified NSX Edge.

Example 8-92. Delete backend pool

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/config/pools

Query Statistics

Retrieves load balancer statistics.

Example 8-93. Retrieve load balancer statistics

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/loadbalancer/statistics

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<loadBalancerStatusAndStats>
 <timeStamp>1359722922</timeStamp>
 <pool>
  <poolId>pool-1</poolId>
  <name>pool-http</name>
  <member>
   <memberId>member-1</memberId>
   <name>m1</name>
   <ipAddress>192.168.101.201</ipAddress>
   <status>UP</status>
   <bytesIn>70771</bytesIn>
   <bytesOut>74619</bytesOut>
   <curSessions>0</curSessions>
   <maxSessions>1</maxSessions>
   <rate>0</rate>
   <rateMax>17</rateMax>
   <totalSessions>142</totalSessions>
  </member>
  <member>
```

```
    <memberId>member-2</memberId>
    <name>m2</name>
    <ipAddress>192.168.101.202</ipAddress>
    <status>UP</status>
    <bytesIn>70823</bytesIn>
    <bytesOut>70605</bytesOut>
    <curSessions>0</curSessions>
    <maxSessions>1</maxSessions>
    <rate>0</rate>
    <rateMax>17</rateMax>
    <totalSessions>141</totalSessions>
  </member>
  <status>UP</status>
  <bytesIn>141594</bytesIn>
  <bytesOut>145224</bytesOut>
  <curSessions>0</curSessions>
  <maxSessions>2</maxSessions>
  <rate>0</rate>
  <rateMax>34</rateMax>
  <totalSessions>283</totalSessions>
</pool>
<virtualServer>
  <virtualServerId>virtualServer-9</virtualServerId>
  <name>http_vip</name>
  <ipAddress>10.117.35.172</ipAddress>
  <status>OPEN</status>
  <bytesIn>141594</bytesIn>
  <bytesOut>145224</bytesOut>
  <curSessions>1</curSessions>
  <httpReqTotal>283</httpReqTotal>
  <httpReqRate>0</httpReqRate>
  <httpReqRateMax>34</httpReqRateMax>
  <maxSessions>2</maxSessions>
  <rate>0</rate>
  <rateLimit>0</rateLimit>
  <rateMax>2</rateMax>
  <totalSessions>13</totalSessions>
</virtualServer>
<globalSite>
    <name>BJ site</name>
    <globalSiteId>site-3</globalSiteId>
    <msgSent>3</msgSent>
    <msgRecv>747</msgRecv>
    <msgRate>0</msgRate>
    <dnsReq>0</dnsReq>
    <dnsResolved>0</dnsResolved>
 </globalSite>
 <globalIp>
    <fqdn>www.company.com</fqdn>
    <globalIpId>gip-3</globalIpId>
    <dnsReq>0</dnsReq>
    <dnsResolved>0</dnsResolved>
    <dnsMiss>0</dnsMiss>
 </globalIp>
 <globalPool>
    <name>www-primary</name>
    <poolId>pool-1</poolId>
    <dnsReq>0</dnsReq>
    <dnsResolved>0</dnsResolved>
    <dnsMiss>0</dnsMiss>
    <member>
      <name>10.117.7.110</name>
      <memberId>member-3</memberId>
      <status>up</status>
      <dnsHit>0</dnsHit>
      <cpuUsage>3</cpuUsage>
      <memUsage>91</memUsage>
      <sessions>0</sessions>
```

```
        <curConn>14</curConn>
        <sessLimit>0</sessLimit>
        <sessRate>0</sessRate>
        <totalThroughput>0</totalThroughput>
        <packagesPerSec>0</packagesPerSec>
      </member>
    </globalPool>
    <globalPool>
      <name>www-primary</name>
      <poolId>pool-1</poolId>
      <dnsReq>0</dnsReq>
      <dnsResolved>0</dnsResolved>
      <dnsMiss>0</dnsMiss>
      <member>
        <name>10.117.7.110</name>
        <memberId>member-3</memberId>
        <status>up</status>
        <dnsHit>0</dnsHit>
        <cpuUsage>3</cpuUsage>
        <memUsage>91</memUsage>
        <sessions>0</sessions>
        <curConn>14</curConn>
        <sessLimit>0</sessLimit>
        <sessRate>0</sessRate>
        <totalThroughput>0</totalThroughput>
        <packagesPerSec>0</packagesPerSec>
      </member>
    </globalPool>
</loadBalancerStatusAndStats>
```

Update LoadBalancer Acceleration Mode

Example 8-94. Update acceleration mode

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId/loadbalancer/acceleration?enable=true/false
```

Update Load Balancer Member Condition

Example 8-95. Update member condition

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId/loadbalancer/config/members/{memberId}?enable=true/false
```

Working with DHCP

NSX Edge provides DHCP service to bind assigned IP addresses to MAC addresses, helping to prevent MAC spoofing attacks. All virtual machines protected by a NSX Edge can obtain IP addresses dynamically from the NSX Edge DHCP service.

NSX Edge supports IP address pooling and one-to-one static IP address allocation based on the vCenter managed object ID (vmId) and interface ID (interfaceId) of the requesting client.

If either bindings or pools are not included in the PUT call, existing bindings or pools are deleted.

All DHCP settings configured by REST requests appear under the **NSX Edge > DHCP** tab for the appropriate NSX Edge in the NSX Manager user interface and in vSphere Client plug-in.

NSX Edge DHCP service adheres to the following rules:

- Listens on the NSX Edge internal interface (non-uplink interface) for DHCP discovery.
- As stated above, vmId specifies the vc-moref-id of the virtual machine, and vnicId specifies the index of the vNic for the requesting client. The hostname is an identification of the binding being created. This hostName is not pushed as the specified host name of the virtual machine.
- By default, all clients use the IP address of the internal interface of the NSX Edge as the default gateway address. To override it, specify defaultGateway per binding or per pool. The client's broadcast and subnetMask values are from the internal interface for the container network.
- leaseTime can be infinite, or a number of seconds. If not specified, the default lease time is 1 day.
- Logging is disabled by default.
- Setting the parameter enable=true starts the DHCP service while enable=false stops the service.
- Both staticBinding and ipPools must be part of the request body. Else, they will be deleted if configured earlier.

Configure DHCP

Example 8-96. Configure DHCP service

PUT https://<vsm-ip>/api/4.0/<edgeId>/dhcp/config

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<dhcp>
  <enabled>true</enabled>  <!-- optional, default is "true". -->
  <staticBindings>
    <staticBinding>
      <!-- NOTE: user can either specify macAddress directly, or specify vmId and vnicId.
           In case both are specified, only macAddress will be used; vmId and vnicId
           will be ignored.-->
      <macAddress>12:34:56:78:90:AB</macAddress> <!-- optional. -->
      <vmId>vm-111</vmId>  <!-- optional. the vm must be connected to the given vNic below. -->
      <vnicId>1</vnicId> <!-- optional. possible values 0 to 9 -->
      <hostname>abcd</hostname> <!-- optional. disallow duplicate. the  -->
      <ipAddress>192.168.4.2</ipAddress>  <!-- required. the IP must belongs to one subnet of edge vNics,
           but must NOT overlap any primary/secondary ips of defined explicitly in vNic. -->
      <defaultGateway>192.168.4.1</defaultGateway> <!-- optional. default is the primary ip of the belonging vNic.-->
      <domainName>eng.vmware.com</domainName> <!-- optional. -->
      <primaryNameServer>192.168.4.1</primaryNameServer>  <!-- optional. if autoConfigDNS=true, the DNS
           primary/secondary ips will be generated from DNS service(if configured). -->
      <secondaryNameServer>4.2.2.4</secondaryNameServer>  <!-- ditto. -->
      <leaseTime>infinite</leaseTime>  <!-- optional. in second, default is "86400". valid leaseTime
           is a valid digit, or "infinite". -->
      <autoConfigDNS>true</autpConfigDNS>  <!-- optional. default is true. -->
    </staticBinding>
  </staticBindings>
  <ipPools>
    <ipPool>
      <ipRange>192.168.4.192-192.168.4.220</ipRange>  <!-- required. the ipRange must belongs to one of
           a subnet of Edge vNics. And can NOT contains any ip that defined explicitly as vNic
           primary ip or secondary ip. -->
      <defaultGateway>192.168.4.1</defaultGateway>  <!-- optional. default is the primary ip of the belonging vNic.-->
      <domainName>eng.vmware.com</domainName>   <!-- optional. -->
      <primaryNameServer>192.168.4.1</primaryNameServer>  <!-- optional. if autoConfigDNS=true, the dns
           primary/secondary ips will be generated from DNS service(if configured). -->
      <secondaryNameServer>4.2.2.4</secondaryNameServer>  <!-- ditto. -->
      <leaseTime>3600</leaseTime>  <!-- optional. in second, default is "86400". valid leaseTime is a valid
           digit, or "infinite". -->
      <autoConfigDNS>true</autoConfigDNS>  <!-- optional. default is true. -->
    </ipPool>
  </ipPools>
  <logging>  <!-- optional. logging is disable by default. -->
    <enable>false</enable>  <!-- optional, default is false. -->
```

```
    <logLevel>info</logLevel>  <!-- optional, default is "info". -->
  </logging>
</dhcp>
```

NOTE If the NSX Edge autoConfiguration flag and autoConfigureDNS is true, and the primaryNameServer or secondaryNameServer parameters are not specified, NSX Manager applies the DNS settings to the DHCP configuration.

Query DHCP Configuration

Gets the DHCP configuration on a NSX Edge including IP pool and static binding assignments.

Example 8-97. Get DHCP configuration

```
GET https://<vsm-ip>/api/4.0/<edgeId>/dhcp/config
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<dhcp>
  <enabled>true</enabled>
  <staticBindings>
    <staticBinding>
      <vmId>vm-111</vmId>
      <vnicId>1</vnicId>
      <hostname>abcd</hostname>
      <ipAddress>192.168.4.2</ipAddress>
      <defaultGateway>192.168.4.1</defaultGateway>
      <domainName>eng.vmware.com</domainName>
      <primaryNameServer>192.168.4.1</primaryNameServer>
      <secondaryNameServer>4.2.2.4</secondaryNameServer>
      <leaseTime>infinite</leaseTime>
      <autoConfigureDNS>true</autoConfigureDNS>
    </staticBinding>
  </staticBindings>
  <ipPools>
    <ipPool>
      <ipRange>192.168.4.192-192.168.4.220</ipRange>
      <defaultGateway>192.168.4.1</defaultGateway>
      <domainName>eng.vmware.com</domainName>
      <primaryNameServer>192.168.4.1</primaryNameServer>
      <secondaryNameServer>4.2.2.4</secondaryNameServer>
      <leaseTime>3600</leaseTime>
      <autoConfigureDNS>true</autoConfigureDNS>
    </ipPool>
  </ipPools>
  <logging>
    <enable>false</enable>
    <logLevel>info</logLevel>
  </logging>
</dhcp>
```

Delete DHCP Configuration

Deletes the DHCP configuration and reverse the configuration back to factory defaults.

Example 8-98. Delete DHCP configuration

Request:

```
DELETE https://<vsm-ip>/api/4.0/<edgeId>/dhcp/config
```

Retrieve DHCP Lease Information

Example 8-99. Get DHCP lease information

GET https://<vsm-ip>/api/4.0/<edgeId>/dhcp/leaseinfo

Response Body:

```
<dhcpLeases>
      <timeStamp>1326950787</timeStamp>
      <dhcpLeaseInfo>
            <leaseInfo>
                  <uid>\001\000PV\265\204\207</uid>
                  <macAddress>00:50:56:b5:84:87</macAddress>
                  <ipAddress>192.168.4.2</ipAddress>
                  <clientHostname>vto-suse-dev</clientHostname>
                  <bindingState>active</bindingState>
                  <nextBindingState>free</nextBindingState>
                  <cltt>4 2012/01/19 05:24:50</cltt>
                  <starts>4 2012/01/19 05:24:50</starts>
                  <ends>4 2012/01/19 17:24:50</ends>
                  <hardwareType>ethernet</hardwareType>
            </leaseInfo>
      </dhcpLeaseInfo>
</dhcp>
```

Append IP Pool to DHCP Configuration

Appends an IP pool to the DHCP configuration. Returns a pool ID within a Location HTTP header.

Example 8-100. Add IP pool

POST https://<vsm-ip>/api/4.0/<edgeId>/dhcp/config/ippools

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipPool>
      <ipRange>192.168.5.2-192.168.5.20</ipRange>
      <defaultGateway>192.168.5.1</defaultGateway>
      <domainName>eng.vmware.com</domainName>
      <primaryNameServer>1.2.3.4</primaryNameServer>
      <secondaryNameServer>4.3.2.1</secondaryNameServer>
      <leaseTime>3600</leaseTime>
      <autoConfigureDNS>true</autoConfigureDNS>
</ipPool>
```

Append Static Binding to DHCP Configuration

Appends a static-binding to the DHCP configuration. A static-binding ID is returned within a Location HTTP header.

Example 8-101. Add static binding

POST https://<vsm-ip>/api/4.0/<edgeId>/dhcp/config/bindings

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<staticBinding>
      <vmId>vm-157</vmId>
      <vnicId>3</vnicId> <!-- possible values 0 to 9 -->
      <hostname>vShield-edge-2-0</hostname>
      <ipAddress>192.168.6.66</ipAddress>
      <defaultGateway>192.168.6.1</defaultGateway>
      <domainName>eng.vmware.com</domainName>
      <primaryNameServer>1.2.3.4</primaryNameServer>
```

```
    <secondaryNameServer>4.3.2.1</secondaryNameServer>
    <leaseTime>infinite</leaseTime>
    <autoConfigureDNS>true</autoConfigureDNS>
</staticBinding>
```

Delete DHCP Pool

Deletes a pool specified by pool-id.

Example 8-102. Delete DHCP pool

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/dhcp/config/ippools/<poolId>
```

Delete DHCP Static Binding

Deletes the static-binding specified by binding-id.

Example 8-103. Delete DHCP static binding

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/dhcp/config/bindings/<bindingId>
```

Working with High Availability (HA)

High Availability (HA) ensures that a NSX Edge appliance is always available on your virtualized network. You can enable HA either when installing NSX Edge or on an installed NSX Edge instance.

If a single appliance is associated with NSX Edge, the appliance configuration is cloned for the standby appliance. If two appliances are associated with NSX Edge and one of them is deployed, this REST call deploys the remaining appliance and push HA configuration to both.

HA relies on an internal interface. If an internal interface does not exist, this call will not deploy the secondary appliance, or push HA config to appliance. The enabling of HA will be done once an available internal interface is added.

If the PUT call includes an empty xml <highAvailability /> or enabled=false, it acts as a DELETE call.

Example 8-104. Configure high availability

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/highavailability/config
```

Request Body:

```
<highAvailability>
    <vnic>1</vnic> <!-- Optional. User can provide the vNic Index. If not provided, the first internal-connected vnic will be used as
                        the vnic -->
    <ipAddresses>  <!-- Optional. It is a pair of ipAddresses with /30 subnet mandatory, one for each appliance. If provided, they
                        must NOT overlap with any subnet defined on the Edge vNics. If not specified, a pair of ips will be picked
                        up from reserved subnet 169.254.0.0/16. -->
    <ipAddress>192.168.10.1/30</ipAddress>
    <ipAddress>192.168.10.2/30</ipAddress>
    </ipAddresses>
    <declareDeadTime>6</declareDeadTime>    <!-- Optional. Default is 6 seconds -->
    <enabled>true<enabled>    <!-- optional, defaults to true. The enabled flag will cause the HA appliance be deployed or
                        destroyed. -->
</highAvailability>
```

Retrieve High Availability Configuration

Example 8-105. Get high availability configuration

Request:api/

```
GET https://<vsm-ip>/4.0/edges/<edgeId>/highavailability/config
```

Request Body:

```
<highAvailability>
      <vnic>1</vnic>
      <ipAddresses>
            <ipAddress>192.168.10.1/30</ipAddress>
            <ipAddress>192.168.10.2/30</ipAddress>
      </ipAddresses>
      <declareDeadTime>6</declareDeadTime>    <!-- Optional. Default is 6 seconds -->
</highAvailability>
```

Delete High Availability Configuration

NSX Manager deletes the standby appliance and removes the HA config from the active appliance.

You can also delete the HA configuration by using a PUT call with empty xml <highAvailability /> or with <highAvailability><enabled>false</enabled></highAvailability>.

Example 8-106. Delete high availability configuration

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/highavailability/config
```

Working with Syslog

You can configure one or two remote syslog servers. NSX Edge events and logs related to firewall events that flow from NSX Edge appliances are sent to the syslog servers.

Configure Syslog

Configures syslog servers.

Example 8-107. Configure syslog servers

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/syslog/config
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<syslog>
    <protocol>udp</protocol>          <!-- Optional. Default is "udp". Valid values : tcp|udp -->
    <serverAddresses>                 <!-- Maximum 2 remote IPs can be configured. -->
      <ipAddress>1.1.1.1</ipAddress>
      <ipAddress>1.1.1.2</ipAddress>
    </serverAddresses>
  </syslog>
```

Query Syslog

Retrieves syslog server information.

Example 8-108. Query syslog servers

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/syslog/config
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<syslog>
    <protocol>udp</protocol>          <!-- Optional. Default is "udp". Valid values : tcp|udp -->
    <serverAddresses>                 <!-- Maximum 2 remote IPs can be configured. -->
      <ipAddress>1.1.1.1</ipAddress>
      <ipAddress>1.1.1.2</ipAddress>
    </serverAddresses>
  </syslog>
```

Delete Syslog

Deletes syslog servers.

Example 8-109. Delete syslog servers

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/syslog/config
```

Managing SSL VPN

With SSL VPN-Plus, remote users can connect securely to private networks behind a NSX Edge gateway. Remote users can access servers and applications in the private networks.

Enable or Disable SSL VPN

Enables or disables SSL VPN on the NSX Edge appliance.

Example 8-110. Enable or disable SSL VPN

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/?enableService=true|False
```

Query SSL VPN Details

Retrieves SSL VPN details.

Example 8-111. Get SSL VPN details

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/
```

Manage Server Settings

Apply Server Settings

Configures SSL VPN server on port 443 using the certificate named server-cert that is already uploaded on the NSX Edge appliance and the specified cipher.

Example 8-112. Apply server settings

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/server/

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<serverSettings>
 <serverAddresses>
 <ipAddress>10.112.243.109</ipAddress> <!-- Ipv4 or IPV6 address of any of the external vnic. ipv4 and ipv6 both can not
                        configured. -->
 </serverAddresses>
 <port>443</port> <!--optional. Default is 60003 -->
 <!-- Certificate has to be generated using certificate REST API and id returned should be mentioned here-->
<!-- <certificateId>certificate-1</certificateId> --> <!-- optional. -->
 <cipherList>
 <!-- any one or more of the following ciphers can be part of configuration -->
 <!—RC4-MD5|AES128-SHA|AES256-SHA|DES-CBC3-SHA-->
 <cipher>RC4-MD5</cipher>
 <cipher>AES128-SHA</cipher>
 <cipher>AES256-SHA</cipher>
 <cipher>DES-CBC3-SHA</cipher>
 </cipherList>
</serverSettings>
```

Query Server Settings

Gets server settings.

Example 8-113. Apply server settings

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/server/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<serverSettings>
<serverAddresses>
        <ipAddress>10.110.12.249</ipAddress>
      </serverAddresses>
      <port>60003</port>
<certificateId>certificate-1</certificateId>
<cipherList>
<cipher>RC4-MD5</cipher>
</cipherList>
</serverSettings>
```

Configure Private Networks

Add Private Network

Configures a private network that the administrator wants to expose to remote users over the SSL VPN tunnel.

Example 8-114. Add private network

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/privatenetworks/

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
```

```
<privateNetwork>
      <description>This is a private network for UI-team</description>
      <network>192.168.1.0/24</network>
      <sendOverTunnel>              <!--optional. -->
            <ports>20-40</ports>       <!-- optional. Default is 0-0 -->
            <optimize>false</optimize> <!--optional. Default is true -->
      </sendOverTunnel>
      <enabled>true</enabled>       <!--optional. Default is true-->
</privateNetwork>
```

Modify Private Network

Modifies the specified private network in the SSL VPN service on NSX Edge.

Example 8-115. Add private network

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/privatenetworks/*privateNetworkID*

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<privateNetwork>
      <description>This is a private network for UI-team</description>
      <network>192.168.1.0/24</network>
      <sendOverTunnel>
            <ports>20-40</ports>
            <optimize>false</optimize>
      </sendOverTunnel>
      <enabled>true</enabled>
</privateNetwork>
```

Query Specific Private Network

Gets the specified private network profile in the SSL VPN instance on NSX Edge.

Example 8-116. Query private network

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/privatenetworks/*privateNetworkID*

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<privateNetwork>
      <description>This is a private network for UI-team</description>
      <network>192.168.1.0/24</network>
      <sendOverTunnel>
            <ports>20-40</ports>
            <optimize>false</optimize>
      </sendOverTunnel>
      <enabled>true</enabled>
</privateNetwork>
```

Query all Private Networks

Gets all private network profiles in the SSL VPN instance on NSX Edge.

Example 8-117. Query private network

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/privatenetworks/

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<privateNetwork>
      <privateNetwork>
            <onjectId>privatenetwork-1</objectId>
            <description>This is a private network for pune-qa-team</description>
            <network>192.168.1.0/24</network>
            <sendOverTunnel>
                  <ports>10-20</ports>
                  <optimize>true</optimize>
            </sendOverTunnel>
      <enabled>true</enabled>
      </privateNetwork>
</privateNetwork>
```

Delete Private Network

Deletes the specified dynamic IP address configuration from the SSL VPN instance on NSX Edge.

Example 8-118. Delete private network

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                  privatenetworks/privatenetworkID
```

Delete all Private Networks

Deletes all dynamic IP address configurations from the SSL VPN instance on NSX Edge.

Example 8-119. Delete private network

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                  privatenetworks/
```

Apply All Private Networks

Updates all private network configurations of NSX Edge with the given list of private network configurations. If the configuration is present, it is updated; if it is not present, a new private network configuration is created. Existing configurations not included in the REST call are deleted.

Example 8-120. Apply all private networks

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                  privatenetworks/
```

Configure Web Resource

Add Portal Web Resource

Adds a web access server that the remote user can connect to via a web browser.

Example 8-121. Add portal web resource

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/webresources/

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<webResource>
      <name>VMware</name>
      <url>http://www.vmware.com</url>
      <method name="POST">
            <data>username=stalin </data>
      </method>
      <description>Click here to visit the corporate intranet Homepage </description>
      <enabled>true</enabled>            <!--optional. Default is true-->
</webResource>
```

Modify Portal Web Resource

Modifies the specified web access server.

Example 8-122. Modify portal web resource

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/webresources/*ID*

Request Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<webResource>
      <name>VMware</name>
      <url>http://www.vmware.com</url>
      <method name="POST">
            <data>username=stalin </data>
      </method>
      <description>Click here to visit the corporate intranet Homepage </description>
      <enabled>true</enabled>            <!--optional. Default is true-->
</webResource>
```

Query Portal Web Resource

Gets the specified web access server.

Example 8-123. Get specific portal web resource

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/webresources/*ID*

Response Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<webResource>
      <name>VMware</name>
      <url>http://www.vmware.com</url>
      <method name="POST">
            <data>username=stalin </data>
      </method>
      <description>Click here to visit the corporate intranet Homepage </description>
      <enabled>true</enabled>            <!--optional. Default is true-->
</webResource>
```

Query all Web Resources

Gets all web resources on the SSL VPN instance.

Example 8-124. Get portal web resource

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/webresources/
```

Response Body:

```
<?xml version="1.0" encoding=”UTF-8”?>
<webResources>
      <webResource>
            <objectId>webresource-1</objectId>
            <name>VMware</name>
            <url>http://www.vmware.com</url>
            <method name="POST">
                  <data>username=stalin </data>
            </method>
            <description>Click here to visit the corporate intranet Homepage </description>
            <enabled>true</enabled>
      </webResource>
</webResources>
```

Delete Portal Web Resource

Deletes the specified web access server.

Example 8-125. Delete specific portal web resource

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/webresources/ID
```

Deletes all Web Resources

Deletes all web resources on the SSL VPN instance.

Example 8-126. Deletes all portal web resources

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/webresources/
```

Apply All Web Resources

Updates web resource configurations of NSX Edge with the given list of web resource configurations. If the configuration is present, it is updated; if it is not present, a new web resource configuration is created. Existing configurations not included in the REST call are deleted.

Example 8-127. Apply all private networks

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                        privatenetworks/
```

Configure Users

Add User

Adds a new portal user.

Example 8-128. Add a user

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/localserver/users/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
      <user>
      <userId>stalin</userId>
      <password>apple@123</password>
      <firstName>STALIN</firstName>
      <lastName>RAJAKILLI</lastName>
      <description>This user belong to vsm team</description>
      <disableUserAccount>false</disableUserAccount>              <!--optional. Default is false-->
      <passwordNeverExpires>true</passwordNeverExpires>           <!--optional. Default is false-->
      <allowChangePassword>
            <changePasswordOnNextLogin>false</changePasswordOnNextLogin> <!--optional. Default is false-->
      </allowChangePassword>
</user>
```

Modify User

Modifies the specified portal user.

Example 8-129. Modify user

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/localserver/users/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
      <user>
      <userId>stalin</userId>
      <password>apple@123</password>
      <firstName>STALIN</firstName>
      <lastName>RAJAKILLI</lastName>
      <description>This user belong to vsm team</description>
      <disableUserAccount>false</disableUserAccount>              <!--optional. Default is false-->
      <passwordNeverExpires>true</passwordNeverExpires>           <!--optional. Default is false-->
      <allowChangePassword>
            <changePasswordOnNextLogin>false</changePasswordOnNextLogin> <!--optional. Default is false-->
      </allowChangePassword>
</user>
```

Query User Details

Gets information about the specified user.

Example 8-130. Query user

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/localserver/users/*userID*

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<users>
      <user>
            <userId>stalin</userId>
            <firstName>Bob</firstName>
            <lastName>Weber</lastName>
```

```
        <disableUserAccount>false</disableUserAccount>          <!--optional. Default is false-->
        <passwordNeverExpires>true</passwordNeverExpires>       <!--optional. Default is false-->
        <allowChangePassword>
            <changePasswordOnNextLogin>false</changePasswordOnNextLogin> <!--optional. Default is false-->
        </allowChangePassword>
</user>
```

Delete User

Deletes specified user.

Example 8-131. Delete user

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/localserver/users/*userID*

Delete all Users

Deletes all users on the specified SSL VPN instance.

Example 8-132. Delete all user

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/localserver/users/

Apply all Users

Updates all users of NSX Edge with the given list of users. If the user is present, it is updated; if it is not present, a new user is created. Existing users not included in the REST call are deleted.

Example 8-133. Apply all users

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/auth/localusers/users

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<users>
    <user>
        <userId>stalin</userId>
        <password>apple@123</password>
        <firstName>Bob</firstName>
        <lastName>Weber</lastName>
        <description>This user belong to vsm team</description>
        <disableUserAccount>false</disableUserAccount>
        <passwordNeverExpires>true</passwordNeverExpires>
        <allowChangePassword>
            <changePasswordOnNextLogin>false</changePasswordOnNextLogin>
        </allowChangePassword>
</user>
```

Configure IP Pool

You can add, edit, or delete an IP pool.

Add IP Pool

Creates an IP pool that will be used to assign IP address to remote users.

Example 8-134. Add IP pool

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/ippools/
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipAddressPool>
      <description>description</description>
      <ipRange>10.112.243.11-10.112.243.57</ipRange>
      <netmask>255.0.0.0</netmask>
      <gateway>192.168.1.1</gateway>
      <primaryDns>192.168.10.1</primaryDns        <!--optional. -->
      <secondaryDns>4.2.2.2</secondaryDns>        <!--optional. -->
      <dnsSuffix></dnsSuffix>
      <winsServer>10.112.243.201</winsServer>
      <enabled>true</enabled>                  <!--optional. Default is true-->
</ipAddressPool>
```

Modify IP Pool

Modifies the specified IP pool.

Example 8-135. Modify IP pool

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/ippools/ippoolID
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipAddressPool>
      <description>description</description>
      <ipRange>10.112.243.11-10.112.243.57</ipRange>
      <netmask>255.0.0.0</netmask>
      <gateway>192.168.1.1</gateway>
      <primaryDns>192.168.10.1</primaryDns
      <secondaryDns>4.2.2.2</secondaryDns>
      <dnsSuffix></dnsSuffix>
      <winsServer>10.112.243.201</winsServer>
      <enabled>true</enabled>
</ipAddressPool>
```

Query IP Pool

Gets details of the IP pool.

Example 8-136. Get IP pool

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/ippools/ippoolID
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipAddressPool>
      <objectId>ipPool-1</objectId>
      <description>description</description>
      <ipRange>10.112.243.11-10.112.243.57</ipRange>
```

```
    <netmask>255.0.0.0</netmask>
    <gateway>192.168.1.1</gateway>
    <primaryDns>192.168.10.1</primaryDns        <!--optional. -->
    <secondaryDns>4.2.2.2</secondaryDns>        <!--optional. -->
    <dnsSuffix></dnsSuffix>
    <winsServer>10.112.243.201</winsServer>
    <enabled>true</enabled>                     <!--optional. Default is true-->
</ipAddressPool>
```

Query all IP Pools

Gets all IP pools configured on the SSL VPN instance.

Example 8-137. Gets all IP pools

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/ippools/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipAddressPool>
    <objectId>ipPool-1</objectId>
    <description>description</description>
    <ipRange>10.112.243.11-10.112.243.57</ipRange>
    <netmask>255.0.0.0</netmask>
    <gateway>192.168.1.1</gateway>
    <primaryDns>192.168.10.1</primaryDns        <!--optional. -->
    <secondaryDns>4.2.2.2</secondaryDns>        <!--optional. -->
    <dnsSuffix></dnsSuffix>
    <winsServer>10.112.243.201</winsServer>
    <enabled>true</enabled>                     <!--optional. Default is true-->
</ipAddressPool>
```

Delete IP Pool

Deletes the specified IP pool.

Example 8-138. Delete IP pool

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                    ippools/ippoolID
```

Deletes all IP Pools

Deletes all IP pools on the SSL VPN instance.

Example 8-139. Deletes all IP pools

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                    ippools/
```

Apply all IP Pools

Updates all IP pools of NSX Edge with the given list of users. If the IP pool is present, it is updated; if it is not present, a new IP pool is created. Existing pools not included in the REST call are deleted.

Example 8-140. Apply IP pools

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/ippools/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipAddressPools>
      <ipAddressPool>
            <description>description</description>
            <ipRange>10.112.243.11-10.112.243.57</ipRange>
            <netmask>255.0.0.0</netmask>
            <gateway>192.168.1.1</gateway>
            <primaryDns>192.168.10.1</primaryDns
            <secondaryDns>4.2.2.2</secondaryDns>
            <dnsSuffix></dnsSuffix>
            <winsServer>10.112.243.201</winsServer>
            <enabled>true</enabled>
      </ipAddressPool>
<ipAddressPools>
```

Configure Network Extension Client Parameters

Apply Client Configuration

Sets advanced parameters for full access client configurations – such as whether client should auto-reconnect in case of network failures or network unavailability, or whether the client should be uninstalled after logout.

Example 8-141. Apply IP pools

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/clientconfig/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<clientConfiguration>
      <autoReconnect>true</autoReconnect>             <!--optional. Default is false-->
      <fullTunnel>                              <!--optional. Default Tunnel mode is SPLIT-->
      <excludeLocalSubnets>true</excludeLocalSubnets>   <!--optional. Default is false-->
            <gatewayIp>10.112.243.11</gatewayIp>
      </fullTunnel>
      <upgradeNotification>false</upgradeNotification>  <!--optional. Default is false-->
</clientConfiguration>
```

Get Client Configuration

Gets information about the specified client.

Example 8-142. Get client configuration

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/clientconfig/

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<clientConfiguration>
      <autoReconnect>true</autoReconnect> <!--optional. Default is false-->
      <tunnelConfiguration>
            <excludeLocalSubnets>true</excludeLocalSubnets> <!--optional. Default is false-->
            <gatewayIp>10.112.243.11</gatewayIp>
      </tunnelConfiguration>
```

```
    <upgradeNotification>false</upgradeNotification> <!--optional. Default is false-->
</clientConfiguration>
```

Configure Network Extension Client Installation Package

You can add, delete, or edit an installation package for the SSL client.

Add Client Installation Package

Creates setup executables (installers) for full access network clients. These setup binaries are later downloaded by remote clients and installed on their systems. The primary parameters needed to configure this setup are - hostname of the gateway, and its port and a profile name which is shown to the user to identify this connection. Administrator can also set few other parameters such as whether to automatically start the application on windows login, hide the system tray icon etc.

Example 8-143. Add installation package

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/installpackages/
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<clientInstallPackage>
    <profileName>client</profileName>
    <gatewayList>
        <gateway>
            <hostName>10.112.243.123</hostName>
            <port>443</port> <!--optional. Default is 443-->
        </gateway>
    </gatewayList>
    <startClientOnLogon>false</startClientOnLogon> <!--optional. Default is false-->
    <hideSystrayIcon>true</hideSystrayIcon> <!--optional. Default is false-->
    <rememberPassword>true</rememberPassword> <!--optional. Default is false-->
    <silentModeOperation>true</silentModeOperation> !--optional. Default is false-->
    <silentModeInstallation>false</silentModeInstallation> <!--optional. Default is false-->
    <hideNetworkAdaptor>false</hideNetworkAdaptor> <!--optional. Default is false-->
    <createDesktopIcon>true</createDesktopIcon> <!--optional. Default is true-->
    <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation> <!--optional. Default is true-->
    <createLinuxClient>false</createLinuxClient> <!--optional. Default is false-->
    <createMacClient>false</createMacClient> <!--optional. Default is false-->
    <description>windows client</description>
    <enabled>true</enabled> <!--optional. Default is true-->
</clientInstallPackage>
```

Modify Client Installation Package

Modifies the specified installation package.

Example 8-144. Modify installation package

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                    installpackages/ID
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<clientInstallPackage>
    <profileName>client</profileName>
    <gatewayList>
        <gateway>
            <hostName>10.112.243.123</hostName>
```

```
                <port>443</port> <!--optional. Default is 443-->
            </gateway>
        </gatewayList>
        <startClientOnLogon>false</startClientOnLogon>          <!--optional. Default is false-->
        <hideSystrayIcon>true</hideSystrayIcon>                 <!--optional. Default is false-->
        <rememberPassword>true</rememberPassword>               <!--optional. Default is false-->
        <silentModeOperation>true</silentModeOperation>         <!--optional. Default is false-->
        <silentModeInstallation>false</silentModeInstallation>  <!--optional. Default is false-->
        <hideNetworkAdaptor>false</hideNetworkAdaptor>          <!--optional. Default is false-->
        <createDesktopIcon>true</createDesktopIcon>             <!--optional. Default is true-->
        <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation>                    <!--optional.
                                Default is true-->
        <createLinuxClient>false</createLinuxClient>            <!--optional. Default is false-->
        <createMacClient>false</createMacClient>                <!--optional. Default is false-->
        <description>windows client</description>
        <enabled>true</enabled>                         <!--optional. Default is true-->
</clientInstallPackage>
```

Query Client Installation Package

Gets information about the specified installation package.

Example 8-145. Query installation package

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                        installpackages/ID
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<clientInstallPackage>
        <objectId>clientinstallpackage-1</objectId>
        <profileName>client</profileName> <gatewayList>
        <gatewayList>
                <gateway>
                        <hostName>10.112.243.123</hostName>
                        <port>443</port> <!--optional. Default is 443-->
                </gateway>
        </gatewayList>
        <startClientOnLogon>false</startClientOnLogon>
        <hideSystrayIcon>true</hideSystrayIcon>
        <rememberPassword>true</rememberPassword>
        <silentModeOperation>true</silentModeOperation>
        <silentModeInstallation>false</silentModeInstallation>
        <hideNetworkAdaptor>false</hideNetworkAdaptor>
        <createDesktopIcon>true</createDesktopIcon>
        <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation>
        <createLinuxClient>false</createLinuxClient>
        <createMacClient>false</createMacClient>
        <description>windows client</description>
        <enabled>true</enabled>
</clientInstallPackage>
```

Query all Client Installation Packages

Gets information about all installation packages.

Example 8-146. Query all installation package

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                        installpackages/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<clientInstallPackages>
      <clientInstallPackage>
            <objectId>clientinstallpackage-1</objectId>
            <profileName>client</profileName> <gatewayList>
            <gatewayList>
                  <gateway>
                        <hostName>10.112.243.123</hostName>
                        <port>443</port>
                  </gateway>
            </gatewayList>
            <startClientOnLogon>false</startClientOnLogon>
            <hideSystrayIcon>true</hideSystrayIcon>
            <rememberPassword>true</rememberPassword>
            <silentModeOperation>true</silentModeOperation>
            <silentModeInstallation>false</silentModeInstallation>
            <hideNetworkAdaptor>false</hideNetworkAdaptor>
            <createDesktopIcon>true</createDesktopIcon>
            <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation>
            <createLinuxClient>false</createLinuxClient>
            <createMacClient>false</createMacClient>
            <description>windows client</description>
            <enabled>true</enabled>
      </clientInstallPackage>
<clientInstallPackage>
```

Delete Client Installation Package

Deletes the specified installation package.

Example 8-147. Delete installation package

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                  installpackages/ID
```

Delete all Client Installation Packages

Deletes all installation packages.

Example 8-148. Delete all installation packages

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                  installpackages/
```

Apply all Installation Packages

Updates all installation packages on NSX Edge with the given list of installation packages. If the installation package is present, it is updated; if it is not present, a new installation package is created. Existing installation packages not included in the REST call are deleted.

Example 8-149. Apply installation packages

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/client/networkextension/
                  installpackages/
```

Request Body:

```
<clientInstallPackages>
    <clientInstallPackage>
        <objectId>clientinstallpackage-1</objectId>
        <profileName>client</profileName> <gatewayList>
        <gatewayList>
            <gateway>
                <hostName>10.112.243.123</hostName>
                <port>443</port>
            </gateway>
        </gatewayList>
        <startClientOnLogon>false</startClientOnLogon>
        <hideSystrayIcon>true</hideSystrayIcon>
        <rememberPassword>true</rememberPassword>
        <silentModeOperation>true</silentModeOperation>
        <silentModeInstallation>false</silentModeInstallation>
        <hideNetworkAdaptor>false</hideNetworkAdaptor>
        <createDesktopIcon>true</createDesktopIcon>
        <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation>
        <createLinuxClient>false</createLinuxClient>
        <createMacClient>false</createMacClient>
        <description>windows client</description>
        <enabled>true</enabled>
    </clientInstallPackage>
<clientInstallPackage>
```

Configure Portal Layouts

You can configure the web layout bound to the SSL VPN client.

Upload Portal Logo

Uploads the portal logo from the given local path.

Example 8-150. Upload portal logo

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/portallogo/
```

Upload Phat Banner

Uploads the phat client banner from the given local path. The phat banner image must in the bmp format.

Example 8-151. Upload phat banner

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/phatbanner
```

Upload Client Connected Icon

Uploads the client connected icon from the given local path. The icon image must be of type ico.

Example 8-152. Upload client connected icon

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/connecticon/
```

Upload Client Disconnected Icon

Uploads the client disconnected icon from the given local path. The icon image must be of type ico.

Example 8-153. Upload client disconnected icon

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/disconnecticon/

Upload Client Desktop Icon

Uploads the client desktop icon from the given local path. The icon image must be of type ico.

Example 8-154. Upload client desktop icon

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/desktopicon/

Upload Error Connected Icon

Uploads the client error connected icon from the given local path. The icon image must be of type ico.

Example 8-155. Upload client desktop icon

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/erroricon/

Apply Layout Configuration

Sets the portal layout.

Example 8-156. Apply layout configuration

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/images/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
      <layout>
      <!-- portal layout configuration-->
      <portalTitle>Pepsi Remote Access</portalTitle><!--optional. Default value is VMware -->
      <companyName>pepsi, Inc.</companyName><!--optional. Default value is VMware -->
      <!-- Portal Color Configuration-->
      <logoBackgroundColor>FFFFFF</logoBackgroundColor><!--optional. Default value is FFFFFF -->
      <titleColor>996600</titleColor><!--optional. Default value is 996600 -->
      <topFrameColor>000000</topFrameColor><!--optional. Default value is 000000 -->
      <menuBarColor>999999</menuBarColor><!--optional. Default value is 999999 -->
      <rowAlternativeColor>FFFFFF</rowAlternativeColor><!--optional. Default value is FFFFFF -->
      <bodyColor>FFFFFF</bodyColor><!--optional. Default value is FFFFFF -->
      <rowColor>F5F5F5</rowColor><!--optional. Default value is F5F5F5 -->
</layout>
```

Query Portal Layout

gets the portal layout configuration.

Example 8-157. Query layout configuration

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/layout/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
      <layout>
      <!-- portal layout configuration-->
      <portalTitle>Pepsi Remote Access</portalTitle><!--optional. Default value is VMware -->
      <companyName>pepsi, Inc.</companyName><!--optional. Default value is VMware -->
      <!-- Portal Color Configuration-->
      <logoBackgroundColor>FFFFFF</logoBackgroundColor><!--optional. Default value is FFFFFF -->
      <titleColor>996600</titleColor><!--optional. Default value is 996600 -->
      <topFrameColor>000000</topFrameColor><!--optional. Default value is 000000 -->
      <menuBarColor>999999</menuBarColor><!--optional. Default value is 999999 -->
      <rowAlternativeColor>FFFFFF</rowAlternativeColor><!--optional. Default value is FFFFFF -->
      <bodyColor>FFFFFF</bodyColor><!--optional. Default value is FFFFFF -->
      <rowColor>F5F5F5</rowColor><!--optional. Default value is F5F5F5 -->
</layout>
```

Configure Authentication Parameters

You can add an external authentication server (AD, LDAP, Radius, or RSA) which is bound to the SSL gateway. All users in the bounded authenticated server will be authenticated.

Upload RSA Config File

Uploads the RSA configuration file to NSX Manager.

Example 8-158. Upload RSA config file

Request:

```
POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/settings/rsaconfigfile/
```

Apply Authentication Configuration

Sets authentication process for remote users. The administrator specifies whether username password based authentication should be enabled and the list and details of authentication servers such as active directory, ldap, radius etc. The administrator can also enable client certificate based authentication.

Example 8-159. Apply Authentication Configuration

Request:edgeId

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/settings/
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<authenticationConfig>
      <passwordAuthentication>
            <authenticationTimeout>1</authenticationTimeout>      <!--optional. Default value is 1 mins-->
            <!-- Only four auth servers can be part of authentication configuration including secondary auth server and can be of type
                        AD,LDAP,RADIUS,LOCAL and RSA -->
            <primaryAuthServers>
                  <com.vmware.vshield.edge.sslvpn.dto.LdapAuthServerDto>
                        <ip>1.1.1.1</ip>
                        <port>90</port>                        <!--optional. Default value is 639 if ssl enabled or 389 for normal cfg-->
                        <timeOut>20</timeOut>                  <!--optional. Default value is 10 secs-->
                        <enableSsl>false</enableSsl>           <!--optional. Default is false-->
                        <searchBase>searchbasevalue</searchBase>
```

```
                    <bindDomainName>binddnvalue</bindDomainName>
                    <bindPassword>password</bindPassword>          <!--optional.-->
                    <loginAttributeName>cain</loginAttributeName>  <!--optional. Default is sAMAccountName -->
                    <searchFilter>found</searchFilter>            <!--optional. Default is 'objectClass=*'-->
                    <enabled>true</enabled>                       <!--optional. Default is ture-->
                </com.vmware.vshield.edge.sslvpn.dto.LdapAuthServerDto>
                <com.vmware.vshield.edge.sslvpn.dto.RadiusAuthServerDto>
                    <ip>3.3.3.3</ip>
                    <port>90</port>                           <!--optional. Default value is 1812-->
                    <timeOut>20</timeOut>                     <!--optional. Default value is 10 secs-->
                    <secret>struct9870</secret>
                    <nasIp>1.1.1.9</nasIp>                    <!--optional. Default value is 0.0.0.0-->
                    <retryCount>10</retryCount>               <!--optional. Default value is 3-->
                </com.vmware.vshield.edge.sslvpn.dto.RadiusAuthServerDto>
                <com.vmware.vshield.edge.sslvpn.dto.LocalAuthServerDto>
        <!--Only one Local auth server can be part of authentication configuration -->
                    <enabled>true</enabled>
                    <passwordPolicy>                          <!-- optional. -->
                        <minLength>1</minLength>              <!--optional. Default value is 1-->
                        <maxLength>1</maxLength>              <!--optional. Default value is 63-->
                        <minAlphabets>0</minAlphabets>        <!--optional -->
                        <minDigits>0</minDigits>              <!--optional -->
                        <minSpecialChar>1</minSpecialChar>    <!--optional -->
                        <allowUserIdWithinPassword>false</allowUserIdWithinPassword>  <!-- optional. Default value is false
                                                                                       -->
                        <passwordLifeTime>20</passwordLifeTime>     <!--optional. Default value is 30 days-->
                        <expiryNotification>1</expiryNotification>  <!--optional. Default value is 25 days-->
                    </passwordPolicy>
                    <accountLockoutPolicy>                    <!--optional -->
                        <retryCount>3</retryCount>            <!--optional. Default value is 3-->
                        <retryDuration>3</retryDuration>      <!--optional. Default value is 2 days -->
                        <lockoutDuration>3</lockoutDuration>  <!--optional. Default value is 2 days -->
                    </accountLockoutPolicy>
                </com.vmware.vshield.edge.sslvpn.dto.LocalAuthServerDto>
                <!-- Only one RSA auth server can be configured. RSA configuration file has to be uploaded prior to config RSA
                                auth server RSA timeOut is optional. Default value is 60 secs-->
                <com.vmware.vshield.edge.sslvpn.dto.RsaAuthServerDto>
                    <timeOut>20</timeOut>
                    <sourceIp>1.2.2.3</sourceIp>
                </com.vmware.vshield.edge.sslvpn.dto.RsaAuthServerDto>  -->
            </primaryAuthServers>
            <secondaryAuthServer>
            <!--Any of one of the auth server AD, LDAP, RSA, LOCAL or RADIUS can be sec auth server -->
                <com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
                    <ip>1.1.1.1</ip>
                    <port>90</port>                           <!--optional. Default value is 639 if ssl enabled or 389 for normal cfg-->
                    <timeOut>20</timeOut>                     <!--optional. Default value is 10 secs-->
                    <enableSsl>false</enableSsl>              <!--optional. Default is false-->
                    <searchBase>searchbasevalue</searchBase>
                    <bindDomainName>binddnvalue</bindDomainName>
                    <bindPassword>password</bindPassword>          <!--optional. -->
                    <loginAttributeName>cain</loginAttributeName>  <!--optional. Default is sAMAccountName -->
                    <searchFilter>found</searchFilter>            <!--optional. Default is 'objectClass=*'-->
                    <terminateSessionOnAuthFails>false</terminateSessionOnAuthFails>  <!--optional. Default is false-->
                    <enabled>true</enabled>
                </com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
            </secondaryAuthServer>
        </passwordAuthentication>
    </authenticationConfig>
```

Query Authentication Configuration

Gets information about the specified authentication server.

Example 8-160. Query Authentication Configuration

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/auth/settings/

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<com.vmware.vshield.edge.sslvpn.dto.AuthenticationConfigurationDto>
      <passwordAuthentication>
            <authenticationTimeout>1</authenticationTimeout>
            <primaryAuthServers>
                  <com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
                        <ip>1.1.1.1</ip>
                        <port>90</port>
                        <timeOut>20</timeOut>
                        <enableSsl>false</enableSsl>
                        <searchBase>searchbasevalue</searchBase>
                        <bindDomainName>binddnvalue</bindDomainName>
                        <bindPassword>password</bindPassword>
                        <loginAttributeName>cain</loginAttributeName>
                        <searchFilter>found</searchFilter>
                        <enabled>true</enabled>
                  <com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
            </primaryAuthServers>
            <secondaryAuthServer>
                  <com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
                        <ip>1.1.1.1</ip>
                        <port>90</port>
                        <timeOut>20</timeOut>
                        <enableSsl>false</enableSsl>
                        <searchBase>searchbasevalue</searchBase>
                        <bindDomainName>binddnvalue</bindDomainName>
                        <bindPassword>password</bindPassword>
                        <loginAttributeName>cain</loginAttributeName>
                        <searchFilter>found</searchFilter>
                        <terminateSessionOnAuthFails>false</terminateSessionOnAuthFails>
                        <enabled>true</enabled>
                  </com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
            </secondaryAuthServer>
      </passwordAuthentication>
</authenticationConfig>
```

Configure SSL VPN Advanced Configuration

Apply advanced configuration

Applies advanced configuration.

Example 8-161. Apply advanced configuration

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/advancedconfig/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<advancedConfig>
      <enableCompression>false</enableCompression>          <!--optional. Default is false-->
      <forceVirtualKeyboard>false</forceVirtualKeyboard>    <!--optional. Default is false-->
      <preventMultipleLogon>true</preventMultipleLogon>     <!--optional. Default is false-->
      <randomizeVirtualkeys>false</randomizeVirtualkeys>    <!--optional. Default is false-->
      <timeout>                                  <!--optional. -->
            <forcedTimeout>16</forcedTimeout>               <!--optional. Value is in minute(s)-->
            <sessionIdleTimeout>10</sessionIdleTimeout>      <!--optional. Default is 10 mins-->
```

```
    </timeout>
    <clientNotification></clientNotification>
    <enablePublicUrlAccess>false</enablePublicUrlAccess>   <!--optional. Default is false-->
    <enableLogging>false</enableLogging>                   <!--optional. Default is false-->
</advancedConfig>
```

Query Advanced Configuration

Retrieves SSL VPN advanced configuration.

Example 8-162. Query advanced configuration

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/advancedconfig/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<advancedConfig>
    <enableCompression>false</enableCompression>          <!--optional. Default is false-->
    <forceVirtualKeyboard>false</forceVirtualKeyboard>    <!--optional. Default is false-->
    <preventMultipleLogon>true</preventMultipleLogon>     <!--optional. Default is false-->
    <randomizeVirtualkeys>false</randomizeVirtualkeys>    <!--optional. Default is false-->
    <timeout>                                  <!--optional. -->
        <forcedTimeout>16</forcedTimeout>                 <!--optional. Value is in minute(s)-->
        <sessionIdleTimeout>10</sessionIdleTimeout>       <!--optional. Default is 10 mins-->
    </timeout>
    <clientNotification></clientNotification>
    <enablePublicUrlAccess>false</enablePublicUrlAccess>   <!--optional. Default is false-->
    <enableLogging>false</enableLogging>                   <!--optional. Default is false-->
</advancedConfig>
```

Working with Active Clients

You can retrieve a list of active clients for the SSL VPN session and disconnect a specific client.

Query Active Clients

Retrieves a list of active clients for the SSL VPN session.

Example 8-163. Query active clients

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/activesessions/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<activeSessions>
    <activeSession>
        <sessionId>488382</sessionId>
        <sessionType>PHAT</sessionType>
        <userName>demo</userName>
        <startTime>2011-09-24-06:00</startTime>
        <upTime>101400</upTime>
        <idleTime>2</idleTime>
        <totalNonTcpBytesReceived>6576</totalNonTcpBytesReceived>
        <totalTcpBytesReceived>30816</totalTcpBytesReceived>
        <totalNonTcpBytesSent>0</totalNonTcpBytesSent>
        <totalTcpBytesSent>152722</totalTcpBytesSent>
        <clientInternalIp>1.0.192.10</clientInternalIp>
        <clientVirtualIP>192.168.27.20</clientVirtualIP>
        <clientExternalNatIp>10.112.243.227</clientExternalNatIp>
```

```
            <clientExternalNatPort>50498</clientExternalNatPort>
            <totalConnections>2</totalConnections>
            <totalActiveConnection>4</totalActiveConnection>
        </activeSession>
</activeSessions>
```

Disconnect Active Client

Disconnects an active client.

Example 8-164. Disconnect active client

Request:

DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/activesessions/*sessionId*

Manage Logon and Logoff scripts

You can bind a login or logoff script to the NSX Edge gateway.

Upload Script

You can add multiple login or logoff scripts. For example, you can bind a login script for starting Internet Explorer with gmail.com. When the remote user logs in to the SSL client, Internet Explorer opens up gmail.com.

The upload script returns a script file ID which is used to configure the file parameters.

Example 8-165. Upload script

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/file/

Configure Script Parameters

Configures parameters associated with the uploaded script file.

Example 8-166. Add script parameters

Request:

POST https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<logonLogoffScript>
    <scriptFileId>logonlogoffscriptfile-12</scriptFileId>    <!-- Script file id generated using upload script file REST API-->
    <type>BOTH</type>
    <description>Testing modify script</description>
    <enabled>false</enabled>                        <!--optional. Default is true -->
</logonLogoffScript>
```

Modify Script Configuration

Modifies the parameters associated with the specified script file ID.

Example 8-167. Modify script parameters

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/*scriptFileId*

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<logonLogoffScript>
      <scriptFileId>logonlogoffscriptfile-12</scriptFileId>
      <type>BOTH</type>
      <description>Testing modify sscript</description>
      <enabled>false</enabled>
</logonLogoffScript>
```

Query Script Configuration

Retrieves parameters associated with the specified script file ID.

Example 8-168. Get script parameters

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/*scriptFileId*

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<logonLogoffScript>
      <objectId>logonlogoffscript-1</objectId>
      <scriptFileId>logonlogoffscriptfile-12</scriptFileId>
      <type>BOTH</type>
      <description>Testing modify script</description>
      <scriptFileUri>https://vsm-ip/api/4.0/edges/edge-id/sslvpn/config/script/file/scriptFileId/</scriptFileUri>
      <enabled>false</enabled>
</logonLogoffScript>
```

Query All Script Configurations

Retrieves all script configurations for the specified NSX Edge.

Example 8-169. Get all script parameters

Request:

GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<logonLogoffScript>
      <logonLogoffScript>
            <scriptFileId>logonlogoffscriptfile-12</scriptFileId>
            <type>BOTH</type>
            <description>Testing modify sscript</description>
            <enabled>false</enabled>
      </logonLogoffScript>
</logonLogoffScript>
```

Delete Script Configuration

Deletes the parameters associated with the specified script file ID.

Example 8-170. Delete script parameters

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/scriptFileId
```

Delete All Script Configuragtions

Deletes all script configurations for the specified NSX Edge.

Example 8-171. Delete script parameters

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/
```

Apply All Script Configurations

Updates all script configurations on the specified NSX Edge with the given list of configurations. If the configuration is present, it is updated; if it is not present, a new configuration is created. Existing configurations not included in the REST call are deleted.

Example 8-172. Apply script configurations

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/script/
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<logonLogoffScript>
      <logonLogoffScript>
            <objectId>logonlogoffscript-1</objectId>
            <scriptFileId>logonlogoffscriptfile-12</scriptFileId>
            <type>BOTH</type>
            <enabled>false</enabled>
            <description>This script will run on both login and logoff of phat client</description>
      </logonLogoffScript>
</logonLogoffScript>
```

Reconfigure SSL VPN

Pushes the entire SSL VPN configuration to the specified NSX Edge in a single call.

Example 8-173. Reconfigure SSL VPN

Request:

```
PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<sslvpnConfig>
      <enabled>true</enabled>
      <logging>  <!-- optional . -->
            <enable>false</enable>
            <logLevel>debug</logLevel>
      </logging>
      <serverSettings>
            <ip>10.112.243.109</ip>
            <port>443</port>                                    <!--optional. Default is 443 -->
                  <!-- Certificate has to be generated using certificate REST API and id returned should be mentioned here-->
            <!--<certificateId>certificate-1</certificateId> -->              <!-- optional -->
            <cipherList> <!-- any one or more of the following ciphers can be part of configuration -->
                  <cipher>RC4-MD5</cipher>
                  <cipher>AES128-SHA</cipher>
                  <cipher>AES256-SHA</cipher>
```

```
            <cipher>DES-CBC3-SHA</cipher>
        </cipherList>
    </serverSettings>
    <privateNetworks>
        <privateNetwork>
            <description>This is a private network for UI-team</description>
            <network>192.168.1.0/24</network>
            <sendOverTunnel>
                <ports>20-40</ports>                          <!-- optional. Default is 0-0 -->
                <optimize>false</optimize>                    <!--optional. Default is true -->
            </sendOverTunnel>
            <enabled>true</enabled>                           <!--optional. Default is true-->
        </privateNetwork>
    </privateNetworks>
    <users>
        <user>
            <userId>stalin</userId>
            <password>apple@123</password>
            <firstName>STALIN</firstName>
            <lastName>RAJAKILLI</lastName>
            <description>This user belong to vsm team</description>
            <disableUserAccount>false</disableUserAccount>          <!--optional. Default is false-->
            <passwordNeverExpires>true</passwordNeverExpires>       <!--optional. Default is false-->
            <allowChangePassword>
            <changePasswordOnNextLogin>false</changePasswordOnNextLogin>    <!--optional. Default is false-->
            </allowChangePassword>
        </user>
    </users>
    <ipAddressPools>
        <ipAddressPool>
            <description>description</description>
            <ipRange>10.112.243.11-10.112.243.57</ipRange>
            <netmask>255.0.0.0</netmask>
            <gateway>192.168.1.1</gateway>
            <primaryDns>192.168.10.1</primaryDns>
            <secondaryDns>4.2.2.2</secondaryDns>
            <dnsSuffix></dnsSuffix>
            <winsServer>10.112.243.201</winsServer>
            <enabled>true</enabled>                           <!--optional. Default is true-->
        </ipAddressPool>
    </ipAddressPools>
    <clientInstallPackages>
        <clientInstallPackage>
            <profileName>client</profileName>
            <gatewayList>
                <gateway>
                    <hostName>10.112.243.123</hostName>
                    <port>443</port>                          <!--optional. Default is 443-->
                </gateway>
            </gatewayList>
            <!-- Optional Parameters-->
            <startClientOnLogon>false</startClientOnLogon>              <!--optional. Default is false-->
            <hideSystrayIcon>true</hideSystrayIcon>                     <!--optional. Default is false-->
            <rememberPassword>true</rememberPassword>                   <!--optional. Default is false-->
            <silentModeOperation>true</silentModeOperation>             <!--optional. Default is false-->
            <silentModeInstallation>false</silentModeInstallation>      <!--optional. Default is false-->
            <hideNetworkAdaptor>false</hideNetworkAdaptor>              <!--optional. Default is false-->
            <createDesktopIcon>true</createDesktopIcon>                 <!--optional. Default is true-->
            <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation>
                                                                        <!--optional. Default is true-->
            <createLinuxClient>false</createLinuxClient>                <!--optional. Default is false-->
            <createMacClient>false</createMacClient>                    <!--optional. Default is false-->
            <description>windows client</description>
            <enabled>true</enabled>                           <!--optional. Default is true-->
        </clientInstallPackage>
    </clientInstallPackages>
    <webResources>
        <webResource>
```

```
            <name>VMware</name>
            <url>http://www.vmware.com</url>
            <method name="POST">
                <data>username=stalin </data>
            </method>
            <description>Click here to visit the corporate intranet Homepage </description>
            <enabled>true</enabled>                                <!--optional. Default is true-->
        </webResource>
    </webResources>
    <clientConfiguration>
        <autoReconnect>true</autoReconnect>                        <!--optional. Default is false-->
        <fullTunnel><!--optional. Default Tunnel mode is SPLIT-->
            <excludeLocalSubnets>true</excludeLocalSubnets>            <!--optional. Default is false-->
            <gatewayIp>10.112.243.11</gatewayIp>
        </fullTunnel>
        <upgradeNotification>false</upgradeNotification>              <!--optional. Default is false-->
    </clientConfiguration>
    <advancedConfig>
        <enableCompression>false</enableCompression>                  <!--optional. Default is false-->
        <forceVirtualKeyboard>false</forceVirtualKeyboard>            <!--optional. Default is false-->
        <preventMultipleLogon>true</preventMultipleLogon>             <!--optional. Default is false-->
        <randomizeVirtualkeys>false</randomizeVirtualkeys>            <!--optional. Default is false-->
        <timeout><!--optional. -->
            <forcedTimeout>16</forcedTimeout>                        <!--optional. -->
            <sessionIdleTimeout>10</sessionIdleTimeout>               <!--optional. Default value is 10 mins-->
        </timeout>
        <clientNotification></clientNotification>
        <enablePublicUrlAccess>false</enablePublicUrlAccess>          <!--optional. Default is false-->
        <enableLogging>false</enableLogging>                        <!--optional. Default is false-->
    </advancedConfig>
    <authenticationConfiguration>
        <passwordAuthentication>
            <authenticationTimeout>1</authenticationTimeout>          <!--optional. Default value is 1 mins-->
                    <!-- Only four auth servers can be part of authentication configuration including secondary auth server
                        and can be of
                        type AD,LDAP,RADIUS,LOCAL and RSA -->
            <primaryAuthServers>
                <com.vmware.vshield.edge.sslvpn.dto.LdapAuthServerDto>
                    <ip>1.1.1.1</ip>
                    <port>90</port>                                <!--optional. Default value is 639 if ssl enabled or 389 for
                                normal cfg-->
                    <timeOut>20</timeOut>                          <!--optional. Default value is 10 secs-->
                    <enableSsl>false</enableSsl>                   <!--optional. Default is false-->
                    <searchBase>searchbasevalue</searchBase>
                    <bindDomainName>binddnvalue</bindDomainName>
                    <bindPassword>password</bindPassword>              <!--optional.-->
                    <loginAttributeName>cain</loginAttributeName>        <!--optional. Default is sAMAccountName
                            -->
                    <searchFilter>found</searchFilter>                 <!--optional. Default is 'objectClass=*'-->
                    <enabled>true</enabled>                        <!--optional. Default is ture-->
                </com.vmware.vshield.edge.sslvpn.dto.LdapAuthServerDto>
                <com.vmware.vshield.edge.sslvpn.dto.RadiusAuthServerDto>
                    <ip>3.3.3.3</ip>
                    <port>90</port>                              <!--optional. Default value is 1812-->
                    <timeOut>20</timeOut>                          <!--optional. Default value is 10 secs-->
                    <secret>struct9870</secret>
                    <nasIp>1.1.1.9</nasIp>                         <!--optional. Default value is 0.0.0.0-->
                    <retryCount>10</retryCount>                    <!--optional. Default value is 3-->
                </com.vmware.vshield.edge.sslvpn.dto.RadiusAuthServerDto>
                <com.vmware.vshield.edge.sslvpn.dto.LocalAuthServerDto>
                                        <!--Only one Local auth server can be part of authentication configuration
                        -->
                    <enabled>true</enabled>
                    <passwordPolicy>                             <!-- optional. -->
                        <minLength>1</minLength>                       <!--optional. Default value is 1-->
                        <maxLength>63</maxLength>                      <!--optional. Default value is 63-->
                        <minAlphabets>0</minAlphabets>                  <!--optional -->
                        <minDigits>0</minDigits>                     <!--optional -->
```

```
                    <minSpecialChar>1</minSpecialChar>                    <!--optional -->
                    <allowUserIdWithinPassword>false</allowUserIdWithinPassword> <!-- optional. Default value is false
                        -->
                    <passwordLifeTime>20</passwordLifeTime>                <!--optional. Default value is 30 days-->
                    <expiryNotification>1</expiryNotification>             <!--optional. Default value is 25 days-->
                </passwordPolicy>
                <accountLockoutPolicy>                              <!--optional -->
                    <retryCount>3</retryCount>                        <!--optional. Default value is 3-->
                    <retryDuration>3</retryDuration>                    <!--optional. Default value is 2 days -->
                    <lockoutDuration>3</lockoutDuration>                  <!--optional. Default value is 2 days -->
                </accountLockoutPolicy>
            </com.vmware.vshield.edge.sslvpn.dto.LocalAuthServerDto>
                                        <!-- Only one RSA auth server can be configured.RSA configuration file
                    has to be uploaded prior to config RSA auth server RSA timeOut is optional. Default value is 60
                    secs -->
            <!--<com.vmware.vshield.edge.sslvpn.dto.RsaAuthServerDto>
            <timeOut>20</timeOut>
            <sourceIp>1.2.2.3</sourceIp>
            </com.vmware.vshield.edge.sslvpn.dto.RsaAuthServerDto>  -->
            </primaryAuthServers>
            <secondaryAuthServer>
            <!--Any of one of the auth server AD, LDAP, RSA, LOCAL or RADIUS can be sec auth server -->
                <com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
                    <ip>1.1.1.1</ip>
                    <port>90</port>                             <!--optional. Default value is 639 if ssl enabled or 389 for
                                normal cfg-->
                    <timeOut>20</timeOut>                         <!--optional. Default value is 10 secs-->
                    <enableSsl>false</enableSsl>                   <!--optional. Default is false-->
                    <searchBase>searchbasevalue</searchBase>
                    <bindDomainName>binddnvalue</bindDomainName>
                    <bindPassword>password</bindPassword>                <!--optional. -->
                    <loginAttributeName>cain</loginAttributeName>          <!--optional. Default is sAMAccountName
                        -->
                    <searchFilter>found</searchFilter>                  <!--optional. Default is 'objectClass=*'-->
                    <terminateSessionOnAuthFails>false</terminateSessionOnAuthFails>
                                                                    <!--optional. Default is false-->
                    <enabled>true</enabled>
                </com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
            </secondaryAuthServer>
        </passwordAuthentication>
    </authenticationConfiguration>
</sslvpnConfig>
```

Query SSL VPN Configuration

Retrieves the SSL VPN configurations of the specified NSX Edge.

Example 8-174. Query SSL VPN Configuration

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<sslvpnConfig>
    <version>32</version>
    <enabled>true</enabled>
    <logging>  <!-- optional . -->
        <enable>false</enable>
        <logLevel>debug</logLevel>
    </logging>
    <serverSettings>
        <ip>10.112.243.109</ip>
        <port>443</port>
        <certificateId>certificate-1</certificateId> -->
```

```
            <cipherList>
                <cipher>RC4-MD5</cipher>
                <cipher>AES128-SHA</cipher>
                <cipher>AES256-SHA</cipher>
                <cipher>DES-CBC3-SHA</cipher>
            </cipherList>
        </serverSettings>
        <privateNetworks>
            <privateNetwork>
                <description>This is a private network for UI-team</description>
                <network>192.168.1.0/24</network>
                <sendOverTunnel>
                    <ports>20-40</ports>
                    <optimize>false</optimize>
                </sendOverTunnel>
                <enabled>true</enabled>
            </privateNetwork>
        </privateNetworks>
        <users>
            <user>
                <userId>stalin</userId>
                <password>apple@123</password>
                <firstName>STALIN</firstName>
                <lastName>RAJAKILLI</lastName>
                <description>This user belong to vsm team</description>
                <disableUserAccount>false</disableUserAccount>
                <passwordNeverExpires>true</passwordNeverExpires>
                <allowChangePassword>
                    <changePasswordOnNextLogin>false</changePasswordOnNextLogin>
                </allowChangePassword>
            </user>
        </users>
        <ipAddressPools>
            <ipAddressPool>
                <description>description</description>
                <ipRange>10.112.243.11-10.112.243.57</ipRange>
                <netmask>255.0.0.0</netmask>
                <gateway>192.168.1.1</gateway>
                <primaryDns>192.168.10.1</primaryDns>
                <secondaryDns>4.2.2.2</secondaryDns>
                <dnsSuffix></dnsSuffix>
                <winsServer>10.112.243.201</winsServer>
                <enabled>true</enabled>
            </ipAddressPool>
        </ipAddressPools>
        <clientInstallPackages>
            <clientInstallPackage>
                <profileName>client</profileName>
                <gatewayList>
                    <gateway>
                        <hostName>10.112.243.123</hostName>
                        <port>443</port>
                    </gateway>
                </gatewayList>
                <!-- Optional Parameters-->
                <startClientOnLogon>false</startClientOnLogon>
                <hideSystrayIcon>true</hideSystrayIcon>
                <rememberPassword>true</rememberPassword>
                <silentModeOperation>true</silentModeOperation>
                <silentModeInstallation>false</silentModeInstallation>
                <hideNetworkAdaptor>false</hideNetworkAdaptor>
                <createDesktopIcon>true</createDesktopIcon>
                <enforceServerSecurityCertValidation>false</enforceServerSecurityCertValidation>
                <createLinuxClient>false</createLinuxClient>
                <createMacClient>false</createMacClient>
                <description>windows client</description>
                <enabled>true</enabled>
            </clientInstallPackage>
```

```
</clientInstallPackages>
<webResources>
    <webResource>
        <name>VMware</name>
        <url>http://www.vmware.com</url>
        <method name="POST">
            <data>username=stalin </data>
        </method>
        <description>Click here to visit the corporate intranet Homepage </description>
        <enabled>true</enabled>
    </webResource>
</webResources>
<clientConfiguration>
    <autoReconnect>true</autoReconnect>
    <fullTunnel>
        <excludeLocalSubnets>true</excludeLocalSubnets>
        <gatewayIp>10.112.243.11</gatewayIp>
    </fullTunnel>
    <upgradeNotification>false</upgradeNotification>
</clientConfiguration>
<advancedConfig>
    <enableCompression>false</enableCompression>
    <forceVirtualKeyboard>false</forceVirtualKeyboard>
    <preventMultipleLogon>true</preventMultipleLogon>
    <randomizeVirtualkeys>false</randomizeVirtualkeys>
    <timeout>
        <forcedTimeout>16</forcedTimeout>
        <sessionIdleTimeout>10</sessionIdleTimeout>
    </timeout>
    <clientNotification></clientNotification>
    <enablePublicUrlAccess>false</enablePublicUrlAccess>
    <enableLogging>false</enableLogging>
</advancedConfig>
<authenticationConfiguration>
    <passwordAuthentication>
        <authenticationTimeout>1</authenticationTimeout>
        <primaryAuthServers>
            <com.vmware.vshield.edge.sslvpn.dto.LdapAuthServerDto>
                <ip>1.1.1.1</ip>
                <port>90</port>
                <timeOut>20</timeOut>
                <enableSsl>false</enableSsl>
                <searchBase>searchbasevalue</searchBase>
                <bindDomainName>binddnvalue</bindDomainName>
                <bindPassword>password</bindPassword>
                <loginAttributeName>cain</loginAttributeName>
                <searchFilter>found</searchFilter>
                <enabled>true</enabled>
            </com.vmware.vshield.edge.sslvpn.dto.LdapAuthServerDto>
        <com.vmware.vshield.edge.sslvpn.dto.RadiusAuthServerDto>
            <ip>3.3.3.3</ip>
            <port>90</port>
            <timeOut>20</timeOut>
            <secret>struct9870</secret>
            <nasIp>1.1.1.9</nasIp>
            <retryCount>10</retryCount>
        </com.vmware.vshield.edge.sslvpn.dto.RadiusAuthServerDto>
        <com.vmware.vshield.edge.sslvpn.dto.LocalAuthServerDto>
            <enabled>true</enabled>
            <passwordPolicy>
                <minLength>1</minLength>
                <maxLength>63</maxLength>
                <minAlphabets>0</minAlphabets>
                <minDigits>0</minDigits>
                <minSpecialChar>1</minSpecialChar>
                <allowUserIdWithinPassword>false</allowUserIdWithinPassword>
                <passwordLifeTime>20</passwordLifeTime>
                <expiryNotification>1</expiryNotification>
```

```
                    </passwordPolicy>
                    <accountLockoutPolicy>
                        <retryCount>3</retryCount>
                        <retryDuration>3</retryDuration>
                        <lockoutDuration>3</lockoutDuration>
                    </accountLockoutPolicy>
                </com.vmware.vshield.edge.sslvpn.dto.LocalAuthServerDto>
                <!--<com.vmware.vshield.edge.sslvpn.dto.RsaAuthServerDto>
                <timeOut>20</timeOut>
                <sourceIp>1.2.2.3</sourceIp>
                </com.vmware.vshield.edge.sslvpn.dto.RsaAuthServerDto>
                </primaryAuthServers>
                <secondaryAuthServer>
                    <com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
                        <ip>1.1.1.1</ip>
                        <port>90</port>
                        <timeOut>20</timeOut>
                        <enableSsl>false</enableSsl>
                        <searchBase>searchbasevalue</searchBase>
                        <bindDomainName>binddnvalue</bindDomainName>
                        <bindPassword>password</bindPassword>
                        <loginAttributeName>cain</loginAttributeName>
                        <searchFilter>found</searchFilter>
                        <terminateSessionOnAuthFails>false</terminateSessionOnAuthFails>
                        <enabled>true</enabled>
                    </com.vmware.vshield.edge.sslvpn.dto.AdAuthServerDto>
                </secondaryAuthServer>
            </passwordAuthentication>
        </authenticationConfiguration>
</sslvpnConfig>
```

Delete SSL VPN Configuration

Deletes the SSL VPN configurations on the specified NSX Edge.

Example 8-175. Delete SSL VPN Configuration

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/sslvpn/config/
```

Query SSL VPN Statistics

Retrieves SSL VPN statistics on the specified NSX Edge.

Example 8-176. Get SSL VPN statistics

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/statistics/dashboard/sslvpn?interval=<range>      <!--range can be 1 - 60 minutes or
                    oneDay|oneWeek|oneMonth|oneYear. Default is 60 minutes -->
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<dashboardStatistics>
    <meta>
        <startTime>1344809160</startTime>      <!-- in seconds -->
        <endTime>1344809460</endTime>          <!-- in seconds -->
        <interval>300</interval>
    </meta>
    <data>
        <sslvpn>
            <sslvpnBytesOut>
                <dashboardStatistic>
```

```
                        <timestamp>1344809160</timestamp>
                        <value>0.0</value>
                    </dashboardStatistic>
                    <dashboardStatistic>
                        <timestamp>1344809460</timestamp>
                        <value>0.0</value>
                    </dashboardStatistic>
                </sslvpnBytesOut>
                <sslvpnBytesIn>
                    <dashboardStatistic>
                        <timestamp>1344809160</timestamp>
                        <value>0.0</value>
                    </dashboardStatistic>
                    <dashboardStatistic>
                        <timestamp>1344809460</timestamp>
                        <value>0.0</value>
                    </dashboardStatistic>
                </sslvpnBytesIn>
                <activeClients>
                    <dashboardStatistic>
                        <timestamp>1344809160</timestamp>
                        <value>4.0</value>
                    </dashboardStatistic>
                    <dashboardStatistic>
                        <timestamp>1344809460</timestamp>
                        <value>4.0</value>
                    </dashboardStatistic>
                </activeClients>
                <authFailures>
                    <dashboardStatistic>
                        <timestamp>1344809160</timestamp>
                        <value>2.0</value>
                    </dashboardStatistic>
                    <dashboardStatistic>
                        <timestamp>1344809460</timestamp>
                        <value>2.0</value>
                    </dashboardStatistic>
                </authFailures>
                <sessionsCreated>
                    <dashboardStatistic>
                        <timestamp>1344809160</timestamp>
                        <value>4.0</value>
                    </dashboardStatistic>
                    <dashboardStatistic>
                        <timestamp>1344809460</timestamp>
                        <value>4.0</value>
                    </dashboardStatistic>
                </sessionsCreated>
            </sslvpn>
        </data>
</dashboardStatistics>
```

Working with L2 VPN

L2 VPN allows you to configure a tunnel between two sites. Virtual machines remain on the same subnet in spite of being moved between these sites, which enables you to extend your datacenter. An NSX Edge at one site can provide all services to virtual machines on the other site.

In order to create the L2 VPN tunnel, you configure an L2 VPN server and L2 VPN client.

Configure L2VPN

You first enable the L2 VPN service on the NSX Edge instance and then configure a server and a client.

Example 8-177. Configure L2VPN

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/l2vpn/config/

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<l2Vpn>
 <enabled>true</enabled> <!-- Optional, true by default -->
 <logging> <!-- optional. Disable by default. -->
 <logLevel>debug</logLevel> <!-- optional, default is INFO. -->
 <enable>true</enable> <!-- optional, false by default. -->
 </logging>

 <l2VpnSites>
 <l2VpnSite>
 <enabled>true</enabled> <!-- Optional, true by default -->
 <name></name> <!-- Optional -->
 <description></description> <!-- Optional -->

 <server> <!-- optional. Either server or client should be configured-->
 <configuration>

 <listenerIp>11.0.0.11</listenerIp> <!-- Required. IP of external interface onwhich L2VPN service to listen on -->
 <listenerPort>443</listenerPort> <!-- optional. 443 by default. Port onwhich L2VPN service to listen on -->

 <encryptionAlgorithm>AES256-SHA</encryptionAlgorithm> <!-- Optional, aes256 by default.-->
 <serverCertificate>certificate-4</serverCertificate> <!-- Optional. If not specified server will use its default(selfsigned) certificate-->

 <vnic>0</vnic> <!-- Required. Traffic from this internal vnic interface will be forwarded to L2VPN tunnel -->

 </configuration>

 <l2VpnUsers> <!-- Required. List of users will be added in server's local database and will authenticate client when connects with
                 these credentials-->
 <l2VpnUser>
 <userId>admin</userId>
 <password>default</password>
 </l2VpnUser>
 </l2VpnUsers>
 </server>

 <client> <!-- optional. Either server or client should be configured-->
 <configuration>
 <serverAddress>11.0.0.11</serverAddress> <!-- Required. IP/Hostname to connect -->
 <serverPort>443</serverPort> <!-- optional. 443 by default. Port to connect on -->

 <caCertificate>certificate-4</caCertificate> <!-- Optional. Validate server certificate sent from server againt this cerficate-->
 <vnic>0</vnic> <!-- Required. Traffic from this internal vnic interface will be forwarded to L2VPN tunnel -->
 </configuration>

 <proxySetting> <!-- Optional, List of proxy configurations -->
 <type>http</type>
 <address>10.112.243.202</address>
 <port>443</port>
 <userName>root</userName>
 <password>java123</password>
 </proxySetting>
 <l2VpnUser> <!-- Required. these credentials will be used to get authenticated by server-->
 <userId>admin</userId>
 <password>default</password>
 </l2VpnUser>

 </client>
 </l2VpnSite>
 </l2VpnSites>
```

```
</l2Vpn>
```

Query L2VPN

Retrieves the current L2VPN configuration for NSX Edge.

Example 8-178. Query L2VPN

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/l2vpn/config/
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<l2Vpn>
 <enabled>true</enabled>
 <logging>
 <logLevel>debug</logLevel>
 <enable>true</enable>
 </logging>

 <l2VpnSites>
 <l2VpnSite>
 <enabled>true</enabled>
 <name></name>
 <description></description>

 <server>
 <configuration>

 <listenerIp>11.0.0.11</listenerIp>
 <listenerPort>443</listenerPort>

 <encryptionAlgorithm>AES256-SHA</encryptionAlgorithm>
 <serverCertificate>certificate-4</serverCertificate>

 <vnic>0</vnic>
 </configuration>

 <l2VpnUsers>
 <l2VpnUser>
 <userId>admin</userId>
 </l2VpnUser>
 </l2VpnUsers>

 </server>
 </l2VpnSite>
 </l2VpnSites>

</l2Vpn>
```

Query L2VPN Statistics

Retrieves L2VPN statistics which has information such as tunnel status, sent bytes , recieved bytes etc. for the given edge.

Example 8-179. Query L2VPN statistics

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/l2vpn/config/statistics
```

Response Body:

```
<l2vpnStatusAndStats>
 <timeStamp>1380045713</timeStamp>
 <siteStats>
 <l2vpnStats>
 <tunnelStatus>up</tunnelStatus>
 <establishedDate>0</establishedDate>
 <txBytesFromLocalSubnet>1726046</txBytesFromLocalSubnet>
 <rxBytesOnLocalSubnet>1838385</rxBytesOnLocalSubnet>
 </l2vpnStats>
 </siteStats>
</l2vpnStatusAndStats>
```

Enable L2VPN

Enables or disables the L2VPN service on edge appliance according to the value of the query parameter "enableService".

Example 8-180. Enable L2VPN

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/l2vpn/config/?enableService=true
```

Result Codes:

On Success : 204 No Content

On Failure:

- 400 Bad Request
- 403 Forbidden if the user is not having appropriate role and scope
- 404 Not found

Delete L2VPN

Example 8-181. Delete L2VPN

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/l2vpn/config/
```

Working with IPSEC VPN

NSX Edge supports site-to-site IPSec VPN between an NSX Edge instance and remote sites. NSX Edge supports certificate authentication, preshared key mode, IP unicast traffic, and no dynamic routing protocol between theNSX Edge instance and remote VPN routers. Behind each remote VPN router, you can configure multiple subnets to connect to the internal network behind an NSX Edge through IPSec tunnels. These subnets and the internal network behind aNSX Edge must have address ranges that do not overlap.

You can deploy an NSX Edge agent behind a NAT device. In this deployment, the NAT device translates the VPN address of an NSX Edge instance to a publicly accessible address facing the Internet. Remote VPN routers use this public address to access theNSX Edge instance.

You can place remote VPN routers behind a NAT device as well. You must provide the VPN native address and the VPN Gateway ID to set up the tunnel. On both ends, static one-to-one NAT is required for the VPN address.

You can have a maximum of 64 tunnels across a maximum of 10 sites.

Example 8-182. Configure IPSEC VPN

Request:

PUT https://<vsm-ip>/api/4.0/edges/<edgeId>/ipsec/config

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipsec>
    <enabled>true</enabled> <!-- Optional, true by default -->
    <logging> <!-- optional. logging is disable by default. -->
        <logLevel>debug</logLevel> <!-- optional, default is info. -->
        <enable>true</enable> <!-- optional, default is false. -->
    </logging>
    <global>
        <psk>hello123</psk>  <!-- Required only when peerIp is specified as any in siteConfig -->
        <serviceCertificate>certificate-4</serviceCertificate>  <!-- Required when x.509 certificate mode is selected -->
        <caCertificates> <!-- Optional, CA list -->
            <caCertificate>certificate-3</caCertificate>
        </caCertificates>
        <crlCertificates> <!-- Optional, CRL list -->
            <crlCertificate>crl-1</crlCertificate>
        </crlCertificates>
    </global>
    <sites>
        <site>
            <enabled>true</enabled>                          <!-- Optional, true by default -->
            <name>VPN to edge-pa-1</name>                    <!-- Optional -->
            <description>psk VPN to edge-pa-1 192.168.11.0/24 == 192.168.1.0/24</description>
                                                             <!-- Optional -->
            <localId>11.0.0.11</localId>
            <localIp>11.0.0.11</localIp>
            <peerId>11.0.0.1</peerId>
            <peerIp>any</peerIp>                             <!-- Can be a Ipv4Address such as 11.0.0.3 -->
            <encryptionAlgorithm>aes256</encryptionAlgorithm>        <!-- Optional, default aes256-->
            <authenticationMode>psk</authenticationMode>             <!-- Possible values are psk and x.509 -->
            <!-- <psk>hello123</psk> -->                     <!-- Required if peerIp is not any -->
            <enablePfs>true</enablePfs>                      <!-- Optional, true by default -->
            <dhGroup>dh2</dhGroup>                           <!-- Optional, dh2 by default -->
            <localSubnets>
                <subnet>192.168.11.0/24</subnet>
            </localSubnets>
            <peerSubnets>
                <subnet>192.168.1.0/24</subnet>
            </peerSubnets>
        </site>
        <site>
            <name>VPN to edge-right</name>
            <description>certificate VPN to edge-right 192.168.22.0/24 == 192.168.2.0/24</description>
            <localId>11.0.0.12</localId>
            <localIp>11.0.0.12</localIp>
            <peerId>C=CN, ST=BJ, L=BJ, O=VMware, OU=DEV, CN=Right</peerId> <!-- Should be a DN if
                        authenticationMode is x.509 -->
            <peerIp>11.0.0.2</peerIp>
            <encryptionAlgorithm>aes256</encryptionAlgorithm>
            <authenticationMode>x.509</authenticationMode>
            <enablePfs>true</enablePfs>
            <dhGroup>dh2</dhGroup>
            <localSubnets>
                <subnet>192.168.22.0/24</subnet>
            </localSubnets>
            <peerSubnets>
                <subnet>192.168.2.0/24</subnet>
            </peerSubnets>
        </site>
    </sites>
```

```
</ipsec>
```

Retrieve IPSec Configuration

Example 8-183. Get IPSec Configuration

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/ipsec/config
```

Response Body when IPSec is not configured:

```
<?xml version="1.0" encoding="UTF-8"?>
      <ipsec>
      <enabled>true</enabled>
      <logging>
            <enable>true</enable>
            <logLevel>debug</logLevel>
      </logging>
      <sites/> <!-- No site to site config present -->
</ipsec>
```

Response Body when IPSec is configured for site-to-site:

```
<?xml version="1.0" encoding="UTF-8"?>
<ipsec>
      <enabled>true</enabled>
      <logging>
            <logLevel>debug</logLevel>
            <enable>true</enable>
      </logging>
      <global>
            <psk>hello123</psk>
            <serviceCertificate>certificate-4</serviceCertificate>
            <caCertificates> <!-- Optional, CA list -->
                  <caCertificate>certificate-3</caCertificate>
            </caCertificates>
            <crlCertificates>
                  <crlCertificate>crl-1</crlCertificate>
            </crlCertificates>
      </global>
      <sites>
            <site>
                  <enabled>true</enabled>
                  <name>VPN to edge-pa-1</name>
                  <description>psk VPN to edge-pa-1 192.168.11.0/24 == 192.168.1.0/24</description>
                  <localId>11.0.0.11</localId>
                  <localIp>11.0.0.11</localIp>
                  <peerId>11.0.0.1</peerId>
                  <peerIp>any</peerIp>
                  <encryptionAlgorithm>aes256</encryptionAlgorithm>
                  <authenticationMode>psk</authenticationMode>
                  <enablePfs>true</enablePfs>
                  <dhGroup>dh2</dhGroup>
                  <localSubnets>
                        <subnet>192.168.11.0/24</subnet>
                  </localSubnets>
                  <peerSubnets>
                        <subnet>192.168.1.0/24</subnet>
                  </peerSubnets>
            </site>
            <site>
                  <name>VPN to edge-right</name>
                  <description>certificate VPN to edge-right 192.168.22.0/24 == 192.168.2.0/24</description>
                  <localId>11.0.0.12</localId>
                  <localIp>11.0.0.12</localIp>
                  <peerId>C=CN, ST=BJ, L=BJ, O=VMware, OU=DEV, CN=Right</peerId>
```

```
                <peerIp>11.0.0.2</peerIp>
                <encryptionAlgorithm>aes256</encryptionAlgorithm>
                <authenticationMode>x.509</authenticationMode>
                <enablePfs>true</enablePfs>
                <dhGroup>dh2</dhGroup>
                <localSubnets>
                    <subnet>192.168.22.0/24</subnet>
                </localSubnets>
                <peerSubnets>
                    <subnet>192.168.2.0/24</subnet>
                </peerSubnets>
            </site>
        </sites>
</ipsec>
```

Retrieve IPSec Statistics

Example 8-184. Get IPSEC statistics

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/ipsec/statistics
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml version="1.0" encoding="UTF-8"?>
        <ipsecStatusAndStats>
        <siteStatistics>
            <ikeStatus>
                <channelStatus>up</channelStatus>
                <channelState>STATE_MAIN_I4 (ISAKMP SA established)</channelState>
                <lastInformationalMessage></lastInformationalMessage>
                <localIpAddress>10.0.0.12</localIpAddress>
                <peerId>11.0.0.12</peerId>
                <peerIpAddress>10.0.0.2</peerIpAddress>
            </ikeStatus>
            <tunnelStats>
                <tunnelStatus>up</tunnelStatus>
                <tunnelState>STATE_QUICK_I2 (sent QI2, IPsec SA established)</tunnelState>
                <lastInformationalMessage></lastInformationalMessage>
                <localSubnet>192.168.2.0/24</localSubnet>
                <peerSubnet>192.168.22.0/24</peerSubnet>
            </tunnelStats>
        </siteStatistics>
        <siteStatistics>
            <ikeStatus>
                <channelStatus>up</channelStatus>
                <channelState>STATE_MAIN_I4 (ISAKMP SA established)</channelState>
                <lastInformationalMessage></lastInformationalMessage>
                <localIpAddress>10.0.0.11</localIpAddress>
                <peerId>11.0.0.11</peerId>
                <peerIpAddress>10.0.0.1</peerIpAddress>
            </ikeStatus>
            <tunnelStats>
                <tunnelStatus>up</tunnelStatus>
                <tunnelState>STATE_QUICK_I2 (sent QI2, IPsec SA established)</tunnelState>
                <lastInformationalMessage></lastInformationalMessage>
                <localSubnet>192.168.1.0/24</localSubnet>
                <peerSubnet>192.168.11.0/24</peerSubnet>
            </tunnelStats>
        </siteStatistics>
        <timeStamp>1325766138</timeStamp>
</ipsecStatusAndStats>
```

Query Tunnel Traffic Statistics

Retrieves tunnel traffic statistics for the specified time interval. Default interval is 1 hour. Other possible values are 1-60 minutes | one day | one week | one month | one year.

Example 8-185. Get tunnel traffic statistics

Request:

```
GET https://<vsm-ip>/api/4.0/edges/<edgeId>/statistics/dashboard/ipsec?interval=<range>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<dashboardStatistics>
      <meta>
            <startTime>1344809160</startTime>      <!-- in seconds -->
            <endTime>1344809460</endTime>      <!-- in seconds -->
            <interval>300</interval>
      </meta>
      <data>
            <ipsec>
                  <ipsecTunnels>
                        <dashboardStatistic>
                              <timestamp>1344809160</timestamp>
                              <value>0.0</value>
                        </dashboardStatistic>
                        <dashboardStatistic>
                              <timestamp>1344809460</timestamp>
                              <value>0.0</value>
                        </dashboardStatistic>
                        </ipsecTunnels>
                        <ipsecBytesIn>
                              <dashboardStatistic>
                                    <timestamp>1344809160</timestamp>
                                    <value>0.0</value>
                              </dashboardStatistic>
                                    <dashboardStatistic>
                                    <timestamp>1344809460</timestamp>
                                    <value>0.0</value>
                              </dashboardStatistic>
                        </ipsecBytesIn>
                        <ipsecBytesOut>
                              <dashboardStatistic>
                                    <timestamp>1344809160</timestamp>
                                    <value>0.0</value>
                              </dashboardStatistic>
                              <dashboardStatistic>
                                    <timestamp>1344809460</timestamp>
                                    <value>0.0</value>
                              </dashboardStatistic>
                        </ipsecBytesOut>
            </ipsec>
      </data>
</dashboardStatistics>
```

Delete IPSec Configuration

Deletes the IPSEC configuration for the specified NSX Edge.

Example 8-186. Delete IPSec

Request:

```
DELETE https://<vsm-ip>/api/4.0/edges/<edgeId>/ipsec/config/
```

Managing an NSX Edge

Force Sync Edge

Re-synchronizes the NSX Edge virtual machines.

Example 8-187. Force sync Edge

Request:

POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}?action=forcesync

Redeploy Edge

Redeploys NSX Edge virtual machines.

Example 8-188. Redeploy Edge

Request:

POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}?action=redeploy

Update DNS Settings

Update dns settings (primary/secondary and search domain) of an Edge.

Example 8-189. Update DNS

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/dnsClient

Request Body:

```
<dnsClient>
    <primaryDns>10.117.0.1</primaryDns>
    <secondaryDns>10.117.0.2</secondaryDns>
    <domainName>vmware.com</domainName>
    <domainName>foo.com</domainName>
  </dnsClient>
```

Modify AESNI Setting

Redeploys NSX Edge virtual machines.

Example 8-190. Modify AESNI

Request:

POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/aesni?enable=true|false

Modify Edge Appliance Core Dump Setting

Enabling Edge appliance core-dump feature results in deployment of an inbuilt extra disk to save the core-dump files. The extra disk consumes 1GB for compact edge and 8GB for other edge types. Disabling this feature detaches the disk.

Example 8-191. Modify core dump setting

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/coredump?enable=true|false
```

Modify FIPs Setting

Example 8-192. Modify FIPs

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/fips?enable=true|false
```

Modify Log Setting

Example 8-193. Modify log setting

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/logging?level=<logLevel>
```

Query Edge Summary

Retrieves details about the specified Edge.

Example 8-194. Retrieve Edge details

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/summary
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<edgeSummary>
 <objectId>edge-32</objectId>
 <type>
  <typeName>Edge</typeName>
 </type>
 <name>vShield-edge-32</name>
 <revision>16</revision>
 <objectTypeName>Edge</objectTypeName>
 <id>edge-32</id>
 <state>deployed</state>
 <datacenterMoid>datacenter-2</datacenterMoid>
 <datacenterName>Datacenter</datacenterName>
 <apiVersion>4.0</apiVersion>
 <numberOfConnectedVnics>2</numberOfConnectedVnics>
 <appliancesSummary>
  <vmVersion>5.1.0</vmVersion>
  <applianceSize>compact</applianceSize>
  <fqdn>vShield-edge-32</fqdn>
  <numberOfDeployedVms>1</numberOfDeployedVms>
  <activeVseHaIndex>0</activeVseHaIndex>
  <vmMoidOfActiveVse>vm-301</vmMoidOfActiveVse>
```

```
  <vmNameOfActiveVse>vShield-edge-32-0</vmNameOfActiveVse>
  <hostMoidOfActiveVse>host-159</hostMoidOfActiveVse>
  <hostNameOfActiveVse>10.20.114.8</hostNameOfActiveVse>
  <resourcePoolMoidOfActiveVse>resgroup-208</resourcePoolMoidOfActiveVse>
  <resourcePoolNameOfActiveVse>Resources</resourcePoolNameOfActiveVse>
  <dataStoreMoidOfActiveVse>datastore-160</dataStoreMoidOfActiveVse>
  <dataStoreNameOfActiveVse>storage1</dataStoreNameOfActiveVse>
  <statusFromVseUpdatedOn>1310625858000</statusFromVseUpdatedOn>
 </appliancesSummary>
 <featureCapabilities>
  <timestamp>1337956125602</timestamp>
  <featureCapability>
   <service>nat</service>
   <isSupported>true</isSupported>
   <configurationLimit>
    <key>MAX_RULES_PER_ACTION</key>
    <value>2048</value>
   </configurationLimit>
  </featureCapability>
  <featureCapability>
   <service>syslog</service>
   <isSupported>true</isSupported>
   <configurationLimit>
    <key>MAX_SERVER_IPS</key>
    <value>2</value>
   </configurationLimit>
  </featureCapability>
  <featureCapability>
   <service>staticRouting</service>
   <isSupported>true</isSupported>
   <configurationLimit>
    <key>MAX_ROUTES</key>
    <value>2048</value>
   </configurationLimit>
  </featureCapability>
  <featureCapability>
   <service>ipsec</service>
   <isSupported>true</isSupported>
   <configurationLimit>
    <key>MAX_TUNNELS</key>
    <value>64</value>
   </configurationLimit>
  </featureCapability>
  <featureCapability>
   <service>loadBalancer</service>
   <isSupported>true</isSupported>
   <configurationLimit>
    <key>MAX_POOLS</key>
    <value>10</value>
   </configurationLimit>
   <configurationLimit>
    <key>MAX_VIRTUAL_SERVERS</key>
    <value>10</value>
   </configurationLimit>
   <configurationLimit>
    <key>MAX_MEMBERS_IN_POOL</key>
    <value>32</value>
   </configurationLimit>
  </featureCapability>
  <featureCapability>
   <service>fw</service>
   <isSupported>true</isSupported>
   <configurationLimit>
    <key>MAX_RULES</key>
    <value>2048</value>
   </configurationLimit>
  </featureCapability>
  <featureCapability>
```

```
    <service>dns</service>
    <isSupported>true</isSupported>
    <configurationLimit>
      <key>MAX_SERVER_IPS</key>
      <value>2</value>
    </configurationLimit>
  </featureCapability>
  <featureCapability>
    <service>sslvpn</service>
    <isSupported>true</isSupported>
    <configurationLimit>
      <key>MAX_CONCURRENT_USERS</key>
      <value>25</value>
    </configurationLimit>
  </featureCapability>
  <featureCapability>
    <service>edge</service>
    <isSupported>true</isSupported>
    <configurationLimit>
      <key>MAX_APPLIANCES</key>
      <value>2</value>
    </configurationLimit>
    <configurationLimit>
      <key>MAX_VNICS</key>
      <value>10</value>
    </configurationLimit>
  </featureCapability>
  <featureCapability>
    <service>firewall</service>
    <isSupported>true</isSupported>
    <configurationLimit>
      <key>MAX_RULES</key>
      <value>2048</value>
    </configurationLimit>
  </featureCapability>
  <featureCapability>
    <service>dhcp</service>
    <isSupported>true</isSupported>
    <configurationLimit>
      <key>MAX_POOL_AND_BINDINGS</key>
      <value>2048</value>
    </configurationLimit>
  </featureCapability>
  <featureCapability>
    <service>highAvailability</service>
    <isSupported>true</isSupported>
    <configurationLimit>
      <key>MAX_MANAGEMENT_IPS</key>
      <value>2</value>
    </configurationLimit>
  </featureCapability>
 </featureCapabilities>
</edgeSummary>
```

Query Edge Status

Retrieves the status of the specified Edge.

Example 8-195. Query status

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/status
```

Request Body:

```
<edgeStatus>
```

```
  <timestamp>1343739873000</timestamp>
  <systemStatus>good</systemStatus>
  <activeVseHaIndex>0</activeVseHaIndex>
  <edgeStatus>GREEN</edgeStatus>
<!-- {GREY,RED,YELLOW,GREEN}. GREY => unknown status. RED => None of appliance in serving state. YELLOW =>
                Intermittent health check failures.
If health check fails for 5 consecutive times for all appliance (2 for HA else 1) then status will turn to RED. GREEN => Good
-->
  <publishStatus>APPLIED</publishStatus> <!-- Applied or persisted i.e., not applied to vse yet-->
  <version>8</version> <!-- Current configuration version -->
  <edgeVmStatus>
    <edgeVmStatus>
      <edgeVMStatus>GREEN</edgeVMStatus> <!-- individual vm status -->
      <haState>active</haState> <!-- active / standy -->
      <index>0</index>
      <id>vm-358</id>
      <name>test2-0</name>
    </edgeVmStatus>
    <edgeVmStatus>
      <edgeVMStatus>GREEN</edgeVMStatus>
      <haState>active</haState>
      <index>1</index>
      <id>vm-362</id>
      <name>test2-1</name>
    </edgeVmStatus>
  </edgeVmStatus>
  <featureStatuses>
    <featureStatus>
      <service>loadBalancer</service>
      <configured>false</configured>
      <serverStatus>down</serverStatus>
    </featureStatus>
    <featureStatus>
      <service>dhcp</service>
      <configured>true</configured>
      <publishStatus>Applied</publishStatus>
      <serverStatus>up</serverStatus>
    </featureStatus>
    <featureStatus>
      <service>sslvpn</service>
      <configured>false</configured>
      <serverStatus>down</serverStatus>
    </featureStatus>
    <featureStatus>
      <service>syslog</service>
      <configured>false</configured>
      <serverStatus>up</serverStatus>
    </featureStatus>
    <featureStatus>
      <service>nat</service>
      <configured>false</configured>
    </featureStatus>
    <featureStatus>
      <service>dns</service>
      <configured>false</configured>
      <serverStatus>down</serverStatus>
    </featureStatus>
    <featureStatus>
      <service>ipsec</service>
      <configured>false</configured>
      <serverStatus>down</serverStatus>
    </featureStatus>
    <featureStatus>
      <service>firewall</service>
      <configured>true</configured>
      <publishStatus>Applied</publishStatus>
    </featureStatus>
    <featureStatus>
```

```
      <service>staticRouting</service>
      <configured>false</configured>
    </featureStatus>
    <featureStatus>
      <service>highAvailability</service>
      <configured>true</configured>
      <publishStatus>Applied</publishStatus>
      <serverStatus>up</serverStatus>
    </featureStatus>
  </featureStatuses>
</edgeStatus>
```

This call can be used with the following query parameters:

- getlatest: fetches the status live from NSX Edge when set to true (default). When false, fetches the latest available status from database.
- detailed: fetches the detailed status per feature when set to true. When false (default), gives an aggregated summary of the status per feature.

Sample calls include:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/status?getlatest=false&detailed=true
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/status?getlatest=true&detailed=true
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/status?getlatest=false&detailed=false
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/status?detailed=true
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/status?getlatest=false
```

Query Edge Tech Support Logs

Retrieves the tech support logs for the specified Edge.

Example 8-196. Query tech support logs

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/techsupportlogs
```

Manage CLI Credentials and Access

You can modify the CLI credentials and enable or disable SSH services for a Edge Edge.

Modify CLI Credentials

You can use this API to:

- Modify the password and password expiry for an existing CLI user.
- Change the CLI login (ssh) banner text.
- Modify both the username and password for Edge CLI User. This results in:
  - deletion of the old user.
  - creation of the new user with specified username and password.

Example 8-197. Modify CLI credentials

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/{edgeId}/clisettings
```

Request Body:

```
<cliSettings> <!-- optional. Default user/pass is admin/default, and remoteAccess is false (i.e. disabled) -->
  <userName>test</userName>
```

```
  <password>testpass</password>
  <remoteAccess>true</remoteAccess>
  <passwordExpiry>30</passwordExpiry>  <!-- optional. in days. defaults to 90.-->
  <sshLoginBannerText>                <!-- optional. pre-formatted text. default to system default banner text. -->
  Hello, VshieldEdge Administrator
  </sshLoginBanerText>
</cliSettings>
```

Change CLI Remote Access

Enables or disables the SSH service on the specified Edge Edge.

Example 8-198. Change CLI remote access

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/cliremoteaccess?enable=true|false
```

Manage Auto Configuration Settings

Auto configuration default setting is enabled by default and the priority is high.

If you disable auto configuration settings, you must add the required NAT, firewall, routing rules to enable control-channel traffic for other services such as load balancing, VPN, etc.

If you change the priority of the auto configuration settings to low, the internal/auto configured rules are placed in lower precedence than the rules you create. With this, you can again control special allow/deny rules for these services too. For example, you can block specific IP addresses from accessing the VPN services.

Modify Auto Configuration Settings

Changes the auto configuration settings for the NSX Edge.

Example 8-199. Modify auto configuration settings

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/autoconfiguration
```

Request Body:

```
<autoConfiguration>
      <enabled>true</enabled>
      <rulePriority>high</rulePriority>
</autoConfiguration>
```

Query Auto Configuration Settings

Retrieves auto configuration settings for the NSX Edge.

Example 8-200. Retrieve auto configuration settings

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/autoconfiguration
```

Response Body:

```
<autoConfiguration>
      <enabled>true</enabled>
      <rulePriority>high</rulePriority>
</autoConfiguration>
```

Working with Appliances

You can manage the Edge Edge appliances with these REST calls.

NOTE Do not use hidden/system resource pool IDs as they are not supported on the UI.

Query Appliance Configuration

Retrieves configuration of both appliances.

Example 8-201. Get appliance configuration

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/appliances
```

Response Body:

```
<appliances>
    <applianceSize>large</applianceSize>
    <appliance>
        <highAvailabilityIndex>0</highAvailabilityIndex>
        <resourcePoolId>resgroup-53</resourcePoolId>
        <datastoreId>datastore-29</datastoreId>
        <hostId>host-28</hostId>
        <vmFolderId>group-v38</vmFolderId>
        <customField>
            <key>system.service.vmware.vsla.main01</key>
            <value>string</value>
        </customField>
        <cpuReservation>
            <limit>2399</limit>
            <reservation>500</reservation>
            <shares>500</shares>
        </cpuReservation>
        <memoryReservation>
            <limit>5000</limit>
            <reservation>500</reservation>
            <shares>20480</shares>
        </memoryReservation>
    </appliance>
    <appliance>
        <highAvailabilityIndex>1</highAvailabilityIndex>
        <resourcePoolId>resgroup-53</resourcePoolId>
        <datastoreId>datastore-29</datastoreId>
        <hostId>host-28</hostId>
        <vmFolderId>group-v38</vmFolderId>
        <customField>
            <key>system.service.vmware.vsla.main01</key>
            <value>string</value>
        </customField>
        <cpuReservation>
            <limit>2399</limit>
            <reservation>500</reservation>
            <shares>500</shares>
        </cpuReservation>
        <memoryReservation>
            <limit>5000</limit>
            <reservation>500</reservation>
            <shares>20480</shares>
        </memoryReservation>
    </appliance>
</appliances>
```

Modify Appliance Configuration

You can retrieve the configuration of both appliances by using the GET call in Example 8-201 and replace the size, resource pool, datastore, and custom parameters of the appliances by using a PUT call. If there were two appliances earlier you PUT only one appliance, the other appliance is deleted.

Example 8-202. Modify appliance configuration

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/appliances

Request Body:

```
<appliances>
    <applianceSize>COMPACT</applianceSize>
    <appliance>
        <resourcePoolId>resgroup-1610</resourcePoolId>
        <datastoreId>datastore-5288</datastoreId>
    </appliance>
    <appliance>
        <resourcePoolId>resgroup-1610</resourcePoolId>
        <datastoreId>datastore-5288</datastoreId>
    </appliance>
</appliances>
```

Change Appliance Size

Changes the size of both appliances.

Example 8-203. Change appliance size

Request:

POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/appliances/?size=compact|large|xlarge

Manage an Appliance

You can manage an appliance by specifying its HA index.

Query Appliance

Retrieves the configuration of the appliance with the specified haIndex.

Example 8-204. Get configuration of appliance with specified haIndex

Request:

GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/appliances/*haIndex*

Response Body:

```
<appliance>
    <resourcePoolId>resgroup-53</resourcePoolId>
    <datastoreId>datastore-29</datastoreId>
    <hostId>host-28</hostId>
    <vmFolderId>group-v38</vmFolderId>
    <customField>
        <key>system.service.vmware.vsla.main01</key>
        <value>string</value>
    </customField>
    <cpuReservation>
        <limit>2399</limit>
        <reservation>500</reservation>
        <shares>500</shares>
    </cpuReservation>
    <memoryReservation>
            <limit>5000</limit>
            <reservation>500</reservation>
            <shares>20480</shares>
    </memoryReservation>
```

```
</appliance>
```

Modify Appliance

Modifies the configuration of the appliance with the specified haIndex.

Example 8-205. Modify configuration of appliance with specified haIndex

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/appliances/haIndex
```

Request Body:

```
<appliance>
    <resourcePoolId>resgroup-53</resourcePoolId>
    <datastoreId>datastore-29</datastoreId>
    <hostId>host-28</hostId>
    <vmFolderId>group-v38</vmFolderId>
    <customField>
        <key>system.service.vmware.vsla.main01</key>
        <value>string</value>
    </customField>
    <cpuReservation>
        <limit>2399</limit>
        <reservation>500</reservation>
        <shares>500</shares>
    </cpuReservation>
    <memoryReservation>
            <limit>5000</limit>
            <reservation>500</reservation>
            <shares>20480</shares>
    </memoryReservation>
</appliance>
```

Delete Appliance

Deletes the appliance with the specified haIndex.

Example 8-206. Delete appliance configuration

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/appliances/haIndex
```

Working with Interfaces

You can add up to ten internal or uplink interfaces to each Edge Edge instance. A Edge Edge must have at least one internal interface before it can be deployed.

Add Interfaces

You can configure one or more interface for an NSX Edge. The specified configuration is stored in the database. If any appliance(s) is associated with this Edge Edge instance, the specified configuration is applied to the appliance as well.

Example 8-207. Add an interface

Request:

```
POST https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/vnics/?action=patch
```

Request Body:

```
<vnics> <!-- mamimum 10 interfaces index:0-9 can be configured. Until one connected vnic is configured, none of the configured
        features will serve the network -->
 <vnic>
 <index>0</index>
 <name>internal0</name> <!-- optional. System has default Names. format vNic0 ... vNic7 -->
 <type>internal</type> <!-- optional. Default is internal. Other possible value is "uplink" -->
 <portgroupId>dvportgroup-114</portgroupId> <!-- Possible values here are portgroupIds or virtualWire-id. portgroupId needs to be
        defined if isConnected=true -->
 <addressGroups>
 <addressGroup> <!-- Vnic can be configured to have more than one addressGroup/subnets -->
 <primaryAddress>192.168.3.1</primaryAddress> <!-- This is mandatory for an addressGroup -->
 <secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
 <ipAddress>192.168.3.2</ipAddress>
 <ipAddress>192.168.3.3</ipAddress> <!-- Optional. This way multiple IP Addresses can be assigned to a vnic/interface -->
 </secondaryAddresses>
 <subnetMask>255.255.255.0</subnetMask> <!-- either subnetMask or subnetPrefixLength should be provided. If both then
        subnetprefixLength is ignored -->
 </addressGroup>
 <addressGroup> <!-- Vnic can be configured to have more than one addressGroup/subnets -->
 <primaryAddress>192.168.4.1</primaryAddress> <!-- This is mandatory for an addressGroup -->
 <secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
 <ipAddress>192.168.4.2</ipAddress>
 <ipAddress>192.168.4.3</ipAddress> <!-- Optional. This way multiple IP Addresses can be assigned to a vnic/interface -->
 </secondaryAddresses>
 <subnetPrefixLength>24</subnetPrefixLength>
 </addressGroup>
 <addressGroup> <!-- ipv6 addressGroup -->
 <primaryAddress>ffff::1</primaryAddress> <!-- This is mandatory for an addressGroup -->
 <secondaryAddresses> <!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
 <ipAddress>ffff::2</ipAddress>
 </secondaryAddresses>
 <subnetPrefixLength>64</subnetPrefixLength> <!-- prefixLength valid values 1-128 -->
 </addressGroup>
 </addressGroups>
 <macAddress> <!-- optional. When not specified, macAddresses will be managed by VC -->
 <edgeVmHaIndex>0</edgeVmHaIndex> <!-- possible values 0 or 1 when HA is enabled -->
 <value>00:50:56:01:03:23</value> <!-- optional. User must ensure that macAddresses provided are unique within the given layer 2
        domain. -->
 </macAddress>
 <fenceParameter> <!-- optional -->
 <key>ethernet0.filter1.param1</key>
 <value>1</value>
 </fenceParameter>
 <mtu>1500</mtu> <!-- optional. Default is 1500 -->
 <enableProxyArp>false</enableProxyArp> <!-- optional. Default is false -->
 <enableSendRedirects>true</enableSendRedirects> <!-- optional. Default is true -->
<enableBridgeMode>false</enableBridgeMode> <!-- optional. Default is false -->
 <isConnected>true</isConnected> <!-- optional. Default is false -->
 <inShapingPolicy> <!-- optional -->
 <averageBandwidth>200000000</averageBandwidth>
 <peakBandwidth>200000000</peakBandwidth>
 <burstSize>0</burstSize>
 <enabled>true</enabled>
 <inherited>false</inherited>
 </inShapingPolicy>
 <outShapingPolicy> <!-- optional -->
 <averageBandwidth>400000000</averageBandwidth>
 <peakBandwidth>400000000</peakBandwidth>
 <burstSize>0</burstSize>
 <enabled>true</enabled>
 <inherited>false</inherited>
 </outShapingPolicy>
 </vnic>
</vnics>
```

---

where:

- inShapingPolicy, outShapingPolicy are optional. Can only be specified for a vnic connected to a distributed portgroup.
- averageBandwidth is a required field. Other fields are optional. If not specified, peakBandwidth is defaulted to averageBandwidth, burstSize is defaulted to '0', enabled is defaulted to 'true', inherited is defaulted to 'false'. averageBandwidth, peakBandwidth and burstSize values are in 'bits per second'.
- addressGroups contains IP addresses for the interface with each addressGroup representing the IP addresses within the same subnet. For each subnet, you can specify a primaryAddress (required), secondaryAddress (optional), and the subnetMask (required).

Retrieve Interfaces for a Edge Edge

Retrieves all interfaces for the specified Edge Edge.

Example 8-208. Retrieve all interfaces

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/vnics
```

Response Body:

```
<vnics>
    <vnic>
        <index>0</index>
        <name>uplink-vnic-network-2581</name>
        <type>uplink</type>
        <portgroupId>network-2581</portgroupId>
        <addressGroups>
            <addressGroup>
                <primaryAddress>10.112.2.40</primaryAddress>
                <secondaryAddresses>
                    <ipAddress>10.112.2.42</ipAddress>
                </secondaryAddresses>
                <subnetMask>255.255.254.0</subnetMask>
            </addressGroup>
        </addressGroups>
        <mtu>1500</mtu>
        <enableProxyArp>false</enableProxyArp>
        <enableSendRedirects>true</enableSendRedirects>
        <isConnected>true</isConnected>
        <inShapingPolicy>
            <averageBandwidth>200000000</averageBandwidth>
            <peakBandwidth>200000000</peakBandwidth>
            <burstSize>0</burstSize>
            <enabled>true</enabled>
            <inherited>false</inherited>
        </inShapingPolicy>
        <outShapingPolicy>
            <averageBandwidth>400000000</averageBandwidth>
            <peakBandwidth>400000000</peakBandwidth>
            <burstSize>0</burstSize>
            <enabled>true</enabled>
            <inherited>false</inherited>
        </outShapingPolicy>
    </vnic>
    <vnic>
    ...
    </vnic>
</vnics>
```

Delete Interfaces

Deletes one or more interfaces for a Edge Edge. Stores the specified configuration in database. If any appliance(s) are associated with this edge, disconnects and deletes the interface.

Example 8-209. Delete interface

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/vnics/?index=<vnicIndexId1>&index=<vnicIndexId2>
```

Manage a Edge Interface

You can manage a specific Edge interface.

Retrieve Interface with Specific Index

Retrieves the interface with specified index for a Edge Edge.

Example 8-210. Get interface with specific index

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/vnics/index
```

Response Body:

```
<vnic>
 <index>0</index>
 <name>uplink-vnic-network-2581</name>
 <type>uplink</type>
 <portgroupId>network-2581</portgroupId>
 <portgroupName>Mgmt</portgroupName>
 <addressGroups>
 <addressGroup>
 <primaryAddress>192.168.3.1</primaryAddress>
 <secondaryAddresses>
 <ipAddress>192.168.3.2</ipAddress>
 <ipAddress>192.168.3.3</ipAddress>
 </secondaryAddresses>
 <subnetMask>255.255.255.0</subnetMask>
 </addressGroup>
 <addressGroup>
 <primaryAddress>192.168.4.1</primaryAddress>
 <secondaryAddresses>
 <ipAddress>192.168.4.2</ipAddress>
 <ipAddress>192.168.4.3</ipAddress>
 </secondaryAddresses>
 <subnetMask>255.255.255.0</subnetMask> <!-- GET will always have subnetMask field for ipv4 and subnetPrefixLength for ipv6
                    -->
 </addressGroup>
 <addressGroup>
 <primaryAddress>ffff::1</primaryAddress>
 <secondaryAddresses>
 <ipAddress>ffff::2</ipAddress>
 </secondaryAddresses>
 <subnetPrefixLength>64</subnetPrefixLength>
 </addressGroup>
 </addressGroups>
 <mtu>1500</mtu>
 <enableProxyArp>false</enableProxyArp>
 <enableSendRedirects>true</enableSendRedirects>
 <isConnected>true</isConnected>
 </vnic>
```

Modify an Interface

Modifies the specified interface.

Example 8-211. Modify interface

Request:

PUT https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/vnics/<index>

Response Body:

```
<vnic>
    <index>0</index>                        <!-- optional. System has default Names. format vNic0 ... vNic7 -->
    <name>uplink-vnic-network-2581</name>           <!-- optional. Default is internal>
    <type>uplink</type>
    <portgroupId>network-2581</portgroupId>         <!-- Possible values are portgroupIds or virtualWire-id. portgroupId
                    needs to be defined if isConnected=true -->
    <addressGroups>
        <addressGroup>                      <!-- Vnic can be configured to have more than one addressGroup/subnets -->
            <primaryAddress>10.112.2.40</primaryAddress>  <!-- This is mandatory for an addressGroup -->
            <secondaryAddresses><!-- Optional. Should be used to add/defined other IPs used for NAT, LB, VPN, etc -->
                <ipAddress>10.112.2.42</ipAddress>
            </secondaryAddresses>
            <subnetMask>255.255.254.0</subnetMask>
        </addressGroup>
    </addressGroups>
    <macAddress>                            <!-- optional. When not specified, macAddresses will be managed by VC -->
        <edgeVmHaIndex>0</edgeVmHaIndex>
        <value>00:50:56:01:03:23</value>
    </macAddress>
    <fenceParameter>                        <!-- optional -->
        <key>ethernet0.filter1.param1</key>
        <value>1</value>
    </fenceParameter>
    <mtu>1500</mtu>                         <!-- Default is 1500.-->
    <enableProxyArp>false</enableProxyArp>          <!--Default is false.-->
    <enableSendRedirects>true</enableSendRedirects>     <!--Default is true.-->
    <isConnected>true</isConnected>             <!--Default is false.-->
    <inShapingPolicy>                       <!-- optional -->
        <averageBandwidth>200000000</averageBandwidth>
        <peakBandwidth>200000000</peakBandwidth>
        <burstSize>0</burstSize>
        <enabled>true</enabled>
        <inherited>false</inherited>
    </inShapingPolicy>
    <outShapingPolicy>                      <!-- optional -->
        <averageBandwidth>400000000</averageBandwidth>
        <peakBandwidth>400000000</peakBandwidth>
        <burstSize>0</burstSize>
        <enabled>true</enabled>
        <inherited>false</inherited>
    </outShapingPolicy>
</vnic>
```

Delete Interface Configuration

Deletes the interface configuration and resets it to the factory default.

Example 8-212. Delete interface configuration

Request:

DELETE https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/vnics/*index*

Query Interface Statistics

Query Statistics for all Interfaces

Retrieves statistics for all configured interfaces between the specified start and end times. When start and end time are not specified, all statistics since the Edge Edge deployed are displayed. When no end time is specified, the current Edge Manager time is set as endTime. Each record has the stats of 5 minutes granularity.

Example 8-213. Get interface statistics

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/statistics/interfaces
```

Response Body:

```
<statistics>
        <meta>
        <startTime>1336068000</startTime>      <!-- in seconds -->
        <endTime>1336100700</endTime>          <!-- in seconds -->
        <interval>300</interval>               <!-- 5 mins interval -->
    </meta>
    <data>
        <statistic>
            <vnic>0</vnic>
            <timestamp>1336068000</timestamp>
            <in>9.1914285714e+02</in>          <!-- Rx rate ( Kilobits per second - kbps ) -->
            <out>5.1402857143e+02</out>        <!-- Tx rate ( Kilobits per second - kbps ) -->
        </statistic>

        ...
        ...

        <statistic>
            <vnic>1</vnic>
            <timestamp>1336100700</timestamp>
            <in>9.2914285714e+02</in>
            <out>5.2402857143e+02</out>
    </statistic>
    </data>
</statistics>
```

Query Statistics for Uplink Interfaces

Retrieves statistics for all uplink interfaces between the specified start and end times. When start and end time are not specified, all statistics since the Edge Edge deployed are displayed. When no end time is specified, the current Edge Manager time is set as endTime. Each record has the stats of 5 minutes granularity.

Example 8-214. Get uplink interface statistics

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/statistics/interfaces/uplink
```

Response Body:

```
<statistics>
        <meta>
        <startTime>1336068000</startTime>      <!-- in seconds -->
        <endTime>1336100700</endTime>          <!-- in seconds -->
        <interval>300</interval>               <!-- 5 mins interval -->
    </meta>
    <data>
        <statistic>
            <vnic>0</vnic>
```

```
            <timestamp>1336068000</timestamp>
            <in>9.1914285714e+02</in>          <!-- Rx rate ( Kilobits per second - kbps ) -->
            <out>5.1402857143e+02</out>        <!-- Tx rate ( Kilobits per second - kbps ) -->
        </statistic>

        ...
        ...

        <statistic>
            <vnic>1</vnic>
            <timestamp>1336100700</timestamp>
            <in>9.2914285714e+02</in>
            <out>5.2402857143e+02</out>
    </statistic>
    </data>
</statistics>
```

Query Statistics for Internal Interfaces

Retrieves statistics for all internal interfaces between the specified start and end times. When start and end time are not specified, all statistics since the Edge Edge deployed are displayed. When no end time is specified, the current Edge Manager time is set as endTime. Each record has the stats of 5 minutes granularity.

Example 8-215. Get internal interface statistics

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/statistics/interfaces/internal
```

Response Body:

```
<statistics>
        <meta>
        <startTime>1336068000</startTime>      <!-- in seconds -->
        <endTime>1336100700</endTime>          <!-- in seconds -->
        <interval>300</interval>               <!-- 5 mins interval -->
    </meta>
    <data>
        <statistic>
            <vnic>0</vnic>
            <timestamp>1336068000</timestamp>
            <in>9.1914285714e+02</in>          <!-- Rx rate ( Kilobits per second - kbps ) -->
            <out>5.1402857143e+02</out>        <!-- Tx rate ( Kilobits per second - kbps ) -->
        </statistic>

        ...
        ...

        <statistic>
            <vnic>1</vnic>
            <timestamp>1336100700</timestamp>
            <in>9.2914285714e+02</in>
            <out>5.2402857143e+02</out>
    </statistic>
    </data>
</statistics>
```

Query Dashboard Statistics

Retrieves dashboard statistics between the specified start and end times. When start and end time are not specified, all statistics since the Edge Edge deployed are displayed. When no end time is specified, the current Edge Manager time is set as endTime. Each record has the stats of 5 minutes granularity.

Example 8-216. Get interface statistics

Request:

```
GET https://<nsxmgr-ip>/api/4.0/edges/<edgeId>/statistics/dashboard/interface?interval=<range>
```

Response Body:

```
<dashboardstatistics>
        <meta>
        <startTime>1336068000</startTime>      <!-- in seconds -->
        <endTime>1336100700</endTime>          <!-- in seconds -->
        <interval>300</interval>               <!-- 5 mins interval -->
    </meta>
    <data>
        <interfaces>
            <vNic_0_in_pkt>
                <dashboardStatistic>
                    <timestamp></timestamp>
                    <value></value>
                </dashboardStatistic>
                <dashboardStatistic>
                    <timestamp></timestamp>
                    <value></value>
                </dashboardStatistic>
                ...
                ...
            <vNic_0_in_pkt>
            ...
            ...
        </interfaces>
    </data>
    </data>
</dashboardstatistics>
```

Distributed Firewall Management

9

Distributed Firewall is a hypervisor kernel-embedded firewall that provides visibility and control for virtualized workloads and networks. You can create access control policies based on VMware vCenter objects like datacenters and clusters, virtual machine names and tags, network constructs like IP/VLAN/VXLAN addresses, as well as user group identity from Active Directory. Firewall rules are enforced at the vNIC level of each virtual machine to provide consistent access control even when the virtual machine gets vMotioned. The hypervisor-embedded nature of the firewall delivers close to line rate throughput to enable higher workload consolidation on physical servers. The distributed nature of the firewall provides a scale-out architecture that automatically extends firewall capacity when additional hosts are added to a prepared cluster.

Distributed Firewall offers multiple sets of configurable rules: Layer 3 (L3) rules (General tab) and Layer 2 (L2) rules (Ethernet tab). Layer 2 firewall rules are processed before Layer 3 rules. The default firewall rule allows all L3 and L2 traffic to pass through all clusters in your infrastructure. The default rule is always at the bottom of the rules table and cannot be deleted or added to. However, you can change the Action element of the rule from Allow to Block, add comments for the rule, and indicate whether traffic for that rule should be logged.

Firewall rules are created at the global scope, but you can then narrow the scope (datacenter, cluster, distributed virtual port group, network, virtual machine, vNIC, or virtual wire) at which you want to apply the rule by using the AppliedTo keyword.

User defined firewall rules are enforced in top-to-bottom ordering, with a per-virtual NIC level precedence. Each traffic session is checked against the top rule in the Firewall table before moving down the subsequent rules in the table. The first rule in the table that matches the traffic parameters is enforced.

The followng table lists the elements that can be used in firewall rules.

Table 9-1. Firewall rule elements

Element	Keyword for API	Used In
application	Application	service
application group	ApplicationGroup	service
cluster compute resource	ClusterComputeResource	AppliedTo
datacenter	Datacenter	source/destination AppliedTo
distributed virtual port group	DistributedVirtualPortgroup	source/destination AppliedTo
global root	GlobalRoot	source/destination
IPv4 addresses	Ipv4Address	source/destination
IPv6 addresses	Ipv6Address	source/destination
logical switch	VirtualWire	source/destination AppliedTo
network	Network	AppliedTo

Table 9-1. Firewall rule elements

Element	Keyword for API	Used In
resource pool	ResourcePool	source/destination
security group	SecurityGroup	source/destination
virtual app	VirtualApp	source/destination
virtual machine	VirtualMachine	source/destination AppliedTo
vNIC	Vnic	source/destination AppliedTo

For information on creating an IPSet, see "Working with IPsets" on page 60. For information on creating a security group, see "Working with Security Groups" on page 53.

Distributed firewall can help in creating identity-based rules as well. Administrators can enforce access control based on the user's group membership as defined in the enterprise Active Directory. Here are some scenarios where identity-based firewall rules can be used:

- User accessing virtual applications using a laptop/mobile device where AD is used for user authentication
- User accessing virtual applications using VDI infrastructure where the virtual machines are Microsoft Windows based

This chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Configuring Distributed Firewall

The firewall table includes one section by default that contains the default rule. You can add additional sections to segregate firewall rules

Firewall rules are enforced in top-to-bottom ordering. Distributed Firewall checks each traffic session against the top rule in the firewall table before moving down the subsequent rules in the table. The first rule in the table that matches the traffic parameters is enforced. See the *NSX Administration Guide* for more information about the hierarchy of Distributed Firewall rules.

Query Firewall Configuration

You can retrieve the the full firewall configuration consisting of all rules that has been defined on the NSX Manager.

Example 9-1. Get firewall configuration for NSX Manager

Request:

```
GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config
```

Response Body:

```
HTTP/1.1 200 OK
Cache-Control: private
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Cache-Control: no-cache
Set-Cookie: JSESSIONID=4CAE025C868939C35245B2553079807A; Path=/
ETag: 1395341576368
Date: Wed, 02 Oct 2013 20:58:39 GMT
Server: vShield Manager
Content-Type: application/xml
Transfer-Encoding: chunked
<?xml version="1.0" encoding="UTF-8"?>
<firewallConfiguration timestamp="1360144793284">
      <contextId>globalroot-0</contextId>
      <layer3Sections>
            <section id="2" name="defaultSectionLayer3" generationNumber="1360144793284" timestamp="1360144793284">
            <rule id="2" disabled="false" logged="false">
            <name>Default Rule</name>
            <action>DENY</action>
            <sectionId>2</sectionId>
            </rule>
            </section>
      </layer3Sections>
      <layer2Sections>
            <section id="1" name="defaultSectionLayer2" generationNumber="1360144793284" timestamp="1360144793284">
            <rule id="1" disabled="false" logged="false">
            <name>Default Rule</name>
            <action>ALLOW</action>
            <sectionId>1</sectionId>
            </rule>
            </section>
      </layer2Sections>
</firewallConfiguration>
```

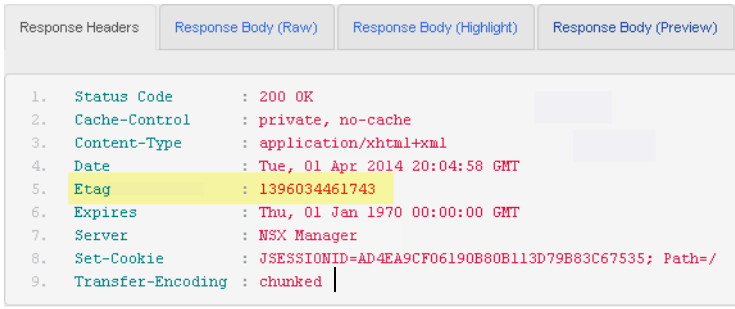
Modify Firewall Configuration

Follow the procedure below to modify the firewall configuration.

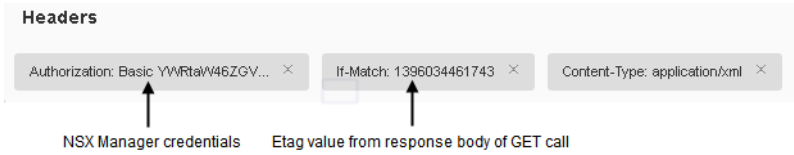
1 Run a GET call for the firewall configuration.

2 Extract the XML from the response body of the GET call and modify it as required.

3 From the Response Header in Step 1, copy the Etag header value.



4 Add the number as the If-Match header in the PUT call.



5 Pass the modified XML as the Request Body in a PUT call.

- Not all fields are required while sending the request. Refer to the optional field in the schema definition of various objects. All the optional fields are safe to be ignored while sending the configuration to server. For example, if an IP Set is referenced in the rule only IPSet and Type is needed in the Source/Destination objects and not Name and isValid tags.
- IDs for new objects (rule/section) should be removed or set to zero.
- If new entities (sections/rules) have been sent in the request, the response will contain the system-generated ids, which are assigned to these new entities. These ID identifies the resource and can be used in the urls if you want to operate on these entities using those URLs.

Example 9-2. Modify firewall configuration

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config
                    --header 'Content-Type:text/xml' --header 'if-match:"1380747467905"
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallConfiguration timestamp="1359979620727">
  <contextId>globalroot-0</contextId>
  <layer3Sections>
    <section id="2" name="defaultSectionLayer3" generationNumber="1359979620727" timestamp="1359979620727">
      <rule disabled="false" logged="true">
        <name>okn-1</name>
        <action>ALLOW</action>
        <sources excluded="false">
          <source>
            <value>datacenter-57</value>
            <type>Datacenter</type>
          </source>
          <source>
            <value>domain-c62</value>
            <type>ClusterComputeResource</type>
          </source>
          <source>
            <value>10.112.1.1</value>
            <type>Ipv4Address</type>
          </source>
        </sources>
        <services>
          <service>
            <destinationPort>80</destinationPort>
```

```
            <protocol>6</protocol>
            <subProtocol>6</subProtocol>
          </service>
          <service>
            <value>application-161</value>
            <type>Application</type>
          </service>
        </services>
        <appliedToList>
          <appliedTo>
            <value>5013bcd8-c666-1e28-c7a9-600da945954f.000</value>
            <type>Vnic</type>
          </appliedTo>
          <appliedTo>
            <value>vm-126</value>
            <type>VirtualMachine</type>
          </appliedTo>
        </appliedToList>
      </rule>
      <rule disabled="true" logged="true">
        <name>Matru-1</name>
        <action>ALLOW</action>
        <sectionId>2</sectionId>
      </rule>
      <rule disabled="true" logged="true">
        <name>Matru-2</name>
        <action>ALLOW</action>
        <sectionId>2</sectionId>
      </rule>
      <rule disabled="true" logged="true">
        <name>Matru-3</name>
        <action>ALLOW</action>
        <sectionId>2</sectionId>
      </rule>
      <rule id="2" disabled="true" logged="false">
        <name>Default Rule</name>
        <action>DENY</action>
        <sectionId>2</sectionId>
      </rule>
    </section>
  </layer3Sections>
  <layer2Sections>
    <section id="1" name="defaultSectionLayer2" generationNumber="1359979620727" timestamp="1359979620727">
      <rule id="1" disabled="false" logged="false">
        <name>Default Rule</name>
        <action>ALLOW</action>
        <sectionId>1</sectionId>
      </rule>
    </section>
  </layer2Sections>
</firewallConfiguration>
```

Delete Firewall Configuration

Restores default configuration, which means one defaultLayer3 section with default allow rule and one defaultLayer2Section with default allow rule.

Example 9-3. Delete firewall configuration

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config
```

Working with Firewall Sections

You can use sections in the firewall table to group logical rules based on AppliedTo or for a tenant use case.A firewall section is the smallest unit of configuration which can be updated independently. There are two kinds of sections

- Layer3Section contains layer3 rules
- Layer2Section contains layer2 rules

Query Firewall Sections

Retrieves section configuration either by section ID or section name.

Example 9-4. Get section configuration

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config/layer3sections|layer2sections/<sectionId> |<sectionName>

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<section id="4" name="TestSection" generationNumber="1360149234572" timestamp="1360149234572">
  <rule id="16" disabled="false" logged="true">
    <name>okn-2</name>
    <action>ALLOW</action>
    <appliedToList>
      <appliedTo>
        <name>vm1 - Network adapter 1</name>
        <value>5013bcd8-c666-1e28-c7a9-600da945954f.000</value>
        <type>Vnic</type>
        <isValid>true</isValid>
      </appliedTo>
      <appliedTo>
        <name>Small XP-2</name>
        <value>vm-126</value>
        <type>VirtualMachine</type>
        <isValid>true</isValid>
      </appliedTo>
    </appliedToList>
    <sectionId>4</sectionId>
    <sources excluded="false">
      <source>
        <name>5.1 ESX</name>
        <value>datacenter-57</value>
        <type>Datacenter</type>
        <isValid>true</isValid>
      </source>
      <source>
        <name>5.1</name>
        <value>domain-c62</value>
        <type>ClusterComputeResource</type>
        <isValid>true</isValid>
      </source>
      <source>
        <value>10.112.1.1</value>
        <type>Ipv4Address</type>
        <isValid>true</isValid>
      </source>
    </sources>
    <services>
      <service>
        <destinationPort>80</destinationPort>
        <protocol>6</protocol>
        <subProtocol>6</subProtocol>
      </service>
      <service>
```

```
        <name>VMware-VDM2.x-Ephemeral</name>
        <value>application-161</value>
        <isValid>true</isValid>
      </service>
    </services>
  </rule>
  <rule id="15" disabled="true" logged="true">
    <name>Matru-3</name>
    <action>ALLOW</action>
    <sectionId>4</sectionId>
  </rule>
  <rule id="14" disabled="true" logged="true">
    <name>test-3</name>
    <action>ALLOW</action>
    <sectionId>4</sectionId>
  </rule>
  <rule id="13" disabled="true" logged="true">
    <name>test-2</name>
    <action>ALLOW</action>
    <sectionId>4</sectionId>
  </rule>
  <rule id="12" disabled="true" logged="false">
    <name>test-1</name>
    <action>DENY</action>
    <sectionId>4</sectionId>
  </rule>
</section>
```

Add Firewall Section

Adds a section at the top of the firewall table.

Example 9-5. Add section

Request:

POST https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config/layer3sections|layer2sections

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<section name="TestSection">
  <rule disabled="false" logged="true">
    <name>okn-2</name>
    <action>ALLOW</action>
    <appliedToList>
      <appliedTo>
        <name>vm1 - Network adapter 1</name>
        <value>5013bcd8-c666-1e28-c7a9-600da945954f.000</value>
        <type>Vnic</type>
        <isValid>true</isValid>
      </appliedTo>
      <appliedTo>
        <name>Small XP-2</name>
        <value>vm-126</value>
        <type>VirtualMachine</type>
        <isValid>true</isValid>
      </appliedTo>
    </appliedToList>
<sources excluded="false">
      <source>
        <name>5.1 ESX</name>
        <value>datacenter-57</value>
        <type>Datacenter</type>
        <isValid>true</isValid>
      </source>
      <source>
```

```
        <name>5.1</name>
        <value>domain-c62</value>
        <type>ClusterComputeResource</type>
        <isValid>true</isValid>
      </source>
      <source>
        <value>10.112.1.1</value>
        <type>Ipv4Address</type>
        <isValid>true</isValid>
      </source>
    </sources>
    <services>
      <service>
        <destinationPort>80</destinationPort>
        <protocol>6</protocol>
        <subProtocol>6</subProtocol>
      </service>
      <service>
        <name>VMware-VDM2.x-Ephemeral</name>
        <value>application-161</value>
        <isValid>true</isValid>
      </service>
    </services>
  </rule>
  <rule disabled="true" logged="true">
    <name>Matru-3</name>
    <action>ALLOW</action>
  </rule>
  <rule disabled="true" logged="true">
    <name>test-3</name>
    <action>ALLOW</action>
  </rule>
  <rule disabled="true" logged="true">
    <name>test-2</name>
    <action>ALLOW</action>
  </rule>
  <rule disabled="true" logged="false">
    <name>test-1</name>
    <action>DENY</action>
  </rule>
</section>
```

Location Header in the response body contains the resource url for the newly created rule resource. This URL can be used to identify this resource.

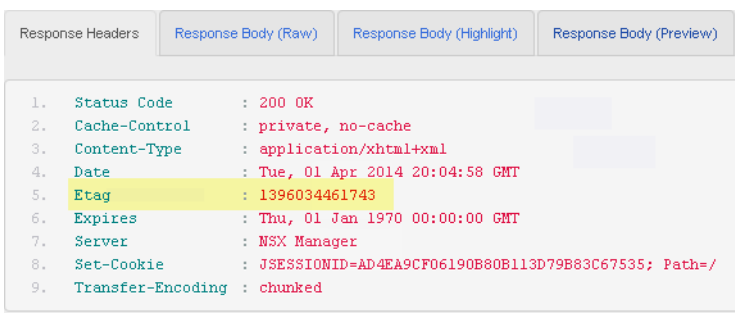
Modify Firewall Section

Follow the procedure below to modify a firewall section.

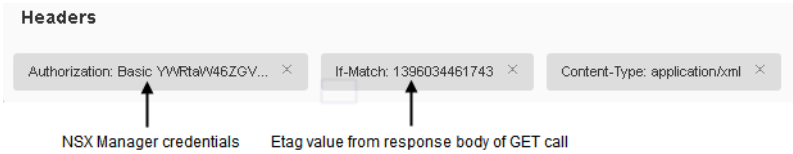
1 Run a GET call for the firewall section.

2 Extract the XML from the response body of the GET call and modify it as required.

3 From the Response Header in Step 1, copy the Etag header value.



4 Add the number as the If-Match header in the PUT call.



5 Pass the modified XML as the Request Body in a PUT call.

- Not all fields are required while sending the request. Refer to the optional field in the schema definition of various objects. All the optional fields are safe to be ignored while sending the configuration to server. For example, if an IP Set is referenced in the rule only IPSet and Type is needed in the Source/Destination objects and not Name and isValid tags.
- IDs for new objects (rule/section) should be removed or set to zero.
- If new entities (sections/rules) have been sent in the request, the response will contain the system-generated ids, which are assigned to these new entities. These ID identifies the resource and can be used in the urls if you want to operate on these entities using those URLs.

Example 9-6. Modify section

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config/layer3sections|layer2sections/<sectionId> |<sectionName>
                    --header 'Content-Type:text/xml' --header 'if-match:"1360149234572"
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<section id="4" name="TestSectionRenamed" generationNumber="1360149234572" timestamp="1360149234572">
  <rule id="16" disabled="false" logged="false">
    <name>okn-2</name>
    <action>ALLOW</action>
    <appliedToList>
      <appliedTo>
        <name>vm1 - Network adapter 1</name>
        <value>5013bcd8-c666-1e28-c7a9-600da945954f.000</value>
        <type>Vnic</type>
        <isValid>true</isValid>
      </appliedTo>
      <appliedTo>
        <name>Small XP-2</name>
        <value>vm-126</value>
        <type>VirtualMachine</type>
        <isValid>true</isValid>
      </appliedTo>
    </appliedToList>
    <sectionId>4</sectionId>
    <sources excluded="false">
      <source>
        <name>5.1 ESX</name>
        <value>datacenter-57</value>
        <type>Datacenter</type>
        <isValid>true</isValid>
      </source>
      <source>
        <name>5.1</name>
        <value>domain-c62</value>
        <type>ClusterComputeResource</type>
        <isValid>true</isValid>
      </source>
      <source>
        <value>10.112.1.1</value>
        <type>Ipv4Address</type>
        <isValid>true</isValid>
      </source>
```

```
    </sources>
    <services>
      <service>
        <destinationPort>80</destinationPort>
        <protocol>6</protocol>
        <subProtocol>6</subProtocol>
      </service>
      <service>
        <name>VMware-VDM2.x-Ephemeral</name>
        <value>application-161</value>
        <isValid>true</isValid>
      </service>
    </services>
  </rule>
  <rule id="15" disabled="true" logged="true">
    <name>Matru-3</name>
    <action>DENY</action>
    <sectionId>4</sectionId>
  </rule>
  <rule id="14" disabled="true" logged="true">
    <name>test-3</name>
    <action>ALLOW</action>
    <sectionId>4</sectionId>
  </rule>
  <rule id="13" disabled="true" logged="true">
    <name>test-2</name>
    <action>ALLOW</action>
    <sectionId>4</sectionId>
  </rule>
  <rule id="12" disabled="true" logged="false">
    <name>test-1</name>
    <action>DENY</action>
    <sectionId>4</sectionId>
  </rule>
</section>
```

Delete Firewall Section

Deletes the specified section. If the section contains a default rule, the section is not deleted but all rules except for the default rule are removed from that section.

If the section does not contain a default rule, the section and all its rules are deleted.

Example 9-7. Delete section

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config/layer3sections|layer2sections/<sectionId> |<sectionName>
```

Working with Firewall Rules

You add firewall rules at the global scope. You can then narrow down the scope (datacenter, cluster, distributed virtual port group, network, virtual machine, vNIC, or virtual wire) at which you want to apply the rule. Firewall allows you to add multiple objects at the source and destination levels for each rule, which helps reduce the total number of firewall rules to be added.

To add a identity based firewall rule, first create a security group based on Directory Group objects. Then create a firewall rule with the security group as the source or destination.

Query Firewall Rule

Retrieves rule details from either a Layer3 or Layer2 section.

Example 9-8. Get firewall rule

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/config/layer3sections|layer3sections/<sectionNumber>/rules/<ruleNumber>

Response Body:

```
HTTP/1.1 200 OK
Cache-Control: private
Expires: Thu, 01 Jan 1970 00:00:00 GMT
Cache-Control: no-cache
Set-Cookie: JSESSIONID=FED4857DF7A2A5CCD7F818A87F463629; Path=/
ETag: 1380747467905
Date: Wed, 02 Oct 2013 21:04:29 GMT
Server: vShield Manager
Content-Type: application/xml
Transfer-Encoding: chunked
<?xml version="1.0" encoding="UTF-8"?>
<rule id="1807" disabled="false" logged="true">
  <name>Section-2-Rule-1</name>
  <action>allow</action>
  <notes>Example with multile sources and any appliedTo with source containing vnics and raw-ips</notes>
  <sources excluded="false">
    <source>
      <value>10.112.1.0-10.112.1.10</value>
      <type>Ipv4Address</type>
      <isValid>true</isValid>
    </source>
    <source>
      <name>2-rhel53-srv-32-local-129-fa110b77-c303-4113-ab66-88c5ed9a5177 - Network adapter 1</name>
      <value>fa110b77-c303-4113-ab66-88c5ed9a5177.000</value>
      <type>Vnic</type>
      <isValid>true</isValid>
    </source>
    <source>
      <value>192.168.1.1</value>
      <type>Ipv4Address</type>
      <isValid>true</isValid>
    </source>
  </sources>
  <destinations excluded="false">
    <destination>
      <name>1-datacenter-129</name>
      <value>datacenter-237</value>
      <type>Datacenter</type>
      <isValid>true</isValid>
    </destination>
  </destinations>
  <services>
    <service>
      <name>AD Server</name>
      <value>application-256</value>
      <type>Application</type>
      <isValid>true</isValid>
    </service>
  </services>
</rule>
```

Add Firewall Rule

Adds a rule at the top of the existing configuration in a Layer2 or Layer3 section.

Example 9-9. Add firewall rule

Request:

POST https://<nsxmgr-ip>/api/4.0/firewall//globalroot-0/config/layer3sections|layer3sections/<sectionNumber>/rules

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<rule disabled="enabled" logged="false">
  <name>AddRuleTest</name>
  <action>allow</action>
  <notes />
  <appliedToList>
    <appliedTo>
      <value>datacenter-26</value>
      <type>Datacenter</type>
    </appliedTo>
  </appliedToList>
  <sectionId>2</sectionId>
  <sources excluded="true">
    <source>
      <value>datacenter-26</value>
      <type>Datacenter</type>
    </source>
  </sources>
  <services>
    <service>
      <value>application-216</value>
    </service>
  </services>
</rule>
```

Location Header in the response body contains the resource url for the newly created rule resource. This URL can be used to identify this resource.

Modify Firewall Rule

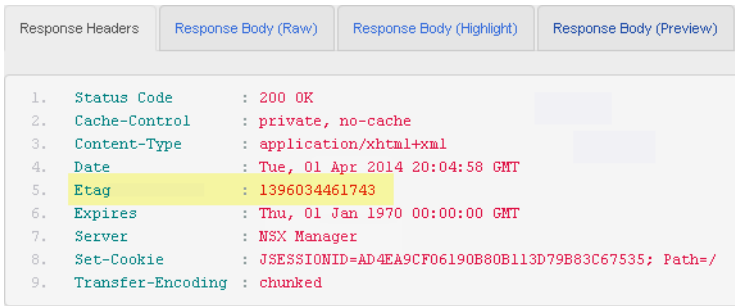
Modifies a rule in the Layer2 or Layer3 section. Follow the procedure below to modify a firewall rule.

Follow the procedure below to modify the firewall configuration.

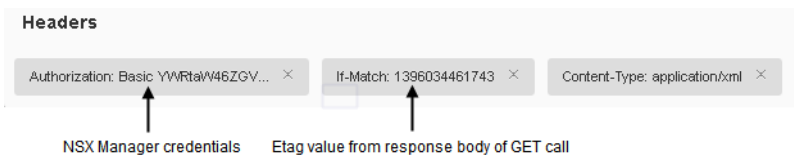
1 Run a GET call for the firewall fules.

2 Extract the XML from the response body of the GET call and modify it as required.

3 From the Response Header in Step 1, copy the Etag header value.



4 Add the number as the If-Match header in the PUT call.



5 Pass the modified XML as the Request Body in a PUT call.

- Not all fields are required while sending the request. Refer to the optional field in the schema definition of various objects. All the optional fields are safe to be ignored while sending the configuration to server. For example, if an IP Set is referenced in the rule only IPSet and Type is needed in the Source/Destination objects and not Name and isValid tags.
- IDs for new objects (rule/section) should be removed or set to zero.
- If new entities (sections/rules) have been sent in the request, the response will contain the system-generated ids, which are assigned to these new entities. These ID identifies the resource and can be used in the urls if you want to operate on these entities using those URLs.

Example 9-10. Modify firewall rule

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/firewall//globalroot-0/config/layer3sections|layer3sections/<sectionNumber>/rules
                        --header 'Content-Type:text/xml' --header 'if-match:"1380747467905"'
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<rule id="23" disabled="enabled" logged="true">
  <name>AddRuleTestUpdated</name>
  <action>allow</action>
  <notes />
  <appliedToList>
    <appliedTo>
      <value>datacenter-26</value>
      <type>Datacenter</type>
    </appliedTo>
  </appliedToList>
  <sectionId>2</sectionId>
  <sources excluded="true">
    <source>
      <value>datacenter-26</value>
      <type>Datacenter</type>
    </source>
  </sources>
  <services>
    <service>
      <value>application-216</value>
    </service>
  </services>
</rule>
```

Location Header in the response body contains the resource url for the newly created rule resource. This URL can be used to identify this resource.

Query Status

Retrieves status of the entire firewall configuration or individual sections.

Query Firewall Configuration Status

Example 9-11. Get firewall configuration status

Request:

```
GET https://<nsxmgr-ip>/api/4.0/firewall//globalroot-0/status
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallStatus>
  <startTime>1380747467905</startTime>
```

```
  <status>published</status>
  <generationNumber>1380747467905</generationNumber>
  <clusterList>
    <clusterStatus>
      <clusterId>domain-c256</clusterId>
      <status>published</status>
      <generationNumber>1380747467905</generationNumber>
      <hostStatusList>
        <hostStatus>
          <hostId>host-244</hostId>
          <hostName>10.24.227.43</hostName>
          <status>published</status>
          <errorCode>0</errorCode>
          <startTime>1380725776946</startTime>
          <endTime>1380747469986</endTime>
          <generationNumber>1380747467905</generationNumber>
          <clusterId>domain-c256</clusterId>
        </hostStatus>
      </hostStatusList>
    </clusterStatus>
    <clusterStatus>
      <clusterId>domain-c322</clusterId>
      <status>published</status>
      <generationNumber>1380747467905</generationNumber>
      <hostStatusList>
        <hostStatus>
          <hostId>host-310</hostId>
          <hostName>10.24.227.75</hostName>
          <status>published</status>
          <errorCode>0</errorCode>
          <startTime>1380746933333</startTime>
          <endTime>1380747470292</endTime>
          <generationNumber>1380747467905</generationNumber>
          <clusterId>domain-c322</clusterId>
        </hostStatus>
      </hostStatusList>
    </clusterStatus>
  </clusterList>
</firewallStatus>
```

Query Layer3 Section Status

Example 9-12. Get Layer3 status

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall//globalroot-0/status/layer3sections/<sectionNumber>

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallStatus>
  <startTime>1380747467905</startTime>
  <status>published</status>
  <generationNumber>1380747467905</generationNumber>
  <clusterList>
    <clusterStatus>
      <clusterId>domain-c256</clusterId>
      <status>published</status>
      <generationNumber>1380747467905</generationNumber>
      <hostStatusList>
        <hostStatus>
          <hostId>host-244</hostId>
          <hostName>10.24.227.43</hostName>
          <status>published</status>
          <errorCode>0</errorCode>
```

```
            <startTime>1380725776946</startTime>
            <endTime>1380747469986</endTime>
            <generationNumber>1380747467905</generationNumber>
            <clusterId>domain-c256</clusterId>
          </hostStatus>
        </hostStatusList>
      </clusterStatus>
      <clusterStatus>
        <clusterId>domain-c322</clusterId>
        <status>published</status>
        <generationNumber>1380747467905</generationNumber>
        <hostStatusList>
          <hostStatus>
            <hostId>host-310</hostId>
            <hostName>10.24.227.75</hostName>
            <status>published</status>
            <errorCode>0</errorCode>
            <startTime>1380746933333</startTime>
            <endTime>1380747470292</endTime>
            <generationNumber>1380747467905</generationNumber>
            <clusterId>domain-c322</clusterId>
          </hostStatus>
        </hostStatusList>
      </clusterStatus>
    </clusterList>
</firewallStatus>
```

Query Layer2 Section Status

Example 9-13. Get layer2 status

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall//globalroot-0/status/layer2sections/<sectionNumber>

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallStatus>
  <startTime>1380747467905</startTime>
  <status>published</status>
  <generationNumber>1380747467905</generationNumber>
  <clusterList>
    <clusterStatus>
      <clusterId>domain-c256</clusterId>
      <status>published</status>
      <generationNumber>1380747467905</generationNumber>
      <hostStatusList>
        <hostStatus>
          <hostId>host-244</hostId>
          <hostName>10.24.227.43</hostName>
          <status>published</status>
          <errorCode>0</errorCode>
          <startTime>1380725776946</startTime>
          <endTime>1380747469986</endTime>
          <generationNumber>1380747467905</generationNumber>
          <clusterId>domain-c256</clusterId>
        </hostStatus>
      </hostStatusList>
    </clusterStatus>
    <clusterStatus>
      <clusterId>domain-c322</clusterId>
      <status>published</status>
      <generationNumber>1380747467905</generationNumber>
      <hostStatusList>
        <hostStatus>
```

```
            <hostId>host-310</hostId>
            <hostName>10.24.227.75</hostName>
            <status>published</status>
            <errorCode>0</errorCode>
            <startTime>1380746933333</startTime>
            <endTime>1380747470292</endTime>
            <generationNumber>1380747467905</generationNumber>
            <clusterId>domain-c322</clusterId>
          </hostStatus>
        </hostStatusList>
      </clusterStatus>
    </clusterList>
</firewallStatus>
```

Synchronizing and Enabling Firewall

You can force hosts and clusters to synchronize with the last good configuration in the NSX Manager database.

Force Sync Host

Forces the host to synch with the last good configuration

Example 9-14. Force sync host

Request:

```
POST https://<nsxmgr-ip>/api/4.0/firewall/forceSync/<hostID>
```

Response Body:

```
HTTP/1.1 200 OK
Cache-Control: no-cache
Set-Cookie: JSESSIONID=EADEDB6AC7323C3FE42E43B8739FBB1F; Path=/
Location: /api/2.0/services/taskservice/job/jobdata-658
Date: Wed, 02 Oct 2013 21:08:52 GMT
Server: vShield Manager
Content-Length: 0
```

The location header contains the task URL, which can be used to monitor the overall task status.

Force Sync Cluster

Example 9-15. Force sync cluster

Request:

```
POST https://<nsxmgr-ip>/api/4.0/firewall/forceSync/<clusterID>
```

Response Body:

```
HTTP/1.1 200 OK
Cache-Control: no-cache
Set-Cookie: JSESSIONID=EADEDB6AC7323C3FE42E43B8739FBB1F; Path=/
Location: /api/2.0/services/taskservice/job/jobdata-659
Date: Wed, 02 Oct 2013 21:08:52 GMT
Server: vShield Manager
Content-Length: 0
```

The location header contains the task URL, which can be used to monitor the overall task status.

Enable or Disable APIs for a Cluster

You can disable firewall components on a cluster. If firewall is disabled on a cluster, all network traffic passes through the hosts in that cluster without any validation.

Example 9-16. Enable or disable API

Request:

```
POST https://<nsxmgr-ip>/api/4.0/firewall/<domainID>/enable/true|false
```

Importing and Exporting Firewall Configurations

You may make changes to a firewall configuration and save a draft copy for future use. A copy of every published configuration is also saved as a draft. A maximum of 100 configurations can be saved at a time. 90 out of these 100 can be auto saved configurations from a publish operation. When the limit is reached, the oldest configuration that is not marked for preserve is purged to make way for a new one.

You can also import and export firewall configurations in XML format.

Save a Configuration

Example 9-17. Save a firewall configuration

Request:

```
POST https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts
```

Request Body:

```
<firewallDraft  name="TestDraft">
  <description>Test draft</description> <!-- optional -->
  <preserve>true</preserve> <!-- optional, default = true -->
  <mode>userdefined</mode>
  <config>
   <contextId>globalroot-0</contextId>
   <layer3Sections>
    <section name="Default Section Layer3" >
      <rule id="1001" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
      </rule>
    </section>
   </layer3Sections>
   <layer2Sections>
    <section name="Default Section Layer2">
     <rule id="1003" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
     </rule>
    </section>
   </layer2Sections>
  </config>
</firewallDraft>
```

Response Body:

```
HTTP/1.1 200 OK
<?xml version="1.0" encoding="UTF-8"?>
<firewallDraft id="23" name="TestDraft" timestamp="1377631752553">
  <description>Test draft</description>
  <preserve>true</preserve>
  <user>localadmin</user>
```

```
  <mode>userdefined</mode>
</firewallDraft>
```

Query all Saved Configurations

Example 9-18. Get all saved firewall configurations

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts/

Request Body:

```
<firewallDrafts>
 <firewallDraft id="3" name="AutoSaved_2013-Aug-22 17:13:08" timestamp="1377191588887">
   <description>Auto saved draft</description>
   <preserve>false</preserve>
   <user>root</user>
   <mode>autosaved</mode>
 </firewallDraft>
 <firewallDraft id="2" name="AutoSaved_2013-Aug-22 15:46:40" timestamp="1377186400472">
   <description>Auto saved draft</description>
   <preserve>false</preserve>
   <user>root</user>
   <mode>autosaved</mode>
 </firewallDraft>
 <firewallDraft id="1" name="AutoSaved_2013-Aug-22 15:42:36" timestamp="1377186156947">
   <description>Auto saved draft</description>
   <preserve>false</preserve>
   <user>root</user>
   <mode>autosaved</mode>
 </firewallDraft>
 </firewallDrafts>
```

Query a Saved Configuration

Retrieve the draftID of the configuration. See "Get all saved firewall configurations" on page 278.

Example 9-19. Get a saved firewall configuration

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts/<draftID>

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<firewallDraft id="1" name="AutoSaved_2013-Aug-22 15:42:36" timestamp="1377186156947">
  <description>Auto saved draft</description>
  <preserve>false</preserve>
  <user>root</user>
  <mode>autosaved</mode>
  <config timestamp="1377186104244">
     <contextId>globalroot-0</contextId>
     <layer3Sections>
        <section id="1002" name="Default Section Layer3" generationNumber="1377186104244" timestamp="1377186104244">
          <rule disabled="false" logged="false">
             <name>Default Rule NDP - Edit</name>
             <action>allow</action>
             <sectionId>1002</sectionId>
             <services>
                <service>
                   <name>IPv6-ICMP Neighbor Solicitation</name>
                   <value>application-182</value>
                   <type>Application</type>
```

```
                    <isValid>true</isValid>
                  </service>
                </services>
              </rule>
              <rule id="1002" disabled="false" logged="false">
                  <name>Default Rule</name>
                  <action>allow</action>
                  <sectionId>1002</sectionId>
                  <precedence>default</precedence>
              </rule>
            </section>
        </layer3Sections>
        <layer2Sections>
          <section id="1001" name="Default Section Layer2" generationNumber="1377186104244" timestamp="1377186104244">
            <rule id="1001" disabled="false" logged="false">
                  <name>Default Rule</name>
                  <action>allow</action>
                  <sectionId>1001</sectionId>
                  <precedence>default</precedence>
              </rule>
           </section>
        </layer2Sections>
        <generationNumber>1377285109371</generationNumber>
    </config>
</firewallDraft>
```

Modify a Saved Configuration

Retrieve the draftID of the configuration. See "Get all saved firewall configurations" on page 278.

Example 9-20. Update a saved firewall configuration

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts/<draftID>
```

Request Body:

```
<f<firewallDraft  name="TestDraft">
  <description>Test draft</description> <!-- optional -->
  <preserve>true</preserve> <!-- optional, default = true -->
  <mode>userdefined</mode>
  <config>
   <contextId>globalroot-0</contextId>
   <layer3Sections>
    <section name="Default Section Layer3" >
      <rule id="1001" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
      </rule>
    </section>
   </layer3Sections>
   <layer2Sections>
    <section name="Default Section Layer2">
     <rule id="1003" disabled="false" logged="false">
      <name>Default Rule</name>
      <action>allow</action>
      <precedence>default</precedence>
     </rule>
    </section>
   </layer2Sections>
  </config>
</firewallDraft>
```

Response Body:

```
HTTP/1.1 200 OK
<firewallDraft id="23" name="TestDraft" timestamp="1377631752553">
  <description>Test draft</description>
  <preserve>true</preserve>
  <user>localadmin</user>
  <mode>userdefined</mode>
</firewallDraft>
```

Delete a Saved Configuration

Retrieve the draftID of the configuration. See "Get all saved firewall configurations" on page 278.

Example 9-21. Delete a saved firewall configuration

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts/<draftID>
```

Export a Saved Configuration

Retrieve the draftID of the configuration. See "Get all saved firewall configurations" on page 278.

Example 9-22. Export a saved firewall configuration

Request:

```
GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts/<draftID>/action/export
```

Response Body:

```
<firewallDraft id="23" name="TestDraft" timestamp="1377631752553">
<description>Test draft Edit</description>
<preserve>false</preserve>
<user>localadmin</user>
<mode>userdefined</mode>
  <config timestamp="0">
  <contextId>globalroot-0</contextId>
   <layer3Sections>
    <section name="Default Section Layer3" timestamp="0">
     <rule id="1002" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
      </rule>
    </section>
   </layer3Sections>
   <layer2Sections>
     <section name="Default Section Layer2" timestamp="0">
      <rule id="1001" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
      </rule>
     </section>
  </layer2Sections>
 <generationNumber>1377285109371</generationNumber>
 </config>
</firewallDraft>
```

Import a Saved Configuration

Retrieve the draftID of the configuration. See "Get all saved firewall configurations" on page 278.

Use the response body of the export command as the request body in this command. See "Export a saved firewall configuration" on page 280.

Example 9-23. Import a saved firewall configuration

Request:

POST https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/drafts/<draftID>/action/import

Request Body:

```
<firewallDraft id="23" name="TestDraft" timestamp="1377631752553">
<description>Test draft Edit</description>
<preserve>false</preserve>
<user>localadmin</user>
<mode>userdefined</mode>
  <config timestamp="0">
  <contextId>globalroot-0</contextId>
   <layer3Sections>
    <section name="Default Section Layer3" timestamp="0">
     <rule id="1002" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
      </rule>
    </section>
   </layer3Sections>
   <layer2Sections>
     <section name="Default Section Layer2" timestamp="0">
      <rule id="1001" disabled="false" logged="false">
       <name>Default Rule</name>
       <action>allow</action>
       <precedence>default</precedence>
      </rule>
     </section>
  </layer2Sections>
 <generationNumber>1377285109371</generationNumber>
 </config>
</firewallDraft>
```

Response Body:

```
HTTP/1.1 200 OK
<firewallDraft id="24" name="TestDraft" timestamp="1377632629140">
  <description>Test draft Edit</description>
  <preserve>false</preserve>
  <user>localadmin</user>
  <mode>imported</mode>
 </firewallDraft>
```

Firewall Migration Switch

Example 9-24. Firewall migration

Request:

GET https://<nsxmgr-ip>/api/4.0/firewall/globalroot-0/state

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<rule id="1807" disabled="false" logged="true">
  <name>Section-2-Rule-1</name>
  <action>allow</action>
  <notes>Example with multile sources and any appliedTo with source containing vnics and raw-ips</notes>
  <sources excluded="false">
    <source>
```

```
      <value>10.112.1.0-10.112.1.10</value>
      <type>Ipv4Address</type>
      <isValid>true</isValid>
    </source>
    <source>
      <name>2-rhel53-srv-32-local-129-fa110b77-c303-4113-ab66-88c5ed9a5177 - Network adapter 1</name>
      <value>fa110b77-c303-4113-ab66-88c5ed9a5177.000</value>
      <type>Vnic</type>
      <isValid>true</isValid>
    </source>
    <source>
      <value>192.168.1.1</value>
      <type>Ipv4Address</type>
      <isValid>true</isValid>
    </source>
  </sources>
  <destinations excluded="false">
    <destination>
      <name>1-datacenter-129</name>
      <value>datacenter-237</value>
      <type>Datacenter</type>
      <isValid>true</isValid>
    </destination>
  </destinations>
  <services>
    <service>
      <name>AD Server</name>
      <value>application-256</value>
      <type>Application</type>
      <isValid>true</isValid>
    </service>
  </services>
</rule>
```

Configuring Fail-Safe Mode for Distributed Firewall

By default, failure or unavailability of the vShield App appliance results in traffic being blocked (fail close). You can change this to allow traffic (fail open).

Configure Fail-Safe Mode for vShield App Firewall

Example 9-25. Configure fail-safe mode

Example:

```
PUT https://<nsxmgr-ip>/api/2.1/app/failsafemode

Request Body
<VshieldAppConfiguration>
      <failsafeConfiguration>
            <failsafemode>FAIL_OPEN</failsafemode>
      </failsafeConfiguration>
</VshieldAppConfiguration>
```

Query Fail-Safe Mode Configuration for vShield App Firewall

Example 9-26. Get fail-safe mode configuration

Example:

```
GET https://<nsxmgr-ip>/api/2.1/app/failsafemode
```

Working with SpoofGuard

After synchronizing with the vCenter Server, NSX Manager collects the IP addresses of all vCenter guest virtual machines from VMware Tools on each virtual machine. If a virtual machine has been compromised, the IP address can be spoofed and malicious transmissions can bypass firewall policies.

You create a SpoofGuard policy for specific networks that allows you to authorize the IP addresses reported by VMware Tools and alter them if necessary to prevent spoofing. SpoofGuard inherently trusts the MAC addresses of virtual machines collected from the VMX files and vSphere SDK. Operating separately from Firewall rules, you can use SpoofGuard to block traffic determined to be spoofed.

Create SpoofGuard Policy

You can create a SpoofGuard policy to specify the operation mode for specific networks. The system generated policy applies to port groups and logical switches not covered by existing SpoofGuard policies.

Example 9-27. Create SpoofGuard policy

Request:

```
POST https://<nsxmgr-ip>/api/4.0/services/spoofguard/policies/
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<spoofguardPolicy>
  <name>rest-spoofguard-policy-1</name>
  <description>Test description</description>
  <operationMode>TOFU</operationMode>
  <enforcementPoint>
    <id>dvportgroup-28</id>
    <name>network 1</name>
    <type>dvportgroup</type>
  </enforcementPoint>
  <enforcementPoint>
    <id>dvportgroup-12</id>
    <name>network 2</name>
    <type>dvportgroup</type>
  </enforcementPoint>
  <allowLocalIPs>true</allowLocalIPs>
</spoofguardPolicy>
```

Response Body:

```
HTTP/1.1 201 Created
Location: /api/4.0/services/spoofguard/policy/spoofguardpolicy-2
```

Modify SpoofGuard Policy

Updates a SpoofGuard policy.

Example 9-28. Create SpoofGuard policy

Request:

```
PUT https://<nsxmgr-ip>/api/4.0/services/spoofguard/policies/<policy-id>
```

Request Body:

```
<spoofguardPolicy>
 <policyId>spoofguardpolicy-2</policyId>
 <name>rest-spoofguard-policy-1</name>
 <description>Test description changed</description>
 <operationMode>TOFU</operationMode>
 <enforcementPoint>
  <id>dvportgroup-28</id>
```

```
   <name>network 1</name>
   <type>dvportgroup</type>
  </enforcementPoint>
  <enforcementPoint>
   <id>dvportgroup-12</id>
   <name>network 2</name>
   <type>dvportgroup</type>
  </enforcementPoint>
  <allowLocalIPs>true</allowLocalIPs>
</spoofguardPolicy>
```

Query SpoofGuard Policy

Retrieves a SpoofGuard policy.

Example 9-29. Query SpoofGuard policy

Request:

```
GET https://<nsxmgr-ip>/api/4.0/services/spoofguard/policies/<policy-id>
```

Request Body:

```
<spoofguardPolicy>
  <policyId>spoofguardpolicy-2</policyId>
  <name>rest-spoofguard-policy-1</name>
  <description>Test description changed</description>
  <operationMode>TOFU</operationMode>
 <enforcementPoint>
  <id>dvportgroup-28</id>
  <name>network 1</name>
  <type>dvportgroup</type>
 </enforcementPoint>
 <enforcementPoint>
  <id>dvportgroup-12</id>
  <name>network 2</name>
  <type>dvportgroup</type>
 </enforcementPoint>
 <publishedOn>2011-10-28 16:12:20.0</publishedOn>
 <publishedBy>system_user</publishedBy>
 <allowLocalIPs>true</allowLocalIPs>
 <publishedPending>false</publishedPending>
 <defaultPolicy>false</defaultPolicy>
 <publishPending>false</publishPending>
 <statistics>
  <inSync>true</inSync>
  <activeCount>0</activeCount>
  <inactiveCount>0</inactiveCount>
  <activeSinceLastPublishedCount>0</activeSinceLastPublishedCount>
  <requireReviewCount>0</requireReviewCount>
  <duplicateCount>0</duplicateCount>
  <unpublishedCount>0</unpublishedCount>
 </statistics>
</spoofguardPolicy>
```

Query all SpoofGuard Policies

Retrieves all SpoofGuard policies.

Example 9-30. Query SpoofGuard policies

Request:

```
GET https://<nsxmgr-ip>/api/4.0/services/spoofguard/policies/
```

Request Body:

```
<spoofguardPolicies>
  <spoofguardPolicy>
    <policyId>spoofguardpolicy-1</policyId>
    <name>system-spoofguard-policy-1</name>
    <description>Test description</description>
    <operationMode>TOFU</operationMode>
    <allowLocalIPs>true</allowLocalIPs>
    <defaultPolicy>true</defaultPolicy>
    <publishedOn>2011-10-28 16:12:20.0</publishedOn>
  </spoofguardPolicy>
  <spoofguardPolicy>
    <policyId>spoofguardpolicy-2</policyId>
    <name>rest-spoofguard-policy-1</name>
    <description>Test description changed</description>
    <operationMode>TOFU</operationMode>
    <enforcementPoint>
      <id>dvportgroup-28</id>
      <name>network 1</name>
      <type>dvportgroup</type>
    </enforcementPoint>
    <enforcementPoint>
      <id>dvportgroup-12</id>
      <name>network 2</name>
      <type>dvportgroup</type>
    </enforcementPoint>
    <publishedOn>2011-10-28 16:12:20.0</publishedOn>
    <publishedBy>system_user</publishedBy>
    <allowLocalIPs>true</allowLocalIPs>
    <publishedPending>false</publishedPending>
    <defaultPolicy>false</defaultPolicy>
  </spoofguardPolicy>
</spoofguardPolicies>
```

Delete SpoofGuard Policy

Deletes a SpoofGuard policy.

Example 9-31. Delete SpoofGuard policy

Request:

```
DELETE https://<nsxmgr-ip>/api/4.0/services/spoofguard/policies/<policy-id>
```

Getting Flow Statistic Details

You can retrieve a detailed view of the traffic on your virtual network that passed through Distributed Firewall.

Get Flow Statistics

You can retrieve flow statistics for a datacenter, port group, virtual machine, or vNIC.

Example 9-32. Retrieve flow statistics

Request:

```
GET https://<nsxmgr-ip>/api/2.1/app/flow/flowstats?contextId=datacenter-21&flowType=TCP_UDP
                    &startTime=0&endTime=1320917094000&startIndex=0&pageSize=2
```

Request Body:

```
<FlowStatsPage>
```

```
    <pagingInfo>
        <contextId>datacenter-2538</contextId>
        <flowType>TCP_UDP</flowType>
        <startTime>1327405883000</startTime>
        <endTime>1327482600000</endTime>
        <totalCount>817</totalCount>
        <startIndex>0</startIndex>
        <pageSize>2</pageSize>
    </pagingInfo>
    <flowStatsTcpUdp>
        <startTime>1327405883000</startTime>
        <endTime>1327446000000</endTime>
        <ruleId>1001</ruleId>
        <blocked>0</blocked>
        <protocol>5</protocol>
        <direction>1</direction>
        <sessions>1449</sessions>
        <sourcePackets>1449</sourcePackets>
        <destinationPackets>0</destinationPackets>
        <sourceBytes>227493</sourceBytes>
        <destinationBytes>0</destinationBytes>
        <networkId>network-2553</networkId>
        <sourceIp>10.112.199.174</sourceIp>
        <destinationIp>255.255.255.255</destinationIp>
        <destinationPort>17500</destinationPort>
        <controlProtocol></controlProtocol>
        <controlSourceIp>0.0.0.0</controlSourceIp>
        <controlDestinationIp>0.0.0.0</controlDestinationIp>
        <controlDestinationPort>0</controlDestinationPort>
        <controlDirection>0</controlDirection>
        </flowStatsTcpUdp>
    <flowStatsTcpUdp>
        <startTime>1327405883000</startTime>
        <endTime>1327446000000</endTime>
        <ruleId>1001</ruleId>
        <blocked>0</blocked>
        <protocol>5</protocol>
        <direction>1</direction>
        <sessions>69</sessions>
        <sourcePackets>69</sourcePackets>
        <destinationPackets>0</destinationPackets>
        <sourceBytes>17832</sourceBytes>
        <destinationBytes>0</destinationBytes>
        <networkId>network-2553</networkId>
        <sourceIp>10.112.199.13</sourceIp>
        <destinationIp>10.112.199.255</destinationIp>
        <destinationPort>138</destinationPort>
        <controlProtocol></controlProtocol>
        <controlSourceIp>0.0.0.0</controlSourceIp>
        <controlDestinationIp>0.0.0.0</controlDestinationIp>
        <controlDestinationPort>0</controlDestinationPort>
        <controlDirection>0</controlDirection>
    </flowStatsTcpUdp>
</FlowStatsPage>
```

Query parameters are described in the table below.

Table 9-2. Query parameters for retrieving flow statistics call

Parameter	Description
flowStats	Type of the flow to be retrieved. Possible values are TCP_UDP, LAYER2, and LAYER3
contextId	vc-moref-id of the datacenter, port group, virtual machine, or UUID of the vNIC for which traffic flow is to be retrieved.
startTime	Flows with start time greater than the specified time are to be retrieved.
endTime	Flows with start time lower than the specified time are to be retrieved.

Table 9-2. Query parameters for retrieving flow statistics call

Parameter	Description
startIndex	Optional parameter that specifies the starting point for retrieving the flows. If this parameter is not specified, flows are retrieved from the beginning.
pageSize	Optional parameter that limits the maximum number of entries returned by the API. The default value for this parameter is 256 and the valid range is 1-1024.

Table 9-3. Response values for retrieving flow statistics call

Value	Description
startTime	Start time for current flow.
endTime	End time for current flow.
ruleId	rule Id for current flow.
blocked	Indicates whether traffic is blocked – 0:Flow allowed, 1:Flow blocked, 2:Flow blocked by Spoofguard.
protocol	protocol in flow – 0:TCP, 1:UDP, 2:ICMP.
direction	Direction of flow – 0:To virtual machine, 1:From virtual machine.
sessions	Number of sessions in current flow.
sourcePackets	Count of Packets from Source to Destination in current flow.
destinationPackets	Count of Packets from Destination to Source in current flow.
sourceBytes	Count of Bytes transferred from Source to Destination in current flow.
destinationBytes	Count of Bytes transferred from Destination to Source in current flow.
sourceIp	Source IP of current flow.
destinationIp	Destination IP of current flow.
sourceMac	Source Mac of current flow.
destinationMac	Destination Mac of current flow.
subtype	Identifies the sub type of current flow.
destinationPort	Port number of Destination for TCP/UDP traffic.
controlProtocol	Control protocol for dynamic TCP traffic.
controlSourceIp	Control source IP for dynamic TCP traffic.
controlDestinationIp	Control destination IP for dynamic TCP traffic.
controlDestinationPort	Control destination port for dynamic TCP traffic.
controlDirection	Control direction for dynamic TCP traffic – 0: Source->Destination, 1:Destination->Source.

Get Flow Meta-Data

You can retrieve the following information for each flow type:

- minimum stats time
- maximum end time
- total flow count

Example 9-33. Get flow meta-data for flow type

Request:

```
GET https://<nsxmgr-ip>/api/2.1/app/flow/flowstats?contextId=datacenter-2538\&flowType=TCP_UDP\
                    &startTime=1327405883000\&endTime=1327482600000\&startIndex=0\&pageSize=2
```

Response Body:

```
<FlowStatsPage>
    <pagingInfo>
        <contextId>datacenter-2538</contextId>
        <flowType>TCP_UDP</flowType>
        <startTime>1327405883000</startTime>
        <endTime>1327482600000</endTime>
        <totalCount>817</totalCount>
        <startIndex>0</startIndex>
        <pageSize>2</pageSize>
    </pagingInfo>
    <flowStatsTcpUdp>
        <startTime>1327405883000</startTime>
        <endTime>1327446000000</endTime>
        <ruleId>1001</ruleId>
        <blocked>0</blocked>
        <protocol>5</protocol>
        <direction>1</direction>
        <sessions>1449</sessions>
        <sourcePackets>1449</sourcePackets>
        <destinationPackets>0</destinationPackets>
        <sourceBytes>227493</sourceBytes>
        <destinationBytes>0</destinationBytes>
        <networkId>network-2553</networkId>
        <sourceIp>10.112.199.174</sourceIp>
        <destinationIp>255.255.255.255</destinationIp>
        <destinationPort>17500</destinationPort>
        <controlProtocol></controlProtocol>
        <controlSourceIp>0.0.0.0</controlSourceIp>
        <controlDestinationIp>0.0.0.0</controlDestinationIp>
        <controlDestinationPort>0</controlDestinationPort>
        <controlDirection>0</controlDirection>
    </flowStatsTcpUdp>
    <flowStatsTcpUdp>
        <startTime>1327405883000</startTime>
        <endTime>1327446000000</endTime>
        <ruleId>1001</ruleId>
        <blocked>0</blocked>
        <protocol>5</protocol>
        <direction>1</direction>
        <sessions>69</sessions>
        <sourcePackets>69</sourcePackets>
        <destinationPackets>0</destinationPackets>
        <sourceBytes>17832</sourceBytes>
        <destinationBytes>0</destinationBytes>
        <networkId>network-2553</networkId>
        <sourceIp>10.112.199.13</sourceIp>
        <destinationIp>10.112.199.255</destinationIp>
        <destinationPort>138</destinationPort>
        <controlProtocol></controlProtocol>
        <controlSourceIp>0.0.0.0</controlSourceIp>
        <controlDestinationIp>0.0.0.0</controlDestinationIp>
        <controlDestinationPort>0</controlDestinationPort>
        <controlDirection>0</controlDirection>
    </flowStatsTcpUdp>
</FlowStatsPage>
```

Query Flow Summary

Retrieves flow summary for given context.

Example 9-34. Get flow summary

Request:

```
GET
        https://<nsxmgr-ip>/api/2.1/app/internal/flow/flowsummary?contextId=datacenter-2538&&startTime=1327405883000&endTime=1327482600000
```

where

- contextId: vc-moref-id of the datacenter, port group, virtual machine, or uuid in case vNIC for which the traffic flow is to be retrieved.
- startTime: Flows with start time greater than this will be fetched.
- endTime: Flows with end time lesser than this will be fetched.

Query Flow Table

Retrieves top rows for given context and table type.

Example 9-35. Get flow table

Request:

```
GET
        https://<nsxmgr-ip>/api/2.1/app/internal/flow/flowtable?contextId=datacenter-2538&&startTime=1327405883000&endTime=1327482600000&tableType=source
```

where

- contextId: vc-moref-id of the datacenter, port group, virtual machine, or uuid in case vNIC for which the traffic flow is to be retrieved.
- startTime: Flows with start time greater than this will be fetched.
- endTime: Flows with end time lesser than this will be fetched.
- tableType: This parameter indicates the type of the flow to be fetched. Possible values are: Source, Application, Destination.
- maxRows: (optional) Maximum number of rows to be returned (default value : 5).

Query Flow Details

Retrieves flow details for given context.

Example 9-36. Get flow details

Request:

```
GET
        https://<nsxmgr-ip>/api/2.1/app/internal/flow/flowdetaild?contextId=datacenter-2538&&&flowType=Allowed&startTime=0&endTime=1327482600000
```

where

- contextId: vc-moref-id of the datacenter, port group, virtual machine, or uuid in case vNIC for which the traffic flow is to be retrieved.
- flowType: This parameter indicates the type of the flow to be fetched. Possible values for flowType parameter are: Allowed or Blocked.
- startTime: Flows with start time greater than this will be fetched.
- endTime: Flows with end time lesser than this will be fetched.

Query Paged Flow Details

Retrieves a page of flow details for given context.

Example 9-37. Get flow details

Request:

```
GET https://<nsxmgr-ip>/api/2.1/app/internal/flow/pagedflowdetails?contextId=datacenter-2538&&&
                    flowType=Allowed&startTime=0&endTime=1327482600000
```

where

- contextId: vc-moref-id of the datacenter, port group, virtual machine, or uuid in case vNIC for which the traffic flow is to be retrieved.
- flowType: This parameter indicates the type of the flow to be fetched. Possible values for flowType parameter are: Allowed or Blocked.
- startTime: Flows with start time greater than this will be fetched.
- endTime: Flows with end time lesser than this will be fetched.
- startIndex: (optional) This is the start index of the flows to be returned (default value : 0).
- pageSize: (optional) This is the maximum number of flows to be returned in a single get call (default value is 256).

Query Flow Details Application

Retrieves flow details for given context by application. If available, the source and destination names are returned.

Example 9-38. Get flow details by application

Request:

```
GET
                    https://<nsxmgr-ip>/api/2.1/app/internal/flow/flowdetaild/application?contextId=datacenter-2538&&&flowType
                    =Allowed&startTime=0&endTime=1327482600000&serviceId=application-211
```

where

- contextId: vc-moref-id of the datacenter, port group, virtual machine, or uuid in case vNIC for which the traffic flow is to be retrieved.
- flowType: This parameter indicates the type of the flow to be fetched. Possible values for flowType parameter are: Allowed or Blocked.
- startTime: Flows with start time greater than this will be fetched.
- endTime: Flows with end time lesser than this will be fetched.
- serviceId: The service identifier of the application to be queried.

Query Paged Flow Details Application

Retrieves a page of flow details for given context by application. If available, the source and destination names are returned.

Example 9-39. Get paged flow details by application

Request:

GET https://<nsxmgr-ip>/api/2.1/app/internal/flow/pagedflowdetails/application?contextId=datacenter-2538&&&flowType=Allowed&startTime=0&endTime=1327482600000&serviceId=application-211

where

- contextId: vc-moref-id of the datacenter, port group, virtual machine, or uuid in case vNIC for which the traffic flow is to be retrieved.
- flowType: This parameter indicates the type of the flow to be fetched. Possible values for flowType parameter are: Allowed or Blocked.
- startTime: Flows with start time greater than this will be fetched.
- endTime: Flows with end time lesser than this will be fetched.
- serviceId: The service identifier of the application to be queried.
- startIndex: (optional) This is the start index of the flows to be returned (default value : 0).
- pageSize: (optional) This is the maximum number of flows to be returned in a single get call (default value is 256).

Flow Exclusion

Firewalling is done by a kernel module present on each host. This kernel module on each host generates flow records for network activity happening on protected on VMs. These flow records generated on each host are sent to NSX Manager, which consumes the records from all hosts and displays aggregated meaningful information. Due to the vast amount of flow records which can be generated on a host, capability has been provided to exclude generation of flow records by the kernel module as per criteria chosen by administrator. Following knobs are provided to control flow exclusion. All exclusion parameters are applied globally on all hosts.

- Disable Flows completely at a global level
- Ignore allowed flows
- Ignore blocked flows
- Ignore layer 2 flows
- Source IPs to ignore. Ex: 10.112.3.14, 10.112.3.15-10.112.3.18,192.168.1.1\24
- Source containers to ignore. Container can contain Vm, vNic, IP Set, MAC Set
- Destination IPs to ignore.
- Destination containers to ignore. Container can contain Vm, vNic, IP Set, MAC Set
- Destination ports
- Service containers to ignore. Container can contain Application or Application group

Flow exclusion happens at the source of generation of flow records i.e. host itself. The following flows are discarded by default:

- Broadcast IP (255.255.255.255)
- Local multicast group (224.0.0.0/24)
- Broadcast MAC address (FF:FF:FF:FF:FF:FF)

Exclude Flows

Excludes specified flows.

Example 9-40. Exclude flows

Request:

POST https://<nsxmgr-ip>/api/2.1/app/flow/config

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<FlowConfiguration>
  <collectFlows>true</collectFlows>
  <ignoreBlockedFlows>false</ignoreBlockedFlows>
  <ignoreLayer2Flows>false</ignoreLayer2Flows>
  <sourceIPs>10.112.3.14, 10.112.3.15-10.112.3.18,192.168.1.1\24</sourceIPs>
  <sourceContainer>
    <name>vm1 - Network adapter 1</name>
    <id>5013bcd8-c666-1e28-c7a9-600da945954f.000</id>
    <type>Vnic</type>
  </sourceContainer>
  <sourceContainer>
    <name>Large XP-1</name>
    <id>vm-126</id>
    <type>VirtualMachine</type>
  </sourceContainer>
  <destinationIPs>10.112.3.14, 10.112.3.15-10.112.3.18,192.168.1.1\24</destinationIPs>
  <destinationContainer>
    <name>vm2 - Network adapter 2</name>
    <id>5013bcd8-c666-1e28-c7a9-600da945954f.000</id>
    <type>Vnic</type>
  </destinationContainer>
  <destinationContainer>
    <name>Small XP-2</name>
    <id>vm-226</id>
    <type>VirtualMachine</type>
  </destinationContainer>
  <destinationPorts>22, 40-50, 60</destinationPorts>
  <service>
    <name>VMware-VDM2.x-Ephemeral</name>
    <id>application-161</id>
  </service>
</FlowConfiguration>
```

Query Excluded Flows

Retrieves excluded flow details.

Example 9-41. Get excluded flows

Request:

GET https://<nsxmgr-ip>/api/2.1/app/flow/config

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<FlowConfiguration>
<collectFlows>true</collectFlows>
<ignoreBlockedFlows>false</ignoreBlockedFlows>
<ignoreLayer2Flows>false</ignoreLayer2Flows>
<sourceIPs>10.112.3.14, 10.112.3.15-10.112.3.18,192.168.1.1\24</sourceIPs>
<sourceContainer><name>vm1 - Network adapter 1</name>
                    <id>5013bcd8-c666-1e28-c7a9-600da945954f.000</id><type>Vnic</type></sourceContainer>
<sourceContainer><name>Large XP-1</name><id>vm-126</id><type>VirtualMachine</type></sourceContainer>
<destinationIPs>10.112.3.14, 10.112.3.15-10.112.3.18,192.168.1.1\24</destinationIPs>
<destinationContainer><name>vm2 - Network adapter 2</name>
                    <id>5013bcd8-c666-1e28-c7a9-600da945954f.000</id><type>Vnic</type></destinationContainer>
<destinationContainer><name>Small XP-2</name><id>vm-226</id><type>VirtualMachine</type></destinationContainer>
```

```
<destinationPorts>22, 40-50, 60</destinationPorts>
<service><name>VMware-VDM2.x-Ephemeral</name><id>application-161</id></service>
</FlowConfiguration>
```

Excluding Virtual Machines from Firewall Protection

You can exclude a set of virtual machines from being protected. This exclusion list is applied across Firewall rules within the specified NSX Manager. If a virtual machine has multiple vNICs, all of them are excluded from protection.

Add a Virtual Machine to the Exclusion List

You can add a virtual machine to the exclusion list.

Example 9-42. Add a virtual machine to exclusion list

Example:

```
PUT https://<nsxmgr-ip>/api/2.1/app/excludelist/<memberId>
```

Where memberId is the vc-moref-id of a virtual machine.

Get Virtual Machine Exclusion List

You can retrieve the set of virtual machines in the exclusion list.

Example 9-43. Get exclusion list

Example:

```
GET https://<nsxmgr-ip>/api/2.1/app/excludelist/
```

Response Body:

```
<VshieldAppConfiguration>
    <excludeListConfiguration>
    <objectId>excludeList-1</objectId>
        <type>
            <typeName>ExcludeList</typeName>
        </type>
    <revision>1</revision>
    <objectTypeName>ExcludeList</objectTypeName>
        <excludeMember>
            <member>
            <objectId>vm-2371</objectId>
                <type>
                    <typeName>VirtualMachine</typeName>
                </type>
            <name>VC-Win2k3</name>
            <revision>2</revision>
            <objectTypeName>VirtualMachine</objectTypeName>
                <scope>
                    <id>domain-c731</id>
                    <objectTypeName>ClusterComputeResource</objectTypeName>
                    <name>Database-CL</name>
                </scope>
            </member>
        </excludeMember>
    </excludeListConfiguration>
</VshieldAppConfiguration>
```

Delete a Virtual Machine from Exclusion List

You can delete a virtual machines from the exclusion list.

Example 9-44. Delete virtual machine from exclusion list

Example:

```
DELETE https://<nsxmgr-ip>/api/2.1/app/excludelist/<memberID>
```

Where memberId is the vc-moref-id of a virtual machine.

Service Composer Management 10

Service Composer helps you provision and assign network and security services to applications in a virtual infrastructure. You map these services to a security group, and the services are applied to the virtual machines in the security group.

Security Group

You begin by creating a security group to define assets that you want to protect. Security groups may be static (including specific virtual machines) or dynamic where membership may be defined in one or more of the following ways:

- vCenter containers (clusters, port groups, or datacenters)
- Security tags, IPset, MACset, or even other security groups. For example, you may include a criteria to add all members tagged with the specified security tag (such as AntiVirus.virusFound) to the security group.
- Directory Groups (if NSX Manager is registered with Active Directory)
- Regular expressions such as virtual machines with name *VM1*

Note that security group membership changes constantly. For example, a virtual machine tagged with the AntiVirus.virusFound tag is moved into the Quarantine security group. When the virus is cleaned and this tag is removed from the virtual machine, it again moves out of the Quarantine security group.

Security Policy

A security policy is a collection of the following service configurations.

Table 10-1. Security services contained in a security policy

Service	Description	Applies to
Firewall rules	Rules that define the traffic to be allowed to, from, or within the security group.	vNIC
Endpoint service	Data Security or third party solution provider services such as anti-virus or vulnerability management services.	virtual machines
Network introspection services	Services that monitor your network such as IPS.	virtual machines

Mapping Security Policy to Security Group

You map a security policy (say SP1) to a security group (say SG1). The services configured for SP1 are applied to all virtual machines that are members of SG1.

If a virtual machine belongs to more than one security group, the services that are applied to the virtual machine depends on the precedence of the security policy mapped to the security groups.

authenticationService Composer profiles can be exported and imported as backups or for use in other environments. This approach to managing network and security services helps you with actionable and repeatable security policy management.

This chapter includes the following topics:

IMPORTANT All NSX vSphere REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authentication.

Working with Security Policies

A security policy is a set of Endpoint, firewall, and network introspection services that can be applied to a security group.

For information on creating a security group, see "Working with Security Groups" on page 53.

Creating a Security Policy

When creating a security policy, a parent security policy can be specified if required. The security policy inherits services from the parent security policy. Security group bindings and actions can also be specified while creating the policy. Note that execution order of actions in a category is implied by their order in the list. The response of the call has Location header populated with the URI using which the created object can be fetched.

Prerequisites

Ensure that:

- the required VMware built in services (such as Distributed Firewall, Data Security, and Endpoint) are installed. See *NSX Installation and Upgrade Guide*.
- the required partner services have been registered with NSX Manager.
- the required security groups have been created.

Example 10-1. Create security policy

Request:

```
POST https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy
```

Request Body:

```
<securityPolicy>
                    <name></name>
                    <description></description>
                    <precedence></precedence>
                    <parent>
                    <objectId></objectId>
                    </parent>
                    <securityGroupBinding>
                    <objectId></objectId>
                    </securityGroupBinding>
                    <securityGroupBinding>
                      ...
                    </securityGroupBinding>
```

```
  ...
  ...
<securityGroupBinding>
  ...
</securityGroupBinding>
<actionsByCategory>
<category>firewall</category>
<action class="firewallSecurityAction">
<name></name>
<description></description>
<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<secondarySecurityGroup>
<objectId></objectId>
</secondarySecurityGroup>
<secondarySecurityGroup>
  ...
</secondarySecurityGroup>
  ...
  ...
<secondarySecurityGroup>
  ...
</secondarySecurityGroup>
<applications>
<application>
<objectId></objectId>
</application>
<applicationGroup>
<objectId></objectId>
</applicationGroup>
...
...
</applications>
<logged></logged>
<action></action>
<direction></direction>
<outsideSecondaryContainer></outsideSecondaryContainer>
</action>
<action>
  ...
</action>
  ...
  ...
<action>
  ...
</action>
</actionsByCategory>
<actionsByCategory>
<category>endpoint</category>
<action class="endpointSecurityAction">
<name></name>
<description></description>
<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<serviceId></serviceId>
<vendorTemplateId></vendorTemplateId>
</action>
</actionsByCategory>
<actionsByCategory>
<category>traffic_steering</category>
<action class="trafficSteeringSecurityAction">
<name></name>
```

```
<description></description>
<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<logged></logged>
<redirect></redirect>
<serviceProfile>
<objectId></objectId>
</serviceProfile>
</action>
</actionsByCategory>
</securityPolicy>
```

Description of Tags

This section describes the tags specific to Service Composer management.

Common Tags

- executionOrderCategory - Category to which the action belongs to (endpoint, firewall or traffic_steering)
- actionType - Defines the type of action belonging to a given executionOrderCategory
- isEnabled - Indicates whether an action is enabled
- isActionEnforced - Enforces an action of a parent policy on its child policies for a given actionType and executionOrderCategory. Note that in a policy hierarchy, for a given actionType and executionOrderCategory, there can be only one action which can be marked as enforced.
- isActive - In a security policy hierarchy, an action within a policy may or may not be active based on the precedence of the policy or usage of isActionEnforced flag in that hierarchy
- securityPolicy - Parent policy in an action
- secondarySecurityGroup - Applicable for actions which need secondary security groups, say a source-destination firewall rule

Output only Tags

- executionOrder - Defines the sequence in which actions belonging to an executionOrderCategory are executed. Note that this is not an input parameter and its value is implied by the index in the list.

Firewall Category Tags

- applications - Applications / application groups on which the rules areto be applied
- logged - Flag to enable logging of the traffic that is hit by this rule
- action - Allow or block the traffic
- direction - Direction of traffic towards primary security group. Possible values: inbound, outbound, intra
- outsideSecondaryContainer - Flag to specify outside i.e. outside securitygroup-3

Endpoint Category Tags

- serviceId - ID of the service(as registered with the service insertion module). If this tag is null, the functionality type (as defined in actionType tag) is not applied which will also result in blocking the actions(of given functionality type) that are inherited from the parent seicrity policy. This is true if there is no action of enfore type.
- vendorTemplateId - ID of specific vendor configuration.
- invalidServiceId - Flag to indicate that the service that was referenced in this rule is deleted, which make the rule ineffective(or deviate from the original intent that existed while configuring the rule). You must either modify this rule by adding correct Service or delete this rule.

- invalidVendorTemplateId - Flag to indicate that the vendor template that was referenced in this rule is deleted, which make the rule ineffective(or deviate from the original intent that existed while configuring the rule). You must either fix this rule by adding correct Service or delete this rule.
- serviceName -Name of the service
- vendorTemplateName - Name of vendor template

TrafficSteering/NetX Category Tags

- redirect - Flag to indicate whether to redirect the traffic or not
- serviceProfile - Service profile for which redirection is being configured
- logged - Flag to enable logging of the traffic that is hit by this rule

Querying Security Policies

You can retrieve a specific security policy by specifying its ID or all security policies.

Example 10-2. Query security policies

Request:

GET https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy/*securitypolicyID* | all

Response Body:

```
<securityPolicy><securityPolicy>
                        <name></name>
                        <description></description>
                        <precedence></precedence>
                        <parent>
                         <objectId></objectId>
                        </parent>
                        <securityGroupBinding>
                        <objectId></objectId>
                        </securityGroupBinding>
                        <securityGroupBinding>
                          ...
                        </securityGroupBinding>
                          ...
                          ...
                        <securityGroupBinding>
                          ...
                        </securityGroupBinding>
                        <actionsByCategory>
                        <category>firewall</category>
                        <action class="firewallSecurityAction">
                        <name></name>
                        <description></description>

                        <category></category>
                        <actionType></actionType>
                        <isActionEnforced></isActionEnforced>
                        <isActive></isActive>
                        <isEnabled></isEnabled>
                        <secondarySecurityGroup>
                        <objectId></objectId>
                        </secondarySecurityGroup>
                        <secondarySecurityGroup>
                          ...
                        </secondarySecurityGroup>
                          ...
                          ...
                        <secondarySecurityGroup>
                          ...
                        </secondarySecurityGroup>
                        <applications>
```

```
<application>
<objectId></objectId>
</application>
<applicationGroup>
<objectId></objectId>
</applicationGroup>
...
...
</applications>
<logged></logged>
<action></action>
<direction></direction>
<outsideSecondaryContainer></outsideSecondaryContainer>
</action>
<action>
  ...
</action>
  ...
  ...
<action>
  ...
</action>
</actionsByCategory>
<actionsByCategory>
<category>endpoint</category>
<action class="endpointSecurityAction">
<name></name>
<description></description>

<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>

<serviceId></serviceId>
<vendorTemplateId></vendorTemplateId>
</action>
</actionsByCategory>
<actionsByCategory>
<category>traffic_steering</category>
<action class="trafficSteeringSecurityAction">
<name></name>
<description></description>

<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>

<logged></logged>
<redirect></redirect>
<serviceProfile>
<objectId></objectId>
</serviceProfile>
</action>
</actionsByCategory>
</securityPolicy>
<name></name>
<description></description>

<precedence></precedence>
<parent>
 <objectId></objectId>
</parent>
<securityGroupBinding>
<objectId></objectId>
```

```
</securityGroupBinding>
<securityGroupBinding>
  ...
</securityGroupBinding>
  ...
  ...
<securityGroupBinding>
  ...
</securityGroupBinding>
<actionsByCategory>
<category>firewall</category>
<action class="firewallSecurityAction">
<name></name>
<description></description>
<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<secondarySecurityGroup>
<objectId></objectId>
</secondarySecurityGroup>
<secondarySecurityGroup>
  ...
</secondarySecurityGroup>
  ...
  ...
<secondarySecurityGroup>
  ...
</secondarySecurityGroup>
<applications>
<application>
<objectId></objectId>
</application>
<applicationGroup>
<objectId></objectId>
</applicationGroup>
...
...
</applications>
<logged></logged>
<action></action>
<direction></direction>
<outsideSecondaryContainer></outsideSecondaryContainer>
</action>
<action>
  ...
</action>
  ...
  ...
<action>
  ...
</action>
</actionsByCategory>
<actionsByCategory>
<category>endpoint</category>
<action class="endpointSecurityAction">
<name></name>
<description></description>
<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<serviceId></serviceId>
<vendorTemplateId></vendorTemplateId>
</action>
</actionsByCategory>
```

```
<actionsByCategory>
<category>traffic_steering</category>
<action class="trafficSteeringSecurityAction">
<name></name>
<description></description>

<category></category>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>

<logged></logged>
<redirect></redirect>
<serviceProfile>
<objectId></objectId>
</serviceProfile>
</action>
</actionsByCategory>
</securityPolicy>
```

Edit a Security Policy

To update a security policy, you must first fetch it. For more information, see Querying Security Policies.

You then edit the received XML and pass it back as the input. The specified configuration replaces the current configuration.

Security group mappings provided in the PUT call replaces the security group mappings for the security policy. To remove all mappings, delete the *securityGroupBindings* parameter.

You can add or update actions for the security policy by editing the *actionsByCategory* parameter. To remove all actions (belonging to all categories), delete the *actionsByCategory* parameter. To remove actions belonging to a specific category, delete the block for that category.

Example 10-3. Edit a security policy

Request:

PUT https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy/*securitypolicyID*

Response Body:

See Example 10-2.

Delete a Security Policy

When you delete a security policy, its child security policies and all the actions in it are deleted as well.

Example 10-4. Delete a security policy

Request:

DELETE https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy/*securitypolicyID?*force=<true/false>

If you set the *force* parameter to true, the security policy is deleted even if it is being used somewhere.

Export a Security Policy Configuration

You can export a Service Composer configuration (along with the security groups to which the security policies are mapped) and save it to your desktop. The saved configuration can be used as a backup for situations where you may accidentally delete a policy configuration, or it can be exported for use in another NSX Manager environment.

Example 10-5. Export a security policy

Request for selective export:

GET https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy/hierarchy?policyIds=*comma_separated_securitypolicy_ids*&prefix=*optional_some_prefix_before_names*

Request for exporting all policies:

GET https://<nsxmgr-ip>/api/2.0/services/policy/hierarchy?prefix=*optional_some_prefix_before_names*

Response Body:

```
<securityPolicyHierarchy>
        <name></name>
        <description></description>
        <securityPolicy></securityPolicy>
        <securityPolicy></securityPolicy>
          ...
          ...
        <securityPolicy></securityPolicy>
        <securityGroup></securityGroup>
        <securityGroup></securityGroup>
          ...
          ...
        <securityGroup></securityGroup>
        </securityPolicyHierarchy>
```

If a prefix is specified, it is added before the names of the security policy, security action, and security group objects in the exported XML. The prefix can thus be used to indicate the remote source from where the hierarchy was exported.

Import a Security Policy Configuration

You can create multiple security policies and parent-child hierarchies using the data fetched through export. All objects including security policies, security groups and security actions are created on a global scope.

Example 10-6. Import a security policy

Request for selective export:

POST https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy/hierarchy?suffix=*optional_suffix_to_be_added_after_names*

Request Body:

See Example 10-5.

If a suffix is specified, it is added after the names of the security policy, security action, and security group objects in the exported XML. The suffix can thus be used to differentiate locally created objects from imported ones.

Location of the newly created security policy objects (multiple locations are separated by commas) is populated in the Location header of the response.

Query Security Actions for a Security Policy

You can retrieve all security actions applicable on a security policy. This list includes security actions from associated parent security policies, if any. Security actions per Execution Order Category are sorted based on the weight of security actions in descending order.

Example 10-7. Query security actions for a security policy

Request:

GET https://<nsxmgr-ip>/api/2.0/services/policy/securitypolicy/*securitypolicyId*/securityactions

Response Body:

```
<securityPolicies>
                    <securityPolicy></securityPolicy>
                    <securityPolicy></securityPolicy>
                    ...
                    ...
                    <securityPolicy></securityPolicy>
</securityPolicies>
```

Working with Security Actions

Query Virtual Machines for a Security Action

You can fetch all VirtualMachine objects on which security action of a given category and attribute has been applied.

Example 10-8. Query virtual machines for security action

Request:

GET
https://<nsxmgr-ip>/api/2.0/services/policy/securityaction/category/virtualmachines?attributeKey=*attribute_name*&attributeValue=*attribute_value*

Response Body:

```
<vmnodes>
    <vmnode>
        <vmId></vmId>
        <vmName></vmName>
    </vmnode>
    <vmnode>
        <vmId></vmId>
        <vmName></vmName>
    </vmnode>
        ...
        ...
    <vmnode>
        <vmId></vmId>
        <vmName></vmName>
    </vmnode>
</vmnodes>
```

Query Security Actions Applicable on a Security Group

You can fetch all security actions applicable on a security group for all ExecutionOrderCategories. The list is sorted based on the weight of security actions in descending order. The **isActive** tag indicates if a securityaction will be applied (by the enforcement engine) on the security group.

Example 10-9. Query security actions for security group

Request:

GET https://<nsxmgr-ip>/api/2.0/services/policy/securitygroup/*securitygroupID*/securityactions

Response Body:

```
<securityActionsByCategoryMap>
                        <actionsByCategory>
                        <category>firewall</category>
                        <action  class="firewallSecurityAction">
                        <objectId></objectId>
                        <objectTypeName></objectTypeName>
                        <vsmUuid></vsmUuid>
                        <revision></revision>
                        <type>
                        <typeName></typeName>
                        </type>
                        <name></name>
                        <description></description>
                        <category></category>
                        <executionOrder></executionOrder>
                        <actionType></actionType>
                        <isActionEnforced></isActionEnforced>
                        <isActive></isActive>
                        <isEnabled></isEnabled>
                        <secondarySecurityGroup>
                        <objectId></objectId>
                        <objectTypeName></objectTypeName>
                        <vsmUuid></vsmUuid>
                        <revision></revision>
                        <type>
                        <typeName></typeName>
                        </type>
                        <name></name>
                        <description></description>
                        <scope>
                        <id></id>
                        <objectTypeName></objectTypeName>
                        <name></name>
                        <description></description>
                        </scope>
                        <extendedAttributes></extendedAttributes>
                        </secondarySecurityGroup>
                        <secondarySecurityGroup>
                          ...
                        </secondarySecurityGroup>
                          ...
                          ...
                        <secondarySecurityGroup>
                          ...
                        </secondarySecurityGroup>
                        <securityPolicy>
                        <objectId></objectId>
                        <objectTypeName></objectTypeName>
                        <vsmUuid></vsmUuid>
                        <revision></revision>
                        <type>
                        <typeName></typeName>
                        </type>
                        <name></name>
                        <description></description>
                        <scope>
                        <id></id>
                        <objectTypeName></objectTypeName>
                        <name></name>
                        <description></description>
                        </scope>
```

```
</securityPolicy>
<invalidSecondaryContainers></invalidSecondaryContainers>
<applications>
<application>
<objectId></objectId>
<objectTypeName></objectTypeName>
<vsmUuid></vsmUuid>
<revision></revision>
<type>
<typeName></typeName>
</type>
<name></name>
<scope>
<id></id>
<objectTypeName></objectTypeName>
<name></name>
</scope>
<clientHandle></clientHandle>
<extendedAttributes/>
<inheritanceAllowed></inheritanceAllowed>
<element>
<applicationProtocol></applicationProtocol>
<value></value>
</element>
</application>
<application>
...
</application>
...
...
</applications>
<invalidApplications>false</invalidApplications>
<logged>false</logged>
<action>block</action>
<direction>inbound</direction>
<outsideSecondaryContainer>true</outsideSecondaryContainer>
</action>
<action>
</action>
  ...
  ...
<action>
  ...
</action>
</actionsByCategory>
<actionsByCategory>
<category>endpoint</category>
<action class="endpointSecurityAction">
<objectId></objectId>
<objectTypeName></objectTypeName>
<vsmUuid></vsmUuid>
<revision></revision>
<type>
<typeName></typeName>
</type>
<name></name>
<description></description>

<category></category>
<executionOrder></executionOrder>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<securityPolicy>
<objectId></objectId>
<objectTypeName></objectTypeName>
<vsmUuid></vsmUuid>
```

```
<revision></revision>
<type>
<typeName></typeName>
</type>
<name></name>
<description></description>
<scope>
<id></id>
<objectTypeName></objectTypeName>
<name></name>
<description></description>
</scope>
</securityPolicy>
      <serviceName></serviceName>
      <serviceId></serviceId>
      <vendorTemplateId></vendorTemplateId>
      <invalidServiceId></invalidServiceId>
      <vendorTemplateName></vendorTemplateName>
      <invalidVendorTemplateId></invalidVendorTemplateId>
</action>
<action>
</action>
  ...
  ...
<action>
  ...
</action>
</actionsByCategory>
<actionsByCategory>
<category>traffic_steering</category>
<action class="trafficSteeringSecurityAction">
<objectId></objectId>
<objectTypeName></objectTypeName>
<vsmUuid></vsmUuid>
<revision></revision>
<type>
<typeName></typeName>
</type>
<name></name>
<description></description>
<category></category>
<executionOrder></executionOrder>
<actionType></actionType>
<isActionEnforced></isActionEnforced>
<isActive></isActive>
<isEnabled></isEnabled>
<securityPolicy>
<objectId></objectId>
<objectTypeName></objectTypeName>
<vsmUuid></vsmUuid>
<revision></revision>
<type>
<typeName></typeName>
</type>
<name></name>
<description></description>
<scope>
<id></id>
<objectTypeName></objectTypeName>
<name></name>
<description></description>
</scope>
</securityPolicy>

<logged></logged>
<serviceProfile>
<objectId></objectId>
<objectTypeName></objectTypeName>
```

```
<vsmUuid></vsmUuid>
<revision></revision>
<type>
<typeName></typeName>
</type>
<name>P</name>
<clientHandle>
</clientHandle>
<extendedAttributes/>
<profileAttributes>
<id></id>
<revision></revision>
<attribute>
<id></id>
<revision></revision>
<key></key>
<name></name>
<value></value>
</attribute>
<attribute>
...
</attribute>
</profileAttributes>
<service>
<objectId></objectId>
<objectTypeName></objectTypeName>
<vsmUuid></vsmUuid>
<revision></revision>
<type>
<typeName></typeName>
</type>
<name></name>
<clientHandle></clientHandle>
<extendedAttributes/>
</service>
<category></category>
<vendorTemplate>
<id></id>
<revision></revision>
<name></name>
<idFromVendor></idFromVendor>
<vendorAttributes>
<id></id>
<revision></revision>
</vendorAttributes>
</vendorTemplate>
<status></status>
<vendorAttributes>
<id></id>
<revision></revision>
</vendorAttributes>
<runtime>
<nonCompliantDvpg/>
<nonCompliantVwire/>
</runtime>
<serviceProfileBinding>
<distributedVirtualPortGroups/>
<virtualWires/>
<excludedVnics/>
<virtualServers/>
</serviceProfileBinding>
</serviceProfile>
<redirect></redirect>
</action>
<action>
</action>
  ...
  ...
```

```
                <action>
                  ...
                </action>
                </actionsByCategory>
                </securityActionsByCategoryMap>
```

Query Security Action Applicable on A Virtual Machine

You can fetch the security actions applicable on a virtual machine for all ExecutionOrderCategories. The list of SecurityActions per ExecutionOrderCategory is sorted based on the weight of security actions in descending order. The **isActive** tag indicates whether a security action will be applied (by the enforcement engine) on the virtual machine.

Example 10-10. Query security actions on a virtual machine

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/policy/virtualmachine/VM_ID//securityactions
```

Response Body:

```
<securityPolicies>
                <securityPolicy></securityPolicy>
                <securityPolicy></securityPolicy>
                ...
                ...
                <securityPolicy></securityPolicy>
</securityPolicies>
```

Query Security Policies Mapped to a Security Group

You can retrieve the security policies mapped to a security group. The list is sorted based on the precedence of security policy precedence in descending order. The security policy with the highest precedence (highest numeric value) is the first entry (index = 0) in the list.

Example 10-11. Query security policies mapped to a security group

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/policy/securitygroup/securitygroupID/securitypolicies
```

Response Body:

```
<securityPolicies>
                <securityPolicy></securityPolicy>
                <securityPolicy></securityPolicy>
                ...
                ...
                <securityPolicy></securityPolicy>
</securityPolicies>
```

Query Service Provider Data

You can query the service provider of a given category to fetch an object containing provider specific data based on the requested property/value pairs.

Example 10-12. Query service provider data

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/policy/serviceprovider/category
```

Request Body:

```
<keyValues>
                    <keyValue>
                    <key></key>
                    <value></value>
                    </keyValue>
                    <keyValue>
                    ..
                    </keyValue>
                    ..
                    ..
                    <keyValue>
                    ..
                    </keyValue>
                    </keyValues>
```

Query Security Group Effective Membership

Retrieves effective membership of a security group in terms of virtual machines. The effective membership is calculated using all the three membership components of a security group - static include, static exclude, and dynamic using the following formula:

Effective membership virtual machines = [(VMs resulting from static include component + VMs resulting from dynamic component) - (VMs resulting from static exclude component)]

Example 10-13. Query virtual machines in a security group

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/{securityGroupId}/translation/virtualmachines
```

Query Security Groups to which a VM Belongs

Retrieves the collection of security groups to which a virtual machine is a direct or indirect member. Indirect membership involves nesting of security groups.

Example 10-14. Query security groups to which a virtual machine belongs

Request:

```
GET https://<nsxmgr-ip>/api/2.0/services/securitygroup/lookup/virtualmachine/<virtualMachineId>
```

11 Data Security Configuration

Data Security provides visibility into sensitive data stored within your organization's virtualized and cloud environments. Based on the violations reported by Data Security, you can ensure that sensitive data is adequately protected and assess compliance with regulations around the world.

This chapter includes the following topics:

To begin using Data Security, you create a policy that defines the regulations that apply to data security in your organization and specifies the areas of your environment and files to be scanned. When you start a Data Security scan, analyzes the data on the virtual machines in your vSphere inventory and reports the number of violations detected and the files that violated your policy.

After you analyze the results of the scan, you can edit your policy as required. When you edit a policy, you must enable it by publishing the changes.

Note that you cannot install Data Security using a REST API. For information on installing Data Security, see the *NSX Installation and Upgrade Guide*.

To deploy Data Security, you must install the latest version of VMware Tools on each virtual machine that you want to scan. This installs a Thin Agent, which allows the SVM to scan the virtual machines.

Data Security User Roles

A user's role determines the actions that the user can perform. A user can only have one role. You cannot add a role to a user, or remove an assigned role from a user, but you can change the assigned role for a user.

Table 11-1. Data Security User Roles

Role	Actions Allowed
Enterprise administrator	All operations and security.
vShield administrator	NSX operations only: for example, install virtual appliances, and configure port groups.
Security administrator	Create and publish policies, view violation reports. Cannot start or stop data security scans.
Auditor	View configured policies and violation reports. Read-only.

Defining a Data Security Policy

In order to detect sensitive data in your environment, you must create a data security policy. You must be a Security Administrator to create policies.

To define a policy, you must specify the following:

- Regulations

  A regulation is a data privacy law for protecting PCI (Payment Card Industry), PHI (Protected Health Information) and PII (Personally Identifiable Information) information. You can select the regulations that your company needs to comply to. When you run a scan, Data Security identifies data that violates the regulations in your policy, and is hence sensitive for your organization.

- Participating areas

  By default, your entire vCenter inventory is scanned. To scan a subset of your inventory, you can specify the security groups that you want to include or exclude.

- File filters

  You can create filters to limit the data being scanned and exclude the file types unlikely to contain sensitive data from the scan.

In the data security APIs, dlp in the pathname stands for data loss prevention (DLP).

Query Regulations

You can retrieve the list of available regulations for a policy. The output includes regulation IDs and the embedded classifications for each regulation.

Example 11-1. Get all SDD policy regulations

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/regulation
```

Response:

```
<set>
    <Regulation>
        <id>66</id>                                    Regulation ID
        <name>California AB-1298</name>
        <description>Identifies documents and transmissions that contain protected health information (ePHI) and personally
                        identifiable information (PII) as regulated by California AB-1298 (Civil Code 56, 1785 and 1798)...
    <classifications>
        <Classification>
        <id>10</id>
        <name>Credit Card Track Data</name>            Classification ID
        <providerName>Credit Card Track Data</providerName>
        <description>Credit Card Track Data</description>
        <customizable>false</customizable>
        </Classification>
        ...
```

Enable a Regulation

You can enable one or more regulations by putting the regulation IDs into the policy. You can get the appropriate regulation IDs from the output of the retrieve regulations API (see Example 11-1). In the example request body, regulation 66 is California AB-1298, and regulations 67 and 68 originate elsewhere.

Example 11-2. Enable a regulation

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/regulations
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<set>
      <long>66</long>
      <long>67</long>
      <long>68</long>
</set>
```

Query Classification Value

You can retrieve the classification values associated with regulations that monitor Group Insurance Numbers, Health Plan Beneficiary Numbers, Medical Record Numbers, or Patient Identification Numbers. The output includes the classification ID.

Example 11-3. Get all classification values associated with customizable classifications

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/classificationvalue
```

Configure a Customized Regex as a Classification Value

You can configure a ClassificationValue with a customized regex that must be matched during violation inspection. You must include the appropriate classification ID, which you can get from the output of the retrieve classification value API.

Example 11-4. Configure a customized regex as a classification value

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/classificationvalues

Authorization: Basic YWRtaW46ZGVmYXVsdA==
                                          ──► Classification ID
<set>
      <ClassificationValue>
            <id>3</id>
            <classification>
                  <id>15</id>
                  <name>Health Plan Beneficiary Numbers</name>
                  <providerName>Health Plan Beneficiary Numbers</providerName>
                  <description>Health Plan Beneficiary Numbers</description>
                  <customizable>true</customizable>
            </classification>
            <value>PATNUM-[0-9]{10}</value>
      </ClassificationValue>
</set>
                                    ──► Regex
```

View the List of Excludable Areas

You can retrieve the list of datacenters, clusters, and resource pools in your inventory to help you determine the areas you might want to exclude from policy inspection.

Example 11-5. View the list of excludable areas

Request:

GET https://<nsxmgr-ip>/api/2.0/dlp/excludableareas

Response:

```
<set>
    <EnhancedInfo>
        <objectId>datacenter-2</objectId>
        <name>jdoe</name>
        <revision>32</revision>
        <objectTypeName>Datacenter</objectTypeName>
        <ownerName>VMware</ownerName>
    </EnhancedInfo>
    <EnhancedInfo>
        <objectId>datacenter-94</objectId>
        <name>jdoe</name>
        <revision>32</revision>
        <objectTypeName>Datacenter</objectTypeName>
        <ownerName>VMware</ownerName>
    </EnhancedInfo>
    <EnhancedInfo>
        <objectId>resgroup-3725</objectId>
        <name>ResourcePool1</name>
        <revision>2</revision>
        <objectTypeName>ResourcePool</objectTypeName>
        <ownerName>jdoe</ownerName>
    </EnhancedInfo>
    <EnhancedInfo>
        <objectId>domain-c2720</objectId>
        <name>Cluster1</name>
        <revision>17</revision>
        <objectTypeName>ClusterComputeResource</objectTypeName>
        <ownerName>jdoe</ownerName>
    </EnhancedInfo>
    <EnhancedInfo>
        <objectId>resgroup-3726</objectId>
        <name>ResourcePool2</name>
        <revision>1</revision>
        <objectTypeName>ResourcePool</objectTypeName>
        <ownerName>jdoe</ownerName>
    </EnhancedInfo>
</set>
```

Exclude Areas from Policy Inspection

This API is deprecated as of 5.0.1. Instead, use the API for excluding security groups from a scan. For more information, see Example 11-8, “Exclude a security group from the scan,” on page 315.

You can exclude one or more datacenters, resource pools or clusters from policy inspection by including the object ID of each area to exclude. You can get the object ID from the output of the View the list of excludable areas API (see Example 11-5).

Example 11-6. Exclude areas from policy inspection

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/excludedareas

Authorization: Basic YWRtaW46ZGVmYXVsdA==

<set>
    <string>datacenter-3720</string>
</set>
```

Specify Security Groups to be Scanned

To scan a subset of your inventory, you can specify the security groups that you want to include or exclude in the data security scan.

Example 11-7. Include a security group in the scan

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/includedsecuritygroups/
```

Request Body:

```
<set>
    <string>securitygroup-id-1</string>
    <string>securitygroup-id-1</string>
</set>
```

Example 11-8. Exclude a security group from the scan

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/excludedsecuritygroups/
```

Request Body:

```
<set>
    <string>securitygroup-id-1</string>
    <string>securitygroup-id-1</string>
</set>
```

Query Security Groups Being Scanned

You can retrieve the security groups that have been included or excluded from data security scans.

Example 11-9. Get included security groups

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/policy/includedsecuritygroups
```

Response:

```
<set>
    <basicinfo>
        <objectId>securitygroup-1</objectId>
        <type>
            <typeName>SecurityGroup</typeName>
        </type>
            <name>included</name>
        <revision>2</revision>
        <objectTypeName>SecurityGroup</objectTypeName>
        <scope>
            <id>datacenter-2</id>
            <objectTypeName>Datacenter</objectTypeName>
            <name>jkiryakoza</name>
        </scope>
    </basicinfo>
</set>
```

Example 11-10. Get excluded security groups

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/policy/excludedsecuritygroups/
```

Response:

```
<set>
    <basicinfo>
        <objectId>securitygroup-1</objectId>
        <type>
            <typeName>SecurityGroup</typeName>
        </type>
            <name>included</name>
        <revision>2</revision>
        <objectTypeName>SecurityGroup</objectTypeName>
        <scope>
            <id>datacenter-2</id>
            <objectTypeName>Datacenter</objectTypeName>
            <name>jkiryakoza</name>
        </scope>
    </basicinfo>
</set>
```

Configure File Filters

You can restrict the files you want to scan based on size, last modified date, or file extensions.

The following file filters are available:

- sizeLessThanBytes – scan only files with a byte size less than the specified number.
- lastModifiedBefore – scan only files modified before the specified date. The date must be specified in GMT format (YYYY-MM-DD HH:MM:SS).
- lastModifiedAfter – scan only files modified after the specified date. The date must be specified in GMT format (YYYY-MM-DD HH:MM:SS).
- extensionsIncluded – Boolean value as in Table 11-1.

Table 11-2. Included extensions parameter

Value of the extensionsIncluded parameter	Result
true followed by the extensions parameter containing one or more extensions	Only files with the specified extensions are scanned
false followed by the extensions parameter containing one or more extensions	All files are scanned except those with the specified extensions.

The scanAllFiles parameter determines if all files should be inspected during a scan operation. This parameter overrides all other parameters, so set this parameter to false if you are configuring a filter.

Example 11-11. Scan only PDF and XLXS files modified after 10/19/2011

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/FileFilters
<FileFilters>
    <scanAllFiles>false</scanAllFiles>
    <lastModifiedAfter>2011-10-19 15:16:04.0 EST</lastModifiedAfter>
    <extensionsIncluded>true</extensionsIncluded>
    <extensions>pdf,xlsx</extensions>
</FileFilters>
```

Example 11-12. Scan all files except PDF and XLXS files

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/FileFilters
<FileFilters>
```

```
    <scanAllFiles>false</scanAllFiles>
    <extensionsIncluded>false</extensionsIncluded>
    <extensions>pdf,xlsx</extensions>
</FileFilters>
```

Example 11-13. Scan PDF and XLXS files that are less than 100 MB in size

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/FileFilters
<FileFilters>
    <scanAllFiles>false</scanAllFiles>
    <sizeLessThanBytes>100000000</sizeLessThanBytes>
    <extensionsIncluded>true</extensionsIncluded>
    <extensions>pdf,xlsx</extensions>
</FileFilters>
```

Saving and Publishing Policies

After you have defined a data security policy, you can edit it by changing the regulations selected, areas excluded from the scan, or the file filters. To apply the edited policy, you must publish it.

Query Saved Policy

As a best practice, you should retrieve and review the last saved policy before publishing it. Each policy contains a revision value that can be used to track version history.

Example 11-14. Get saved SDD policy

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/policy/saved
Authorization: Basic YWRtaW46ZGVmYXVsdA==
```

Response: the following response contains a policy with a single regulation, Indiana HB-1101.

```
<DlpPolicy>
    <objectId>DlpPolicy-1</objectId>
    <type>
        <typeName>DlpPolicy</typeName>
    </type>
    <name>DlpPolicy-One</name>
    <revision>6</revision>
    <objectTypeName>DlpPolicy</objectTypeName>
    <regulations>
        <Regulation>
            <id>37</id>
            <name>Indiana HB-1101</name>
            <description>Indiana HB-1101</description>
            <classifications>
                <Classification>
                    <id>16</id>
                    <name>US National Provider Identifier</name>
                    <providerName>US National Provider Identifier</providerName>
                    <description>US National Provider Identifier</description>
                    <customizable>false</customizable>
                </Classification>
            <classifications>
            <regions>
                <string>North America</string>
                <string>USA</string>
            </regions>
            <categories>
                <string>PHI</string>
                <string>PCI</string>
```

```
                        <string>PII</string>
                    </categories>
                </Regulation>
            </regulations>
            <regulationsChanged>false</regulationsChanged>
            <excludedAreas/>
            <excludedAreasChanged>false</excludedAreasChanged>
            <fileFilters>
                <scanAllFiles>false</scanAllFiles>
                <sizeLessThanBytes>0</sizeLessThanBytes>
                <extensionsIncluded>false</extensionsIncluded>
            </fileFilters>
            <fileFiltersChanged>false</fileFiltersChanged>
            <classificationValues>
                <ClassificationValue>
                    <id>1</id>
                    <classification>
                        <id>19</id>
                        <name>Patient Identification Numbers</name>
                        <providerName>Patient Identification Numbers</providerName>
                        <description>Patient Identification Numbers</description>
                        <customizable>true</customizable>
                    </classification>
                    <value>deg</value>
                </ClassificationValue>
            </classificationValues>
            <classificationValuesChanged>false</classificationValuesChanged>
            <lastUpdatedOn class="sql-timestamp">2012-01-04 21:25:08.0</lastUpdatedOn>
            <lastUpdatedBy>admin</lastUpdatedBy>
</DlpPolicy>
```

Query Published Policy

You can retrieve the currently published SDD policy that is active on all vShield Endpoint SVMs.

Example 11-15. Get published SDD policy

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/policy/published
Authorization: Basic YWRtaW46ZGVmYXVsdA==
```

Publish the Updated Policy

After updating a policy with added regulations, excluded areas, or customized regex values publish the policy to enforce the new parameters.

Example 11-16. Publish the updated policy

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/policy/publish
```

Data Security Scanning

Running a data security scan identifies data in your virtual environment that violates your policy.

All virtual machines in your datacenter are scanned once during a scan. If the policy is edited and published while a scan is running, the scan restarts. This rescan ensures that all virtual machines comply with the edited policy. A rescan is triggered by publishing an edited policy, not by data updates on your virtual machines. After you start a scan, it continues to run until you pause or stop it.

If new virtual machines are added to your inventory while a scan is in progress, those machines will also be scanned. If a virtual machine is moved to an excluded cluster or resource pool while the data security scan is in progress, the files on that virtual machine are not scanned. In case a virtual machine is moved via vMotion to another host, the scan continues on the second host (files that were scanned while the virtual machine was on the previous host are not scanned again).

Data Security scans one virtual machine on a host at a time to minimize impact on performance. VMware recommends that you pause the scan during normal business hours to avoid any performance overhead.

Start, Pause, Resume, or Stop a Scan Operation

You can start or stop a scan operation. The scan operation options are as follows:

- START: Start a new scan.
- PAUSE: Pause a started scan.
- RESUME: Resume a paused scan.
- STOP: Stop any scan.

Example 11-17. Start, pause, resume, or stop a scan operation

Request:

```
PUT https://<nsxmgr-ip>/api/2.0/dlp/scanop

<ScanOp>STOP</ScanOp>
```

Query Status for a Scan Operation

You can retrieve the status of the scan operation to determine if a scan is STARTED (that is, in progress), PAUSED, or STOPPED. The nextScanOps parameter indicates the scan operations possible from your current state. In the following example, the current scan state is Stopped and the only action you can perform is Start the scan.

Example 11-18. Get scan status

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/scanstatus
```

Response:

```
<DlpScanStatus>
    <currentScanState>STOPPED</currentScanState>
    <nextScanOps><ScanOp>START</ScanOp></nextScanOps>
    <vmsInProgress>0</vmsInProgress>
    <vmsCompleted>0</vmsCompleted>
</DlpScanStatus>
```

Querying Scan Results

You can retrieve detailed results of the current data security scan as well as summary results for the previous five scans.

Get List of Virtual Machines Being Scanned

You can retrieve information about the virtual machines being scanned by a scan.

Example 11-19. Get list of virtual machines being scanned

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/scan/current/vms/<id>
                    ?scanstatus=COMPLETED&pagesize=10&startindex=1
```

Response:

```
<?xml version="1.0" encoding="UTF-8"?>
<VmScanStatusDp>
    <dataPage>
        <pagingInfo>
            <pageSize>10</pageSize>
            <startIndex>1</startIndex>
            <totalCount>2</totalCount>
            <sortOrderAscending>false</sortOrderAscending>
        </pagingInfo>
        <VmScanStatus>
            <startTime>1320803585000</startTime>
            <endTime>1320803826000</endTime>
            <vmMoId>vm-25</vmMoId>
            <scanStatus>COMPLETED</scanStatus>
            <violationCount>8</violationCount>
            <vmName>jim-win2k8-32-mux</vmName>
            <dcName>jack</dcName>
         </VmScanStatus>
    </dataPage>
</VmScanStatusDp>
```

Where

- id is an optional parameter which limits the filter results by the VC MOID of a datacenter, cluster, or resource pool.
- scanstatus specifies the scan status of the virtual machines to be retrieved. Possible value s are all, notstarted, started, and completed. This limits the results to virtual machines that have the specified scan state.
- pagesize limits the maximum number of entries returned by the API. The default value for this parameter is256 and the valid range is 1-1024.
- startindex specifies the starting point for retrieving the logs. If this parameter is not specified, logs are retrieved from the beginning.

Get Number of Virtual Machines Being Scanned

You can retrieve the number of virtual machines being scanned.

Example 11-20. Get number of virtual machines being scanned

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/scan/current/vms/count/<id>?scanstatus=COMPLETED
```

Where

- scanstatus is an optional parameter that specifies the scan status of the virtual machines to be retrieved. Possible value s are all, notstarted, started, and completed. This limits the results to virtual machines that have the specified scan state.
- id is an optional parameter which limits the filter results by the VC MOID of a datacenter, cluster, or resource pool.

Get Summary Information about the Last Five Scans

You can retrieve the start and end time, total number of virtual machines scanned, and total number of violations for the last five completed data security scans.

Example 11-21. Get summary information about last five scans

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/completedscansummaries
```

Response:

```
<?xml version="1.0" encoding="UTF-8"?>
<list>
    <CompletedScanSummary>
        <globalScanId>5</globalScanId>
        <startTime class="sql-timestamp">2011-11-09 17:02:48.0</startTime>
        <endTime class="sql-timestamp">2011-11-09 17:02:55.0</endTime>
        <totalVmsScannedCount>0</totalVmsScannedCount>
        <totalViolationCount>0</totalViolationCount>
    </CompletedScanSummary>
</list>
```

Scan ID

Get Information for Virtual Machines Scanned During Previous Scan

You can retrieve the following information about the virtual machines scanned during the previous data security scan:

- ID
- Name
- Scan status
- Violation count

Example 11-22. Get Information for virtual machines scanned during last scan

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/scan/<scan_ID>/detailsascsv
```

Retrieve Information About Previous Scan Results

You can retrieve a detailed report about the results of the previous scan in a CSV format.

Example 11-23. Retrieves Information for virtual machines scanned during last scan

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/scan/<scan_ID>/violatingfilesascsv
```

Get XML Representation of Policy Used for Previous Scan

You can retrieve the XML representation of the policy used in the previous scan.

Example 11-24. Get XML representation of policy used in previous scan

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/scan/<scan_ID>/policyasxml
```

Response:

```
<DlpPolicy>
    <objectId>dlppolicy-2</objectId>
    <type>
        <typeName>DlpPolicy</typeName>
```

```
        </type>
        <name>Published Policy</name>
        <revision>2</revision>
        <objectTypeName>DlpPolicy</objectTypeName>
        <regulations/>
        <regulationsChanged>false</regulationsChanged>
        <excludedAreas/>
        <excludedAreasChanged>false</excludedAreasChanged>
        <excludedSecurityGroups>
            <basicinfo>
                <objectId>securitygroup-1</objectId>
                <type>
                    <typeName>SecurityGroup</typeName>
                </type>
                <name>included</name>
                <revision>2</revision>
                <objectTypeName>SecurityGroup</objectTypeName>
                <scope>
                    <id>datacenter-2</id>
                    <objectTypeName>Datacenter</objectTypeName>
                    <name>jkiryakoza</name>
                </scope>
            </basicinfo>
        </excludedSecurityGroups>
        <excludedSecurityGroupsChanged>false</excludedSecurityGroupsChanged>
        <includedSecurityGroups>
            <basicinfo>
                <objectId>securitygroup-1</objectId>
                <type reference="../../../excludedSecurityGroups/basicinfo/type"/>
                <name>included</name>
                <revision>2</revision>
                <objectTypeName>SecurityGroup</objectTypeName>
                <scope>
                    <id>datacenter-2</id>
                    <objectTypeName>Datacenter</objectTypeName>
                    <name>jkiryakoza</name>
                </scope>
            </basicinfo>
        </includedSecurityGroups>
        <includedSecurityGroupsChanged>false</includedSecurityGroupsChanged>
        <fileFilters>
            <scanAllFiles>false</scanAllFiles>
            <sizeLessThanBytes>0</sizeLessThanBytes>
            <extensionsIncluded>true</extensionsIncluded>
<extensions>doc,docm,docx,dot,dotx,dotm,wri,xla,xlam,xls,xlt,xltx,xltm,xlsx,xlsb,xlsm,ppt,pptx,pptm,pot,potx,potm,ppsx,ppsm,mdb,
                mpp,pdf,txt,log,csv,htm,html,xml,text,rtf,svg,ps,gs,vis,msg,rfc822,pm,swf,dgn,jpg,CATAnalysis,CATDrawing,C
                ATFCT,CATMaterial,CATPart,CATProcess,CATProduct,CATShape,CATSWL,CATSystem,3DXML,7z,cab,emx,
                gz,hqx,jar,lha,lzh,rar,tar,uue,z,zip,eml,mail,cal,cont,task,note,jrnl,pst</extensions>
        </fileFilters>
        <fileFiltersChanged>false</fileFiltersChanged>
        <classificationValues>
            <ClassificationValue>
                <id>33</id>
                <classification>
                    <id>90</id>
                    <name>Custom Accounts</name>
                    <providerName>Custom Accounts</providerName>
                    <description>Custom Accounts</description>
                    <customizable>true</customizable>
                </classification>
            </ClassificationValue>
        <ClassificationValue>
        ...
        <classificationValuesChanged>false</classificationValuesChanged>
        <lastUpdatedOn class="sql-timestamp">2011-11-09 16:59:01.0</lastUpdatedOn>
        <lastUpdatedBy>dlp</lastUpdatedBy>
```

```
</DlpPolicy>
```

Querying Violation Details

Once you start a data security scan, NSX reports the regulations that are being violated by the files in your inventory, and the violating files. If you fix a violating file (by deleting the sensitive information from the file, deleting or encrypting the file, or editing the policy), the file will continue to be displayed in the Violating files section until the current scan completes, and a new scan starts and completes.

You must be a Security Administrator or Auditor to view reports.

Get List of Violation Counts

You can view a report that displays the violated regulations with the number of violations for each regulation. The violating files report requires filtering by node ID.

Example 11-25. Get violation count for entire inventory

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/violations/
```

Example 11-26. Get violation count for specific resource

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/violations/<context_ID>
```

Response Body

```
<list>
    <Violations>
        <scope>
            <objectId>group-d1</objectId>
            <type>
                <typeName>Folder</typeName>
            </type>
            <name>Datacenters</name>
            <revision>1</revision>
            <objectTypeName>Folder</objectTypeName>
        </scope>
        <regulation>
            <id>100</id>
            <name>California AB-1298</name>
            <description>Identifies documents and transmissions that contain protected health information (ePHI) and personally
                identifiable information (PII) as regulated by California AB-1298 (Civil Code 56, 1785 and
                1798). California residents medical and health insurance information, when combined with
                personally identifiable information must be protected from unauthorized access, destruction, use,
                modification, or disclosure. Any business that operates in California and owns or licenses
                computerized ePHI and PII data for California residents, regardless of the physical location of
                the business, is required to comply with this law. This policy detects US Social Security
                Numbers, credit card numbers, California drivers license numbers, US National Provider
                Numbers, group insurance numbers, health plan beneficiary numbers, medical record numbers,
                patient identifiers, birth and death certificates and Healthcare Dictionaries.
            </description>
            <classifications>
                <Classification>
                    <id>76</id>
                    <name>Health Plan Beneficiary Numbers</name>
                    <providerName>Health Plan Beneficiary Numbers</providerName>
                    <description>Health Plan Beneficiary Numbers</description> <customizable>true</customizable>
                </Classification>
            ...
            <regions>
```

```
                    <string>NA</string>
                </regions>
                    <categories>
                    <string>PHI</string>
                    <string>PCI</string>
                    <string>PII</string>
                </categories>
            </regulation>
            <violationCount>1</violationCount>
        </Violations>
 <Violations>
</list>
```

Where context_ID is the MOID of a datacenter, cluster, folder, resource pool, or virtual machine.

Get List of Violating Files

You can view a report that displays the violating files and the regulations each file violated. This API requires filtering by context node ID, and returns a formatted XML report showing violating files.

Example 11-27. Get violating files for entire inventory

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/violatingfiles?pagesize=<i>&startindex=<j>
```

Where:

- pagesize is the number of results to view.
- startindex is the page number from which the results should be displayed.

Example 11-28. Get violating files for a resource

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/violatingfiles/<context_ID>?pagesize=<i>&startindex=<j>
```

Response Body:

```
<ViolatingFiles>
    <dataPage>
        <pagingInfo>
            <pageSize>10</pageSize>
            <startIndex>0</startIndex>
            <totalCount>1</totalCount>
            <sortOrderAscending>false</sortOrderAscending>
        </pagingInfo>
        <ViolatingFile>
            <identifier>59</identifier>
                <revision>0</revision>
                <fileName>C:\TruePositives\SocialSecurityNumbersTP1.05.txt</fileName>
                <fileExtension />
                <fileLastModifiedTime class="sql-timestamp">2011-02-01 15:02:00.0</fileLastModifiedTime>
                <vm>
                    <name>jim-xp32-dlp1</name>
                    <revision>0</revision>
                </vm>
                <cluster>
                    <name>JimCluster</name>
                    <revision>0</revision>
                </cluster>  \
                <dataCenter>
                    <name>jkiryakoza</name>
                    <revision>0</revision>
                </dataCenter>
```

```
                    <violations>
                    <ViolationInfo>
                        <identifier>99</identifier>
                        <revision>0</revision>
                        <regulation>
                            <objectId>152</objectId>
                            <name>California SB-1386</name>
                            <description>Identifies documents and transmissions that contain personally identifiable information
                                    (PII) as regulated by California SB-1386 (Civil Code 1798). Businesses that
                                    own or license computerized PII about California residents are required to
                                    maintain security procedures and practices to protect it from unauthorized
                                    access, destruction, use, modification, or disclosure. Any business that operates
                                    in California and owns or licenses computerized PII data for California
                                    residents, regardless of the physical location of the business, is required to
                                    comply with this law. This policy detects US Social Security numbers, credit
                                    card numbers and California drivers license numbers. This regulation has been
                                    amended to protect health and medical information that can be found in
                                    California AB-1298. </description>
                            <revision>0</revision>  </regulation>
                            <firstViolationReportedTime class="sql-timestamp">2012-01-26
                                    12:56:42.0</firstViolationReportedTime>
                            <lastViolationReportedTime class="sql-timestamp">2012-01-26
                                    12:56:42.0</lastViolationReportedTime>
                            <cumulativeViolationCount>1</cumulativeViolationCount>
                            <violationCount>0</violationCount>
                    </ViolationInfo>
                    </violations>
            </ViolatingFile>
        </dataPage>
</ViolatingFiles>
```

Where:

- context_ID is the MOID of a datacenter, cluster, folder, resource pool, or virtual machine..
- pagesize is the number of results to view.
- startindex is the page number from which the results should be displayed.

Get List of Violating Files in CSV Format

You can view a report that displays the violating files and the regulations each file violated in a CSV format.

Example 11-29. Get list of violating files in CSV format

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/violatingfilesascsv
```

Get Violations in Entire Inventory

You can view a report of the violated regulations and the violating files for the entire inventory in CSV (comma separated variable) format.

Example 11-30. Get list of violated regulations

Request:

```
GET https://<nsxmgr-ip>/api/2.0/dlp/violatingfilescsv/<context_ID>
```

Where context_ID is the MOID of a datacenter, cluster, folder, resource pool, or virtual machine.

12 Activity Monitoring

Activity Monitoring provides visibility into your virtual network to ensure that security policies at your organization are being enforced correctly.

A Security policy may mandate who is allowed access to what applications. The Cloud administrator can generate Activity Monitoring reports to see if the IP based firewall rule that they set is doing the intended work. By providing user and application level detail, Activity Monitoring translates high level security policies to low level IP address and network based implementation.

Once you enable data collection for Activity Monitoring, you can run reports to view inbound traffic (such as virtual machines being accessed by users) as well as outbound traffic (resource utilization, interaction between inventory containers, and AD groups that accessed a server).

The chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Data Collection

You must enable data collection for one or more virtual machines on a vCenter Server before running an Activity Monitoring report. Before running a report, ensure that the enabled virtual machines are active and are generating network traffic.

You should also register NSX Manager with the AD Domain Controller. See "Working with Domains" on page 338.

Note that only active connections are tracked by Activity Monitoring. Virtual machine traffic blocked by firewall rules at the vNIC level is not reflected in reports.

In case of an emergency such as a network overload, you can turn off data collection at a global level. This overrides all other data collection settings.

Some API calls may require the VMID, which is the MOID of the guest virtual machine. You can retrieve this by queying the vCenter mob structure (https:<vc-ip>/mob). The VMID is listed under host structure.

Enable Data Collection on a Single Virtual Machine

You must enable data collection at least five minutes before running an Activity Monitoring report.

Example 12-1. Enable data collection on a virtual machine

Request:

POST https://<nsxmgr_ip>/api/1.0/eventcontrol/vm/<vmID>/request

Request Body:

```
<perVmConfig>
  <actions>
    <action>
      <type>per_vm_config</type>
      <value>enabled</value>
    </action>
  </actions>
</perVmConfig>
```

Disable Data Collection on a Single Virtual Machine

Example 12-2. Disable data collection on a virtual machine

Request:

POST https://<nsxmgr_ip>/api/1.0/eventcontrol/vm/<vmID>/request

Request Body:

```
<perVmConfig>
  <actions>
    <action>
      <type>per_vm_config</type>
      <value>disabled</value>
    </action>
  </actions>
</perVmConfig>
```

Override Data Collection

In case of an emergency such as a network overload, you can turn off data collection at a global level (jill switch). This overrides all other data collection settings.

Turn On Kill Switch

Example 12-3. Turn on kill switch

Request:

POST https://<nsxmgr_ip>/api/1.0/eventcontrol/eventcontrol-root/request

Request Body:

```
<request>
  <actions>
    <action>
      <type>global_switch</type>
      <value>disabled</value>
    </action>
  </actions>
</request>
```

Turn Off Kill Switch

Example 12-4. Turn off kill switch

Request:

```
POST https://<nsxmgr_ip>/api/1.0/eventcontrol/eventcontrol-root/request
```

Request Body:

```
<request>
  <actions>
    <action>
      <type>global_switch</type>
      <value>enabled</value>
    </action>
  </actions>
</request>
```

Query Per Virtual Machine Data Collection

When reporting per virtual machine configuration, current kill switch status is also reported too. The effective configuration of a virtual machine is determined by both kill switch config and per virtual machine configuration. If kill switch is on, event collection is effectively disabled regardless of what its per virtual machine configuration is; if kill switch is off, per virtual machine configuration determines whether event collection should be performed for this virtual machine.

Example 12-5. Retrieve per virtual machine configuration when kill switch is on and when per virtual machine configuration is enabled for specified virtual machine

Request:

```
GET https://<nsxmgr_ip>/api/1.0/eventcontrol/eventcontrol/config/vm/<vm-id>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<perVmConfig>
  <actions>
    <action>
      <type>global_switch</type>
      <value>disabled</value>
    </action>
    <action>
      <type>per_vm_config</type>
      <value>enabled</value>
    </action>
  </actions>
</perVmConfig>
```

Example 12-6. Retrieve per virtual machine configuration when kill switch is off and when per virtual machine configuration is enabled for specified virtual machine

Request:

```
GET https://<nsxmgr_ip>/api/1.0/eventcontrol/eventcontrol/config/vm/<vm-id>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<perVmConfig>
  <actions>
    <action>
      <type>global_switch</type>
      <value>enabled</value>
```

```
    </action>
    <action>
      <type>per_vm_config</type>
      <value>enabled</value>
    </action>
  </actions>
</perVmConfig>
```

Query Resources

This method allow you to get the aggregated user activity (action records) for the given set of parameters. The same API is used for all reports.

Prerequisites

- vShield Endpoint must be installed in your environment. See *NSX Installation and Upgrade Guide*.
- NSX Manager must be registered with Active Directory.
- Data collection must be enabled on one or more virtual machines.

Table 12-1. Parameters for GET https://<nsxmgr-ip>/api/3.0/ai/records

Parameter Name	Description	Mandatory?	Valid Values	Default Value	Example
query	Name of report	Yes	resource,adg,containers, sam,vma	query=resource	None
interval	Relative time to current time	Yes	number followed by either of m,h,d, or s	interval=60m, interval=1h	60m
stime	Start time for query	No. Interval is used if stime and etime are not specified.	yyyy-mm-ddTh24:mi:ss	stime=2012-02-28T21:00 :00	None
etime	End time for query	No. Interval is used if stime and etime are not specified.	yyyy-mm-ddTh24:mi:ss	etime=2012-02-29T21:00 :00	None
param	Parameter to be applied to query	Depends on query	format, <param-name>:<param-type>:<comma-separated-values>:<operator>	param:src:SECURITY_ GROUP:1:INCLUDE	None
pagesize	Number of records to be retrieved	No	Any number (recommended is between 100-2000)	pagesize=1000	1024
startindex	Start record number (used for pagination)	No	number for the next page you want to retrieve	startindex=100	0

View Outbound Activity

You can view what applications are being run by a security group or desktop pool and then drill down into the report to find out which client applications are making outbound connections by a particular group of users. You can also discover all user groups and users who are accessing a particular application, which can help you determine if you need to adjust identity firewall in your environment.

Parameter Values

- query = resource
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>

- possible values for "resource" query type,
- <param-name>
  - src
  - dest
  - app
- required parameters = src, dest
- <param-type>
  - for src - SECURITY_GROUP, DIRECTORY_GROUP, DESKTOP_POOL
  - for dest - VIRTUAL_MACHINE
  - for app - SRC_APP
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE (default is INCLUDE)

Example 12-7. View user activities to VM id 1 originating from application id 1

Request:

GET https://<nsxmgr_ip>/api/3.0/ai/records?query=resource&interval=60m&param=src:DIRECTORY_GROUP&param=dest:VIRTUAL_MACHINE:1&param=app:SRC_APP:1

View Inbound Activity

You can view all inbound activity to a server by desktop pool, security group, or AD group.

Parameter Values

- query = sam
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src
  - dest
  - app
- required parameters = src, dest
- <param-type>
  - for src - SECURITY_GROUP, DIRECTORY_GROUP, DESKTOP_POOL
  - for dest - VIRTUAL_MACHINE
  - for app - DEST_APP
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE, NOT (default is INCLUDE)

Example 12-8. View user activities to VM id 1 originating from application id 1

Request:

```
GET https://<nsxmgr_ip>/api/3.0/ai/records?query=containers&interval=60m&
                    param=dest:SECURITY_GROUP:1:EXCLUDE&param=src:SECURITY_GROUP:1
```

View Interaction between Inventory Containers

You can view the traffic passing between defined containers such as AD groups, security groups and/or desktop pools. This can help you identify and configure access to shared services and to resolve misconfigured relationships between Inventory container definitions, desktop pools and AD groups.

Parameter Values

- query = containers
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src
  - dest
- required parameters = src, dest
- <param-type>
  - for src - SECURITY_GROUP, DIRECTORY_GROUP, DESKTOP_POOL
  - for dest - SECURITY_GROUP, DESKTOP_POOL
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE, NOT (default is INCLUDE)

Example 12-9. View interaction between inventory containers

Request:

```
GET https://<nsxmgr_ip>/api/3.0/ai/records?query=containers&interval=60m&
                    param=dest:SECURITY_GROUP:1:EXCLUDE&param=src:SECURITY_GROUP:1
```

View Outbound AD Group Activity

You can view the traffic between members of defined Active Directory groups and can use this data to fine tune your firewall rules.

Parameter Values

- query = adg
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src
  - adg
- required parameters = src
- <param-type>
  - src - SECURITY_GROUP, DESKTOP_POOL
  - adg- USER
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.

- <operator> - INCLUDE, EXCLUDE (default is INCLUDE)

Example 12-10. View interaction between inventory containers

Request:

```
GET https://<nsxmgr_ip>/api/3.0/ai/records?query=adg&interval=24h&
                    param=adg:USER:1:INCLUDE&param=src:SECURITY_GROUP:1:EXCLUDE
```

Query User Details

This method allows you to retrieve user detail records for the given set of parameters.

Table 12-2. Parameters for GET https://<nsxmgr-ip>/api/3.0/ai/userdetails

Parameter Name	Description	Mandatory?	Valid Values	Default Value	Example
query	Name of report	Yes	resource,adg,containers,sam,vma	query=resource	None
interval	Relative time to current time	Yes	number followed by either of m,h,d, or s	interval=60m, interval=1h	60m
stime	Start time for query	No. Interval is used if stime and etime are not specified.	yyyy-mm-ddTh24:mi:ss	stime=2012-02-28T21:00:00	None
etime	End time for query	No. Interval is used if stime and etime are not specified.	yyyy-mm-ddTh24:mi:ss	etime=2012-02-29T21:00:00	None
param	Parameter to be applied to query	Depends on query	format, <param-name>:<param-type>:<comma-separated-values>:<operator>	param:src:SECURITY_GROUP:1:INCLUDE	None
pagesize	Number of records to be retrieved	No	Any number (recommended is between 100-2000)	pagesize=1000	1024
startindex	Start record number (used for pagination)	No	number for the next page you want to retrieve	startindex=100	0

View Outbound Activity

You can view what applications are being run by a security group or desktop pool and then drill down into the report to find out which client applications are making outbound connections by a particular group of users. You can also discover all user groups and users who are accessing a particular application, which can help you determine if you need to adjust identity firewall in your environment.

Parameter Values

- query = resource
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- possible values for "resource" query type,
- <param-name>
  - src
  - dest

- required parameters = src, dest
- <param-type>
  - for src - SECURITY_GROUP, DIRECTORY_GROUP, DESKTOP_POOL
  - for dest - IP (this has to be a valid IP address in the dot notation, xx.xx.xx.xx)
  - for app - SRC_APP
- <operator> - INCLUDE, EXCLUDE (default is INCLUDE)

Example 12-11. View user activities to VM id1 originating from application id1

Request:

GET

https://<nsxmgr_ip>/api/3.0/ai/userdetails?query=resource&stime=2012-10-15T00:00:00&etime=2012-10-20T00:00:00&param=src:DIRECTORY_GROUP:2&param=app:SRC_APP:16&param=dest:IP:172.16.4.52

View Inbound Activity

You can view all inbound activity to a server by desktop pool, security group, or AD group.

Parameter Values

- query = sam
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src
  - dest
  - app
- required parameters = src, dest, app
- <param-type>
  - for src - SECURITY_GROUP, DIRECTORY_GROUP, DESKTOP_POOL
  - for dest - VIRTUAL_MACHINE
  - for app - DEST_APP
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE, NOT(default is INCLUDE)

Example 12-12. View user activities to VM id 1 originating from application id 1

Request:

GET

https://<nsxmgr_ip>/api/3.0//userdetails?query=sam&interval=60m&param=app:DEST_APP:1:EXCLUDE&param=dest:IP:1:EXCLUDE&param=src:SECURITY_GROUP:1:EXCLUDE

View Interaction between Inventory Containers

You can view the traffic passing between defined conatiners such as AD groups, security groups and/or desktop pools. This can help you identify and configure access to shared services and to resolve misconfigured relationships between Inventory container definitions, desktop pools and AD groups.

Parameter Values

- query = containers
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src
  - dest
- required parameters = src, dest
- <param-type>
  - for src - SECURITY_GROUP, DIRECTORY_GROUP, DESKTOP_POOL
  - for dest - SECURITY_GROUP, DESKTOP_POOL
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE, NOT (default is INCLUDE)

Example 12-13. View interaction between inventory containers

Request:

GET

https://<nsxmgr_ip>/api/3.0/ai/userdetails?query=containers&interval=60m&param=dest:SECURITY_GROUP:1:EXCLUDE&param=src:SECURITY_GROUP:1

View Outbound AD Group Activity

You can view the traffic between members of defined Active Directory groups and can use this data to fine tune your firewall rules.

Parameter Values

- query = adg
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src
  - adg
- required parameters = src
- <param-type>
  - src - SECURITY_GROUP, DESKTOP_POOL
  - adg- USER
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE (default is INCLUDE)

Example 12-14. View interaction between inventory containers

Request:

GET

https://<nsxmgr_ip>/api/3.0/ai/userdetails?query=adg&interval=24h&param=adg:USER:1:INCLUDE&param=src:SECURITY_GROUP:1:EXCLUDE

View Virtual Machine Activity Report

You can view traffic to or from a virtual machine or a set of virtual machines in your environment.

Parameter Values

- query = vma
- param = <param-name>:<param-type>:<comma-separated-values>:<operator>
- <param-name>
  - src (for outbound traffic)
  - dest(for inbound traffic)
  - app - SRC_APP, DEST_APP
- required parameters = none (if no parameter passed then this would show all SAM activities)
- <param-type>
  - src - SECURITY_GROUP, DESKTOP_POOL
  - dest - VIRTUAL_MACHINE,VM_UUID
  - adg- USER
- Parameter Values - comma-separated numbers (optional). If none specified then no filter is applied.
- <operator> - INCLUDE, EXCLUDE (default is INCLUDE)

Example 12-15. View inbound vm activities to a VM id1 for a specific service used (app=16)

Request:

```
GET
        https://<nsxmgr_ip>/api/3.0/ai/userdetails?query=vma&interval=60m&param=dest:VIRTUAL_MACHINE:1&p
        aram=app:DEST_APP:16
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<DataPage>
   <pagingInfo>
      <pageSize>1024</pageSize>
      <startIndex>0</startIndex>
      <totalCount>5</totalCount>
      <sortOrderAscending>false</sortOrderAscending>
   </pagingInfo>
   <aiActionRecord>
      <application>JABBER</application>
      <connectionCount>3</connectionCount>
      <destHost>PMI-BL-X61$</destHost>
      <destIP>172.16.4.21</destIP>
      <id>0</id>
      <srcContainer>HOKUIFLVPC</srcContainer>
   </aiActionRecord>
   <aiActionRecord>
      <application>SLP</application>
      <connectionCount>2</connectionCount>
      <destHost>ENGG-LAPTOP-002$</destHost>
      <destIP>172.16.4.48</destIP>
      <id>0</id>
      <srcContainer>HOKUIFLVPC</srcContainer>
   </aiActionRecord>
   <aiActionRecord>
      <application>KEYSERV</application>
      <connectionCount>1</connectionCount>
      <destHost>PMI00ELTON03$</destHost>
      <destIP>172.16.1.12</destIP>
```

```
      <id>0</id>
      <srcContainer>HOKUIFLVPC</srcContainer>
   </aiActionRecord>
   <aiActionRecord>
      <application>ACCOUNT_MGMT</application>
      <connectionCount>1</connectionCount>
      <destHost>PMIFEEXCH01$</destHost>
      <destIP>172.16.4.70</destIP>
      <id>0</id>
      <srcContainer>HOKUIFLVPC</srcContainer>
   </aiActionRecord>
   <aiActionRecord>
      <application>PNA</application>
      <connectionCount>3</connectionCount>
      <destHost>IDC-DEV-1$</destHost>
      <destIP>10.0.200.92</destIP>
      <id>0</id>
      <srcContainer>HOKUIFLVPC</srcContainer>
   </aiActionRecord>
</DataPage>
```

Query Discovered User Details

This method retrieves the list of all discovered users (both by agent introspection and LDAP Sync) and their detail.

Example 12-16. Retrieve user details

Retrieve user details for a specific user:

```
GET https://<nsxmgr_ip>/api/3.0/ai/user/<userID>
```

Retrieve app details:

```
GET https://<nsxmgr_ip>/api/3.0/ai/app
```

Retrieve application details for a specific application:

```
GET https://<nsxmgr_ip>/api/3.0/ai/app/<appID>
```

Retrieve list of all discovered hosts (both by agent introspection and LDAP Sync) and their detail:

```
GET https://<nsxmgr_ip>/api/3.0/ai/host
```

Retrieve host details:

```
GET https://<nsxmgr_ip>/api/3.0/ai/host/<hostID>
```

Retrieve list of all discovered desktop pools by agent introspection:

```
GET https://<nsxmgr_ip>/api/3.0/ai/desktoppool
```

Retrieve details specific desktop pool:

```
GET https://<nsxmgr_ip>/api/3.0/ai/desktoppool/<desktoppoolID>
```

Retrieve list of all discovered virtual machines:

```
GET https://<nsxmgr_ip>/api/3.0/ai/vm
```

Retrieve details about a specific virtual machine:

```
GET https://<nsxmgr_ip>/api/3.0/ai/vm/<vmID>
```

Retrieve list of all the discovered (and configured) LDAP directory groups:

```
GET https://<nsxmgr_ip>/api/3.0/ai/directorygroup
```

Retrieve details about a specific directory groups:

```
GET https://<nsxmgr_ip>/api/3.0/ai/directorygroup/<directorygroupID>
```

Retrieve list of AD groups a user belongs to:

```
GET https://<nsxmgr_ip>/api/3.0/ai/directorygroup/user/<userID>
```

Retrieve list of all the observed security groups. Observed entities are the ones that are reported by the agents. For ex, if a host activity is reported by an agent and if that host belongs to a security group then that security group would reported as observed in SAM database:

```
GET https://<nsxmgr_ip>/api/3.0/ai/securitygroup
```

Retrieve details about specific security group:

```
GET https://<nsxmgr_ip>/api/3.0/ai/securitygroup/<securitygroupID>
```

Working with Domains

After you create a domain, you can apply a security policy to it and run queries to view the applications and virtual machines being accessed by the users of a domain.

Register a Domain with NSX Manager

You can a register one or more Windows domains with an NSX Manager and associated vCenter server.

NSX Manager gets group and user information as well as the relationship between them from each domain that it is registered with. NSX Manager also retrieves Active Directory credentials.

You can apply security policies on an Active Directory domain and run queries to get information on virtual machines and applications accessed by users within an Active Directory domain.

Example 12-17. Register or update domain

Request:

```
POST https://<nsxmgr_ip>/api/3.0/directory/updateDomain
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<?xml version="1.0" encoding="UTF-8"?>
<DirectoryDomain>
   <name>vs4.net</name>
   <type>ActiveDirectory</type>
   <netbiosName>VS4</netbiosName>
   <username>Administrator</username>
   <password>xxx</password>
</DirectoryDomain>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<DirectoryDomain>
   <id>2</id>
   <name>vs4.net</name>
   <type>ActiveDirectory</type>
   <netbiosName>VS4</netbiosName>
   <username>Administrator</username>
   <baseDn>DC=vs4,DC=net</baseDn>
</DirectoryDomain>
```

Parameter Values for Register/Update Domain

Parameter Name	Description	Mandatory?
ID	Domain id. If you want to create a new domain, do not provide this value. Otherwise, system will find an existing domain object by this ID and update it.	`true` if update existing domain
name	Domain name. This should be domain's full qualified name. In case agent discovered, this will be NetBIOS name, so you need to update it to FQN in order to support LDAP sync and event log reader.	true if creating a new domain
description	Domain description	false
type	Domain type. Valid value include: AGENT_DISCOVERED, ActiveDirectory, SPECIAL Do NOT modify SPECIAL domain (we will put guard later). For LDAP sync and event log reader work, this need to be sent to ActiveDirectory.	true if creating a new domain
netbiosName	NetBIOS name of domain. This is Domain's NetBIOS name. Check windows domain setting, for value of it. Normally Agent report domain name is NetBIOS name. But confirm from Windows domain setting.	false
baseDn	Domain's Base DN (for LDAP sync). Base DN is REQUIRED for LDAP Sync. If you have a domain like: w2k3.vshield.vmware.com, the base DN is very likely to be: DC=w2k3,DC=vshield,DC=vmware,DC=com. Another example is: domain name is: vs4.net, the base DN should be: DC=vs4,DC=net. If you don't know what is this, use a LDAP client and connect to domain controller, that will give you domain's base DN.	false
rootDn	LDAP Sync root DN. Specify where should LDAP sync start from LDAP tree. This could be absolute path, for example: OU=Engineer,DC=vs4,DC=net, or relative path (relate to Base DN), for example: OU=Engineer. Don't use this column in most cases.	false
securityId	Domain's Security ID (SID). This should be filled by LDAP sync process, just don't use this column unless you know what you are doing.	false
username	Domain's User name (Used for LDAP Sync and/or Event Log reader)	false
password	User password	false
eventLogUsernam e	Domain's event log reader username (will use above username if this is NULL)	false
eventLogPassword	Domain's event log reader password	false

Query Domains

Retrieves all agent discovered (or configured) LDAP domains.

Example 12-18. Query domains

Request:

```
GET https://<nsxmgr_ip>/api/1.0/directory/listDomains
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<DirectoryDomains>
  <DirectoryDomain>
    <id>2</id>
    <name>vs4.net</name>
    <type>ActiveDirectory</type>
    <netbiosName>VS4</netbiosName>
    <username>Administrator</username>
    <baseDn>DC=vs4,DC=net</baseDn>
```

```
    </DirectoryDomain>
</DirectoryDomains>
```

Delete Domain

Deletes domain.

Example 12-19. Delete domain

Request:

```
DELETE https://<nsxmgr_ip>/api/1.0/directory/deleteDomain/<Domain Id>
```

Working with LDAP Servers

Example 12-20. Create LDAP server

Request:

```
POST https://<nsxmgr_ip>/api/1.0/directory/updateLdapServer
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<LDAPServer>
  <domainId>4</domainId>
  <hostName>10.142.72.70</hostName>
  <enabled>true</enabled>
</LDAPServer>
```

If the Response Body is not 200 for OK, log in to your NSX Manager and try to ping the hostname.

Example 12-21. LDAP server calls

Query LDAP servers for a domain:

```
GET https://<nsxmgr_ip>/api/1.0/directory/listLdapServersForDomain/<domain id>
```

Start LDAP full sync:

```
PUT https://<nsxmgr_ip>/api/1.0/directory/fullSync/<domain id>
```

Start LDAP delta sync:

```
PUT https://<nsxmgr_ip>/api/1.0/directory/deltaSync/<domain id>
```

Delete LDAP server:

```
DELETE https://<nsxmgr_ip>/api/1.0/directory/deleteLdapServer/<LdapServerID>
```

Working with EventLog Servers

Example 12-22. Create EventLog server

Request:

```
POST https://<nsxmgr_ip>/api/1.0/directory/updateEventLogServer
```

Request Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<EventlogServer>
  <id>1</id>
```

```
 <domainId>4</domainId>
 <hostName>10.142.72.70</hostName>
 <enabled>false</enabled>
</EventlogServer>
```

Example 12-23. EventLog server calls

Query EventLog servers for a domain:

```
GET https://<nsxmgr_ip>/api/1.0/directory/listEventLogServersForDomain/<EventLogServer id>
```

Delete EventLog server:

```
DELETE https://<nsxmgr_ip>/api/1.0/directory/deleteEventLogServer/<EventLogServerID>
```

Working with Mapping Lists

Example 12-24. Query mapping lists

Query user-to-ip mapping list from database:

```
GET https://<nsxmgr_ip>/api/1.0/identity/userIpMapping
```

Query host-to-ip mapping list from database:

```
GET https://<nsxmgr_ip>/api/1.0/identity/hostIpMapping
```

Query set of users associated with a given set of IP addresses during a specified time period. Since more than one user can be associated with a single IP address during the specified time period, each IP address can be associated with zero or more (i.e a SET of) users:

```
GET https://<nsxmgr_ip>/api/1.0/identity/ipToUserMapping
```

Query set of Windows Domain Groups (AD Groups) to which the specified user belongs:

```
GET https://<nsxmgr_ip>/api/1.0/identity/directoryGroupsForUser
```

Create static user IP mapping:

```
POST https://<nsxmgr_ip>/api/1.0/identity/staticUserMapping/<userID>/<IP>
```

Query static user IP mapping list:

```
GET https://<nsxmgr_ip>/api/1.0/identity/staticUserMappings
```

Query static user IP mapping for specified user:

```
GET https://<nsxmgr_ip>/api/1.0/identity/staticUserMappingsbyUser/<userID>
```

Query static user IP mapping for specified IP:

```
GET https://<nsxmgr_ip>/api/1.0/identity/staticUserMappingsbyIP/<userID>
```

Delete static user IP mapping for specified user:

```
DELETE https://<nsxmgr_ip>/api/1.0/identity/staticUserMappingsbyUser/<userID>
```

Delete static user IP mapping for specified IP:

```
DELETE https://<nsxmgr_ip>/api/1.0/identity/staticUserMappingsbyIP/<userID>
```

Working with Activity Monitoring Syslog Support

Example 12-25. Enable Activity Monitoring syslog support

Request:

```
POST https://<vsm_ip>/api/1.0/sam/syslog/enable
```

Example 12-26. Disable Activity Monitoring syslog support

Request:

```
POST https://<vsm_ip>/api/1.0/sam/syslog/disable
```

Task Framework Management 13

The NSX Manager requires communication with your vCenter Server and services such as DNS and NTP to provide details on your VMware Infrastructure inventory.

The chapter includes the following topics:

IMPORTANT All REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

About Task Framework

The task framework provides the abstraction needed to execute asynchronous tasks using a global thread pool.

A Job is identified by a Job ID. A job has a set of tasks within it. These tasks are executed either synchronously or in parallel based on their dependencies with other tasks in the Job. The Job is the primary interface to interact with the Task Framework to get the details of the job and the tasks within it. This could be the status of the job, the status of the tasks within it, etc.

When a Job is scheduled for execution, it is put into a queued state. This is true for a job that has to execute immediately or a job that is scheduled for later execution.

At the scheduled time when the task runs it is put into executing state. Once the task finishes its execution, it is considered as completed. The task framework then queries the task to check if the execution was successful or not. Based on this status, the task is marked as completed or failed. If the task is successful, the next task in the Job is executed. If the task fails, the appropriate fault policy action is taken.

The fault policy specifies the type of action to be taken as one of the following:

- Retry: Framework attempts to retry the task. Job data / data populated during the earlier run is supplied to the task before execution.
- Rollback: Framework rolls back the task.
- Rollback Retry: Framework rolls back the task and retries it.
- Abort: Framework aborts the task (and the Job).
- Ignore: Framework ignores the failure / timeout and proceeds with execution of subsequent tasks, if any, in the job.

Every task can define a timeout value which indicates the maximum esitmated time for the task to complete. Beyond this time, the task is considered to have timed out and an appropriate fault policy action is taken on the task. The task framework monitors the executing tasks at periodic intervals of time to check whether they have timed out. If the fault policy indicates that a retry has to be done in case of a time out, the task framework retries the task.

Query Job Instances for Job ID

Retrieves all job instances for the specified job ID. If a job is a one-time job, a single job instance is returned. If a job is a recurring job, all instances for the given job ID are returned.

Example 13-1. Query job instances

Request Body:

```
GET https://<nsxmgr-ip>/api/2.0/services/taskservice/job/<jobID>
```

Response Body:

```
<?xml version="1.0" encoding="UTF-8"?>
<jobInstances>
  <jobInstance>
    <id>jobinstance-1</id>
    <name>SVM Updater</name>
    <taskInstances>
      <taskInstance>
        <id>taskinstance-1</id>
        <name>SVM Updater</name>
        <startTimeMillis>1375867719752</startTimeMillis>
        <endTimeMillis>1375867720025</endTimeMillis>
        <taskStatus>COMPLETED</taskStatus>
        <timeoutRetryCount>0</timeoutRetryCount>
        <failureRetryCount>0</failureRetryCount>
        <taskOutput />
        <taskData />
      </taskInstance>
    </taskInstances>
    <startTimeMillis>1375867719663</startTimeMillis>
    <endTimeMillis>1375867720050</endTimeMillis>
    <status>COMPLETED</status>
    <timeoutRetryCount>0</timeoutRetryCount>
    <failureRetryCount>0</failureRetryCount>
    <job>
      <id>jobdata-1</id>
      <name>SVM Updater</name>
      <description>Updating all sdd SVMs at startup.</description>
      <creationTimeMillis>1375867718710</creationTimeMillis>
      <nextExecutionTimeMillis>0</nextExecutionTimeMillis>
      <taskList>
        <task>
          <id>task-1</id>
          <name>SVM Updater</name>
          <description>Updating all sdd SVMs at startup.
          </description>
          <failurePolicy>
            <faultAction>RETRY</faultAction>
            <retryLimit>30</retryLimit>
            <retryInterval>60000</retryInterval>
          </failurePolicy>
          <timeoutPolicy>
            <faultAction>IGNORE</faultAction>
            <retryLimit>0</retryLimit>
            <retryInterval>-1</retryInterval>
          </timeoutPolicy>
          <priority>5</priority>
          <timeoutMillis>-1</timeoutMillis>
          <visible>false</visible>
```

```
            <systemTask>true</systemTask>
            <taskClass>com.vmware.vshield.dlp.service.impl.DlpServiceImpl$1
            </taskClass>
            <creationTimeMillis>1375867718729
            </creationTimeMillis>
            <jobId>jobdata-1</jobId>
            <nextExecutionTime>0</nextExecutionTime>
          </task>
        </taskList>
        <jobOwner>Unknown</jobOwner>
        <scope>/globalroot-0</scope>
      </job>
      <jobOutput />
    </jobInstance>
</jobInstances>
```

Query Latest Job Instances for Job ID

In case of cron jobs or fixed-delay jobs, there can be multiple job instances for the same job depending upon the number of times the job was executed. This call fetches the latest job instance for a given job id.

Example 13-2. Query job instances

Request Body:

GET https://<nsxmgr-ip>/api/2.0/services/taskservice/job/<jobID>

Response Body:

See Example 13-1

Block REST Thread

This is a blocking call where a service has scheduled a job and a REST thread needs to be blocked till the job gets completed. If the job was already completed, then the job instance is returned immediately. If the job is still executing then the REST thread is blocked and returns after the job completes.

Example 13-3. Query job instances

Request Body:

GET https://<nsxmgr-ip>/api/2.0/services/taskservice/job/<jobID>

Response Body:

See Example 13-1.

Query Job Instances by Criterion

You can specify filtering criteria and paging information and query the task framework.

Example 13-4. Query job instances by criterion

Request Body:

GET https://<nsxmgr-ip>/api/2.0/services/taskservice/job/startIndex=<0>&pageSize=<10>&sortBy=startTime&sortOrderAscending=false|true

Response Body:

See Example 13-1.

Object IDs

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This section describes how to retrieve the IDs for the objects in your virtual inventory.

The chapter includes the following topics:

IMPORTANT All NSX REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Query Datacenter MOID

1. In a web browser, type the following:

   http://<vCenter-IP>/mob

2. Click content.
3. Click on the rootFolder value.
4. Click on the childEntity value.

   The datacenter MOID is displayed on top of the window.

Query Datacenter ID

1. In a web browser, type the following:

   http://<vCenter-IP>/mob

2. Click content.
3. Click on the rootFolder value.
4. Click on the childEntity value.

   The datacenter value is the datacenter ID.

Query Host ID

1. In a web browser, type the following:

   http://<vCenter-IP>/mob

2 Click content.

3 Click on the rootFolder value.

4 Click on the childEntity value.

1 Click on the datacenter value.

The host value is the host ID.

Query Portgroup ID

1 In a web browser, type the following:

http://<vCenter-IP>/mob

2 Click content.

3 Click on the rootFolder value.

4 Click on the childEntity value.

5 Click on the datacenter value.

6 Click on the host value.

The network property value is the portgroup ID.

Query VMID

In a web browser, type the following:

http://<vCenter-IP>/mob

The VMID is listed under host structure.

vShield Endpoint Management 15

These partner solutions that were developed with EPSec Partner Program 3.0 or earlier – (for vShield 5.5 or earlier). These partner solutions are also supported on NSX 6.0 and need the APIs listed below. These API should not be used with partner solutions developed specifically for NSX 6.0 or later, as these newer solutions automate the registration and deployment process by using the new features introduced in NSX.

A vShield Endpoint appliance delivers an introspection-based antivirus solution that uses the hypervisor to scan guest virtual machines from the outside with only a thin agent on each guest virtual machine.

This chapter includes the following topics:

IMPORTANT All vShield REST requests require authentication. See "Using the NSX REST API" on page 25 for details about basic authorization.

Overview of Solution Registration

To register a third-party solution with vShield Endpoint, clients can use four REST calls to do the following:

1 Register the vendor.

2 Register one or more solutions.

3 Set the solution IP address and port (for all hosts).

4 Activate registered solutions per host.

NOTE Steps 1 through 3 need to be performed once per solution, while step 4 needs to be performed for each host.

To unregister a solution, clients essentially perform these steps in reverse:

5 Deactivate solutions per host.

6 Unset a solution's IP address and port.

7 Unregister solutions.

8 Unregister the vendor.

To update registration information for a vendor or solution, clients must first unregister that entity and then reregister. The following sections detail the specific REST calls to perform registration and unregistration.

Registering a Solution with vShield Endpoint Service

The APIs described in this section register a vendor, solutions, set network address, and activate solutions.

For a list of return status codes, see "Return Status Codes" on page 354.

Register a Vendor

You can register the vendor of an antivirus solution.

Example 15-1. Register a vendor

Request:

```
POST https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration
```

Request Body:

```
<VendorInfo>
   <id>vendor_id</id>
   <title>vendor_title</title>
   <description>vendor_description</description>
</VendorInfo>
```

In the request body, vendor_id is the VMware-assigned ID for the vendor, while vendor_title and vendor_description are vendor provided strings.

Register a Solution

You can register an antivirus solution.

Example 15-2. Register a solution

Request:

```
POST https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>
```

Request Body:

```
<SolutionInfo>
   <altitude>solution_altitude</altitude>
   <title>solution_title</title>
   <description>solution_description</description>
</SolutionInfo>
```

In the request, <vendor_id> is the previously registered ID for the vendor.

In the request body, solution_altitude is the VMware-assigned altitude for the solution, solution_title and solution_description are vendor provided strings. See "Altitude of a Solution" on page 350.

Altitude of a Solution

Altitude is a number that VMware assigns to uniquely identify the solution. The altitude describes the type of solution and the order in which the solution receives events relative to other solutions on the same host.

IP Address and Port for a Solution

You can set a solution's IP address and port on the vNIC host.

Example 15-3. Set IP address and port

Request:

```
POST https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>/<altitude>/location
```

Request Body:

```
<LocationInfo>
   <ip>solution_ip_address</ip>
   <port>solution_port</port>
</LocationInfo>
```

In the request, <vendor_id> is the previously registered ID for the vendor, and <altitude> for the altitude.

In the request body, solution_ip_address is the solution's IPv4 address for the vNIC that is connected to the VMkernel port group (for example, 169.254.1.31). This address must be within the range of VMware-assigned IP addresses for the solution. The solution_port is the port on which the solution accepts connections.

If you want to change the location of a solution, deactivate all security virtual machines, change the location, and then reactivate all security virtual machines.

Activate a Solution

You can activate a solution that has been registered and located.

Example 15-4. Activate solution

Request:

```
POST https://<nsxmgr-ip>/api/2.0/endpointsecurity/activation/<vendor_id>/<altitude>
```

Request Body:

```
<ActivationInfo>
   <moid>svm_moid</moid>
</ActivationInfo>
```

In the request, <vendor_id> is the previously registered ID for the vendor, and <altitude> for the altitude.

In the request body, svm_moid is the managed object ID of the activated solution's virtual machine.

Querying Registration Status of vShield Endpoint

You can use the same URLs shown in the previous section with the GET method to retrieve vendor registration information, solution registration information, location information, and solution activation status.

Get Vendor Registration

You can retrieve vendor registration information.

Example 15-5. Get list of all registered vendors

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/vendors
```

Example 15-6. Get vendor registration information

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>
```

Get Solution Registration

You can retrieve solution registration information.

Example 15-7. Get all registered solutions for a vendor

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>/solutions
```

Example 15-8. Get solution registration information

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>/<altitude>
```

Get IP Address of a Solution

This call retrieves the IP address and port associated with a solution.

Example 15-9. Get IP address and port of a solution

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>/<altitude>/location
```

Get Activation Status of a Solution

This call retrieves solution activation status, given the managed object reference <moid> of its virtual machine.

Example 15-10. Get activation status of a solution

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/activation/<vendor_id>/<altitude>/<moid>
```

Status can be false (not activated) or true (activated).

Querying Activated Security Virtual Machines for a Solution

You can retrieve a list of activated security virtual machines for a solution, as well as the activation information for all activated security virtual machines on a host.

Query Activated Security Virtual Machines

You can retrieve a list of activated security virtual machines for the specified solution.

Example 15-11. Get activated security virtual machines

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/activation/<vendor_id>/<solution_id>
```

Response Body:

```
<ActivatedSVMs>
    <ActivationInfo>
        <moid>vm-819</moid>
        <hostMoid>host-9</hostMoid>
        <vmName>VMWARE-Data Security-10.24.130.174</vmName>
        <hostName>10.24.130.174</hostName>
        <clusterName>Dev</clusterName>
        <dcName>dev</dcName>
        <vendorId>VMWARE</vendorId>
```

```
            <solutionId>6341068275337723904</solutionId>
        </ActivationInfo>
        ...
</ActivatedSVMs>
```

In the request, vendor_id is the VMware-assigned ID for the vendor, while solution_id is the solution ID.

Query Activation Information

You can retrieve activation information for all activated security virtual machines on the specified host.

Example 15-12. Get activation information

Request:

```
GET https://<nsxmgr-ip>/api/2.0/endpointsecurity/activation?hostId=<hostID>
```

Response Body:

```
<ActivatedSVMs>
    <ActivationInfo>
        <moid>vm-819</moid>
        <hostMoid>host-9</hostMoid>
        <vmName>VMWARE-Data Security-10.24.130.174</vmName>
        <hostName>10.24.130.174</hostName>
        <clusterName>Dev</clusterName>
        <dcName>dev</dcName>
        <vendorId>VMWARE</vendorId>
        <solutionId>6341068275337723904</solutionId>
    </ActivationInfo>
    ...
</ActivatedSVMs>
```

Unregistering a Solution with vShield Endpoint

You can use the same URIs shown in the first section with the DELETE method to unregister a vendor, unregister a solution, unset location information, or deactivate a solution.

Unregister a Vendor

This call unregisters a vendor.

Example 15-13. Unregister a vendor

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>
```

Unregister a Solution

This call unregisters a solution.

Example 15-14. Unregister a vendor

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>/<altitude>
```

Unset IP Address

This call unsets a solution's IP address and port.

Example 15-15. Unset IP address and port

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/endpointsecurity/registration/<vendor_id>/<altitude>/location
```

Deactivate a Solution

This call deactivates a solution on a host.

Example 15-16. Deactivate a solution

Request:

```
DELETE https://<nsxmgr-ip>/api/2.0/endpointsecurity/activation/<vendor_id>/<altitude>/<moid>
```

Status Codes and Error Schema

This section lists various status codes returned from the REST API, and shows the error schema.

Return Status Codes

The 200 codes indicate success, the 400 codes indicate some failure, and the 600 codes are call specific.

- 200 OK operation successful
- 201 Created: Entity successfully altered.
- 400 Bad Request: Internal error codes. Please refer to the Error Schema for more details.
- 401 Unauthorized: Incorrect user name or password.
- 600 Unrecognized vendor ID.
- 601 Vendor is already registered.
- 602 Unrecognized altitude.
- 603 Solution is already registered.
- 604 Invalid IPv4 address.
- 605 Invalid port.
- 606 Port out of range.
- 607 Unrecognized moid.
- 608 Location information is already set.
- 609 Location not set.
- 612 Solutions still registered.
- 613 Solution location information still set.
- 614 Solution still activated.
- 615 Solution not activated.
- 616 Solution is already activated.
- 617 IP:Port already in use.
- 618 Bad solution ID.
- 619 vShield Endpoint is not licensed.
- 620 Internal error.

Error Schema

Here is the XML schema for vShield Endpoint registration errors.

```
<?xml version="1.0" encoding="UTF-8"?><xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
                        elementFormDefault="qualified">
<xs:element name="Error">
   <xs:complexType>
    <xs:sequence>
      <xs:element name="code" type="xs:unsignedInt"/>
      <xs:element name="description" type="xs:string"/>
    </xs:sequence>
   </xs:complexType>
 </xs:element>
```

Appendix B

16 Deprecated APIs

The following APIs have been deprecated in the NSX 6.0 release.

Table 16-1. Deprecated APIs

Deprecated API	Alternate API(s)
Local user management	
/api/2.0/global/heartbeat	/api/1.0/appliance-management/global/info
/api/2.0/global/config	/api/2.0/services/vcconfig /api/2.0/services/ssoconfig /api/1.0/appliance-management/system/network/dns /api/1.0/appliance-management/system/timesettings
/api/2.0/global/vcInfo	/api/2.0/services/vcconfig
/api/2.0/global/techsupportlogs	/api/1.0/appliance-management/techsupportlogs/NSX
/api/2.0/vdn/map/cluster/*clusterID*	
/api/2.0/services/usermgmt/securityprofile	

Appendix A: Schemas

The REST API configuration of the vShield Edge and vShield App virtual machines supports schemas for installation and service management.

This appendix covers the following topics:

Firewall Schemas

Firewall Configuration Schema

```
<xs:element name="firewallConfiguration" type="FirewallConfigurationDto">
</xs:element>

<xs:complexType name="FirewallConfigurationDto">
    <xs:sequence>
        <xs:element name="layer3Sections" type="FirewallLayer3SectionsDto"
            maxOccurs="1" minOccurs="1" />
        <xs:element name="layer2Sections" type="FirewallLayer2SectionsDto"
            maxOccurs="1" minOccurs="1" />
    </xs:sequence>
    <xs:attribute name="contextId" type="xs:string" use="required" />
    <xs:attribute name="timestamp" type="xs:long" use="optional" />
    <xs:attribute name="generationNumber" type="xs:long" use="optional" />
</xs:complexType>
```

Firewall Section Schema

```
<xs:complexType name="FirewallLayer3SectionsDto">
    <xs:sequence>
        <xs:element name="section" type="FirewallSectionDto"
            maxOccurs="unbounded" minOccurs="1">
        </xs:element>
    </xs:sequence>
</xs:complexType>

<xs:complexType name="FirewallLayer2SectionsDto">
    <xs:sequence>
        <xs:element name="section" type="FirewallSectionDto"
            maxOccurs="unbounded" minOccurs="1">
        </xs:element>
    </xs:sequence>
</xs:complexType>

<xs:complexType name="FirewallSectionDto">
    <xs:sequence>
        <xs:element name="rule" type="FirewallRuleDto" maxOccurs="unbounded"
            minOccurs="0" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:long" use="optional" />
    <xs:attribute name="name" type="xs:string" use="required" />
    <xs:attribute name="timestamp" type="xs:long" use="optional" />
    <xs:attribute name="generationNumber" type="xs:string"
        use="optional" />
</xs:complexType>
```

Firewall Sections Schema

```
<xs:complexType name="FirewallRuleDto">
    <xs:sequence>
        <xs:element name="appliedToList" type="AppliedToListDto" />
        <xs:element name="sources" type="FirewallSourcesDto" />
        <xs:element name="destination" type="FirewallDestinationsDto" />
        <xs:element name="services" type="FirewallServicesDto" />
        <xs:element name="action" type="xs:string" />
        <xs:element name="logged" type="xs:boolean" />
        <xs:element name="notes" type="xs:string" minOccurs="0" />
    </xs:sequence>
    <xs:attribute name="id" type="xs:long" use="optional" />
    <xs:attribute name="disabled" type="xs:boolean" use="optional" />
    <xs:attribute name="precedence" type="xs:string" use="optional" />
</xs:complexType>
```

Deprecated: vShield Manager Global Configuration Schema

The following schema shows vShield Manager REST configuration.

This replaces the 1.0 API schema items for vCenter synchronization, DNS service, virtual machine information, and security groups.

```
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"
    targetNamespace="vmware.vshield.edge.2.0"
    xmlns:vse="vmware.vshield.edge.2.0"
    elementFormDefault="qualified">

    <xs:element name="nsxmgrGlobalConfig">
        <xs:complexType>
            <xs:sequence>
                <xs:element minOccurs="0" name="vshieldEdgeReleaseInfo" type="vse:ReleaseInfoType"/>  <!-- In response
                    from server -->
                <xs:element minOccurs="0" name="vcInfo" type="vse:VcInfoType" />
                <xs:element minOccurs="0" name="hostInfo" type="vse:HostInfoType" />
                <xs:element minOccurs="0" name="techSupportLogsTarFilePath" type="xs:string"/>
                <xs:element minOccurs="0"  name="auditLogs" type="vse:AuditLogsType" />
                <xs:element minOccurs="0"  name="dnsInfo" type="vse:DnsInfoType" />
                <xs:element minOccurs="0"  name="versionInfo" type="xs:string" />    <!-- only in response -->
                <xs:element minOccurs="0"  name="vpnLicensed" type="xs:boolean" />   <!-- only in response -->
                <xs:element minOccurs="0"  name="ipsecVpnTunnels" type="vse:IpsecVpnTunnels" />   <!-- only in response -->
                <xs:element minOccurs="0" maxOccurs="1" name="nsxmgrCapability" type="vse:nsxmgrCapabilityType"/>
                <!-- only in response -->
                <xs:element minOccurs="0" maxOccurs="1" name="timeInfo" type="vse:TimeInfoType"/>

            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <xs:complexType name="ReleaseInfoType">                 <!-- can be re-used for release information of vshield, vShield
                Manager, or vShield Edge-->
        <xs:sequence>
            <xs:element name="buildNumber" type="xs:NMTOKEN" />  <!-- add fields as required -->
```

```
                <xs:element minOccurs ="0" name="vseLocationOnnsxmgr" type="xs:string" />
            </xs:sequence>
        </xs:complexType>

        <xs:complexType name="SSOInfoType">
         <xs:sequence>
            <xs:element minOccurs="0" name="nsxmgrSolutionName">
            <xs:simpleType>
               <xs:restriction base="xs:string">
                  <xs:minLength value="1"/>
               </xs:restriction>
            </xs:simpleType>
         </xs:element>
            <xs:element name="lookupServiceUrl">
            <xs:simpleType>
               <xs:restriction base="xs:string">
                  <xs:minLength value="1"/>
               </xs:restriction>
            </xs:simpleType>
         </xs:element>
         <xs:element name="ssoAdminUserName">
            <xs:simpleType>
               <xs:restriction base="xs:string">
                  <xs:minLength value="1"/>
               </xs:restriction>
            </xs:simpleType>
         </xs:element>
         <xs:element name="ssoAdminPassword">
            <xs:simpleType>
               <xs:restriction base="xs:string">
                  <xs:minLength value="1"/>
               </xs:restriction>
            </xs:simpleType>
         </xs:element>
         <xs:element minOccurs="0" name="certificateThumbprint">
            <xs:simpleType>
               <xs:restriction base="xs:string">
                  <xs:pattern
                        value="[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0
                        -9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-
                        9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}"></xs:patt
                        ern>
               </xs:restriction>
            </xs:simpleType>
         </xs:element>
      </xs:sequence>
   </xs:complexType>

      <xs:complexType name="VcInfoType">
            <xs:sequence>
                  <xs:element name="ipAddress">
                  <xs:simpleType>
                        <xs:restriction base="xs:string">
                              <xs:minLength value="1"/>
                        </xs:restriction>
                  </xs:simpleType>
               </xs:element>
               <xs:element name="userName">
                  <xs:simpleType>
                        <xs:restriction base="xs:string">
                              <xs:minLength value="1"/>
                        </xs:restriction>
                  </xs:simpleType>
               </xs:element>
               <xs:element name="password">
                  <xs:simpleType>
                        <xs:restriction base="xs:string">
                              <xs:minLength value="1"/>
```

```
                                    </xs:restriction>
                                </xs:simpleType>
                            </xs:element>
                                    <xs:element minOccurs="0" name="token">
                        <xs:simpleType>
                            <xs:restriction base="xs:string">
                                <xs:minLength value="1"/>
                            </xs:restriction>
                        </xs:simpleType>
                            </xs:element>
                        <xs:element minOccurs="0" name="certificateThumbprint">
                        <xs:simpleType>
                            <xs:restriction base="xs:string">
<xs:pattern value="[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{
                        2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0
                        -9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}:[a-fA-F0-9]{2}"></xs:pattern>
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                        <xs:element minOccurs="0" name="pluginDownloadServer">
                        <xs:simpleType>
                            <xs:restriction base="xs:string">
                                <xs:minLength value="1"/>
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                        <xs:element minOccurs="0" name="pluginDownloadPort">
                        <xs:simpleType>
                            <xs:restriction base="xs:string">
                                <xs:minLength value="1"/>
                            </xs:restriction>
                        </xs:simpleType>
                    </xs:element>
                        </xs:sequence>
                </xs:complexType>

                <xs:complexType name="HostInfoType">
                    <xs:sequence>
                        <xs:element name="hostId" type="xs:string" />
                        <xs:element name="ipAddress" type="xs:string" />
                        <xs:element name="userName" type="xs:string" />
                        <xs:element name="password" type="xs:string" />
                    </xs:sequence>
                </xs:complexType>

                <xs:complexType name="SecurityGroups">
                <xs:choice>
                    <xs:element name="securityGroup" type="vse:SecurityGroup" maxOccurs="unbounded" />
                    <xs:element name="securityGroupIdList" type="vse:SecurityGroupIdList" />
                </xs:choice>
            </xs:complexType>

            <xs:complexType name="SecurityGroup">
                <xs:sequence>
                    <xs:element name="securityGroupBaseNode" type="xs:string"/>
                    <xs:element name="securityGroupName" type="xs:string"/>
                    <xs:element name="securityGroupId" type="xs:string" minOccurs="0" />
                    <xs:element name="securityGroupNodeList" type="vse:NodeList" minOccurs="0"/>
                    <xs:element name="securityGroupIpList" type="vse:IpList" minOccurs="0" />
                </xs:sequence>
            </xs:complexType >

            <xs:complexType name="SecurityGroupIdList">
                <xs:sequence>
                    <xs:element name="securityGroupId" type="xs:string" maxOccurs="unbounded" />
                </xs:sequence>
            </xs:complexType>
```

```
<xs:complexType name="IpList">
    <xs:sequence>
        <xs:element name="ip" type="xs:string" maxOccurs="unbounded" />
    </xs:sequence>
</xs:complexType>

<xs:complexType name="NodeList">
    <xs:sequence>
        <xs:element name="node" type="vse:SecurityGroupNode" maxOccurs="unbounded" />
    </xs:sequence>
</xs:complexType>

<xs:complexType name="SecurityGroupNode">
    <xs:sequence>
        <xs:element name="id" type="xs:string" />
        <xs:element name="name" type="xs:string" minOccurs="0" />
        <xs:element name="ipList" type="vse:IpList" minOccurs="0" />
    </xs:sequence>
</xs:complexType>

<xs:complexType name="VnicsType">
    <xs:sequence>
        <xs:element name="vnic" type="vse:VnicType" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>

<xs:complexType name="VnicType">
    <xs:sequence>
        <xs:element name="id" type="xs:string" />
        <xs:element name="name" type="xs:string" />
        <xs:element name="ipList" type="vse:IpList" minOccurs="0" maxOccurs="1"/>
        <!-- Will be good if we can also send this information
        <xs:element name="VLAN" type="xs:int" />
        <xs:element name="PortGroup" type="xs:string" />
        <xs:element name="Protected" type="xs:boolean"/> -->
    </xs:sequence>
</xs:complexType>

<xs:complexType name="AuditLogsType">
    <xs:sequence>
        <xs:element name="auditLog" type="vse:AuditLogType" maxOccurs="unbounded"/>
    </xs:sequence>
</xs:complexType>
<xs:complexType name="DnsInfoType">
    <xs:sequence>
        <xs:element name="primaryDns" type="xs:string"/>
        <xs:element minOccurs="0" name="secondaryDns" type="xs:string"/>
        <xs:element minOccurs="0" name="tertiaryDns" type="xs:string"/>
    </xs:sequence>
</xs:complexType>

<xs:complexType name="AuditLogType">
    <xs:sequence>
        <xs:element name="id" type="xs:string" />
        <xs:element name="userName" type="xs:string" />
        <xs:element name="accessInterface" type="xs:string" />
        <xs:element name="module" type="xs:string" />
        <xs:element name="operation" type="xs:string" />
        <xs:element name="status" type="xs:string" />
        <xs:element name="operationSpan" type="xs:string" />
        <xs:element name="resource" type="xs:string" />
        <xs:element name="timestamp" type="xs:string" />
        <xs:element name="notes" type="xs:string" />
    </xs:sequence>
</xs:complexType>

<xs:complexType name="IpsecVpnTunnels">
    <xs:sequence>
```

```
            <xs:element name="lastEventId" type="xs:unsignedInt" />
            <xs:element minOccurs="0" maxOccurs="unbounded" name="ipsecVpnTunnelStatusList"
                type="vse:IpsecVpnTunnelStatus" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="IpsecVpnTunnelStatus">
        <xs:sequence>
            <xs:element name="networkId" type="xs:string" />
            <xs:element name="ipsecVpnTunnelConfig" type="vse:IpsecVpnTunnelConfigType" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="IpsecVpnTunnelConfigType">  <!--only in response -->
        <xs:sequence>
            <xs:element name="peerName">
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:minLength value="1"/>
                        <xs:maxLength value="256"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element name="peerId" type="xs:string" />
            <xs:element name="peerIpAddress" type="xs:string" />
            <xs:element maxOccurs="64" name="localSubnet" type="xs:string" />  <!-- localSubnet * peerSubnet * noOfSites
                should not be more than 64 -->
            <xs:element maxOccurs="64" name="peerSubnet" type="xs:string" /> <!-- localSubnet * peerSubnet * noOfSites should
                not be more than 64 -->
            <xs:element name="authenticationMode" >
                <xs:simpleType>
                    <xs:restriction base="xs:string">
                        <xs:pattern value="((psk)|(x.509))"/>
                    </xs:restriction>
                </xs:simpleType>
            </xs:element>
            <xs:element minOccurs="0" name="preSharedKey" type="xs:string" />
            <xs:element minOccurs="0" name="encryptionAlgorithm" type="xs:string" />
            <xs:element minOccurs="0" name="mtu" type="xs:unsignedInt" />
            <xs:element minOccurs="0" name="status" type="xs:string" />
            <xs:element minOccurs="0" name="stateChangeReason" type="xs:string" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="nsxmgrCapabilityType">
            <xs:sequence>
          <xs:element name="ipsecVpnCapability" type="xs:boolean"/>
          <xs:element name="webLoadBalancerCapability" type="xs:boolean"/>
          <xs:element name="natCapability" type="xs:boolean"/>
          <xs:element name="firewallCapability" type="xs:boolean"/>
          <xs:element name="dhcpCapability" type="xs:boolean"/>
          <xs:element name="staticRoutingCapability" type="xs:boolean"/>
          <xs:element name="nsxmgrVersion" type="xs:string"/>
            </xs:sequence>
    </xs:complexType>

        <xs:complexType name="TimeInfoType">
            <xs:sequence>
                <xs:element minOccurs="0" name="clock" type="xs:string"/>
                <xs:element minOccurs="0" name="ntpServer" type="xs:string"/>
                <xs:element minOccurs="0" name="zone" type="xs:string"/>
            </xs:sequence>
        </xs:complexType>

</xs:schema>
```

Deprecated: ESX Host Preparation and Uninstallation Schema

This schema can be used to install or uninstall vShield App and vShield Endpoint services on an ESX host.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">

    <xs:element name="VshieldConfiguration">
        <xs:complexType>
            <xs:all>
                <xs:element minOccurs="0" name="VszInstallParams" type="VszInstallParams"/>
                <xs:element minOccurs="0" name="EpsecInstallParams" type="xs:boolean"/>
                <xs:element name="InstallAction" type="InstallAction"/>    <!-- InstallAction to be taken on appliance -
                                    install/upgrade  -->
                <xs:element name="InstallStatus" type="InstallStatus"/>     <!-- only in response -->
            </xs:all>
        </xs:complexType>
    </xs:element>

    <xs:complexType name="InstallStatus">
        <xs:sequence>
            <xs:element minOccurs="0" name="ProgressState" type="xs:string"/>
            <xs:element minOccurs="0" name="ProgressSubState" type="xs:string"/>
            <xs:element minOccurs="0" name="InstalledServices" type="InstalledServices"/>
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="InstalledServices">
        <xs:sequence>
            <xs:element name="VszInstalled" type="xs:boolean"/>
            <xs:element name="EpsecInstalled" type="xs:boolean"/>
        </xs:sequence>
    </xs:complexType>

    <!-- Install parameters -->
    <xs:complexType name="VszInstallParams">
        <xs:sequence>
            <xs:element name="DatastoreId" type="Moid"/>
            <xs:element name="ManagementPortSwitchId" type="xs:string"/>    <!-- contains the networkId of the mgmt
                                portgroup -->
            <xs:element name="MgmtInterface" type="MgmtInterfaceType"/>
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="MgmtInterfaceType">
        <xs:sequence>
            <xs:element name="IpAddress" type="IP"/>
            <xs:element name="NetworkMask" type="IP"/>
            <xs:element name="DefaultGw" type="IP"/>
        </xs:sequence>
    </xs:complexType>


    <xs:simpleType name="InstallAction">
        <xs:restriction base="xs:string">
            <xs:enumeration value="install"/>
            <xs:enumeration value="upgrade"/>
        </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="IP">
        <xs:restriction base="xs:string">
            <xs:pattern value=
                                "((25[0-5]|2[0-4][0-9]|1[0-9][0-9]|[1-9]?[0-9])\.){3}(25[0-5]|2[0-4][0-9]|1[0-9][0-9]|[1-9]?[0-9])
                                "/>
        </xs:restriction>
    </xs:simpleType>
```

```
    <xs:simpleType name="Moid">
        <xs:restriction base="xs:string">
            <xs:pattern value="[a-zA-Z0-9\-]+"/>
        </xs:restriction>
    </xs:simpleType>

</xs:schema>
```

Deprecated: vShield App Schemas

The following schemas detail vShield App configuration via REST API.

vShield App Configuration Schema

This schema configures a vShield App after installation.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">

    <xs:element name="ZonesConfiguration">
        <xs:complexType>
            <xs:all>
                <xs:element name="VszInstallParams" type="VszInstallParams" minOccurs="0"/>
            </xs:all>
        </xs:complexType>
    </xs:element>

    <!-- Install parameters -->
    <xs:complexType name="VszInstallParamsType">
        <xs:sequence>
            <xs:element name="NodeId" type="xs:string"/>
            <xs:element name="DatacenterId" type="xs:string"/>
            <xs:element name="DatastoreId" type="xs:string"/>
            <xs:element name="NameForZones" type="xs:string"/>
            <xs:element name="VswitchForMgmt" type="xs:string"/>
            <xs:element name="MgmtInterface" type="InterfaceType"/>
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="InterfaceType">
        <xs:sequence>
            <xs:element name="IpAddress" type="xs:NMTOKEN"/>
            <xs:element name="NetworkMask" type="xs:NMTOKEN"/>
            <xs:element name="DefaultGw" type="xs:NMTOKEN"/>
            <xs:element minOccurs="0" name="VlanTag" type="xs:string"/>
        </xs:sequence>
    </xs:complexType>

</xs:schema>
```

vShield App Firewall Schema

This schema configures the firewall rules enforced by a vShield App.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified" >

    <xs:element name="VshieldAppConfiguration">
        <xs:complexType>
            <xs:choice>
                <xs:element name="firewallConfiguration" type="FirewallConfigurationDto" />
                <xs:element name="firewallConfigurationHistoryList" type="FirewallConfigHistoryInfoListDto" />
                <xs:element name="consolidatedConfiguration" type="FirewallConfigurationDto" maxOccurs="unbounded" />
                <xs:element name="status" type="StatusDto" />
                <xs:element name="datacenterState" type="DatacenterStateDto" />
                <xs:element name="protocolsList" type="ProtocolListDto" />
                <xs:element name="protocolTypes" type="ProtocolsTypeEnum" maxOccurs="4" />
```

```
            </xs:choice>
        </xs:complexType>
    </xs:element>

    <xs:complexType name="FirewallConfigHistoryInfoListDto">
        <xs:sequence>
            <xs:element name="contextId" type="xs:string" />
            <xs:element name="firewallConfigHistoryInfo" type="FirewallConfigHistoryInfoDto"maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="FirewallConfigHistoryInfoDto">
        <xs:sequence>
            <xs:element name="configId" type="xs:long" />
            <xs:element name="userId" type="xs:string" />
            <xs:element name="timestamp" type="xs:long" />
            <xs:element name="status" type="xs:string" minOccurs="0" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="DatacenterStateDto">
        <xs:sequence>
            <xs:element name="datacenterId" type="xs:string" />
            <xs:element name="userId" type="xs:string" minOccurs="0" />
            <xs:element name="timestamp" type="xs:long" minOccurs="0" />
            <xs:element name="status" type="DatacenterStatusEnum" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="StatusDto">
        <xs:sequence>
            <xs:element name="currentState" type="ConfigStateEnum" />
            <xs:element name="failedPublishInfo" type="FailedPublishInfoDto" maxOccurs="unbounded" minOccurs="0" />
        </xs:sequence>
        <xs:attribute name="contextId" type="xs:string" use="required" />
        <xs:attribute name="generationNumber" type="xs:long" />
    </xs:complexType>

    <xs:complexType name="FailedPublishInfoDto">
        <xs:sequence>
            <xs:element name="applianceIp" type="xs:string" />
            <xs:element name="timestamp" type="xs:long" />
            <xs:element name="errorDescription" type="xs:string" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="FirewallConfigurationDto">
        <xs:sequence>
            <xs:element name="layer3FirewallRule" type="Layer3FirewallRuleDto" maxOccurs="unbounded" minOccurs="0"
                        />
            <xs:element name="layer2FirewallRule" type="Layer2FirewallRuleDto" maxOccurs="unbounded" minOccurs="0"
                        />
        </xs:sequence>
        <xs:attribute name="provisioned" type="xs:boolean" use="optional" />
        <xs:attribute name="contextId" type="xs:string" use="required" />
        <xs:attribute name="timestamp" type="xs:long" use="optional" />
        <xs:attribute name="generationNumber" type="xs:long" use="optional" />
    </xs:complexType>

    <xs:complexType name="ApplicationDto">
        <xs:choice>
            <xs:element name="applicationSetId" type="xs:string" />
            </xs:choice>
    </xs:complexType>

    <xs:complexType name="DestinationDto" abstract="true">
        <xs:sequence>
            <xs:element name="address" type="AddressDto" minOccurs="0" />
```

```
            <!-- Only in response, not considered in request -->
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="Layer2DestinationDto">
        <xs:complexContent>
            <xs:extension base="DestinationDto">
            </xs:extension>
            <xs:element name="application" type="ApplicationDto" minOccurs="0" />
        </xs:complexContent>
    </xs:complexType>

    <xs:complexType name="Layer3DestinationDto">
        <xs:sequence>
            <xs:element name="address" type="AddressDto" minOccurs="0" />
            <xs:element name="application" type="ApplicationDto" minOccurs="0" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="Layer3SourceAddressDto">
        <xs:sequence>
            <xs:element name="address" type="AddressDto" minOccurs="0" />
            <xs:element name="portInfo" type="xs:string" minOccurs="0" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="FirewallRuleDto" abstract="true">
        <xs:sequence>
            <xs:element name="action" type="ActionEnum" />
            <xs:element name="logged" type="xs:boolean" />
            <xs:element name="notes" type="xs:string" minOccurs="0" />
        </xs:sequence>
        <xs:attribute name="id" type="xs:long" use="required" />
        <xs:attribute name="precedence" type="PrecedenceEnum" use="optional" />
        <xs:attribute name="disabled" type="xs:boolean" use="optional" />
    </xs:complexType>

    <xs:complexType name="Layer2FirewallRuleDto">
        <xs:complexContent>
            <xs:extension base="FirewallRuleDto">
                <xs:sequence>
                    <xs:element name="source" type="AddressDto" minOccurs="0" />
                    <xs:element name="destination" type="Layer2DestinationDto" />
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>


    <xs:complexType name="Layer3FirewallRuleDto">
        <xs:complexContent>
            <xs:extension base="FirewallRuleDto">
                <xs:sequence>
                    <xs:element name="source" type="Layer3SourceAddressDto" minOccurs="0" />
                    <xs:element name="destination" type="Layer3DestinationDto" minOccurs="0" />
                </xs:sequence>
            </xs:extension>
        </xs:complexContent>
    </xs:complexType>

    <xs:complexType name="AddressDto">
        <xs:choice>
            <xs:element name="containerId" type="xs:string" minOccurs="0">
            </xs:element>
        </xs:choice>
        <xs:attribute name="exclude" type="xs:boolean" use="optional" default="false" />
    </xs:complexType>
```

```
    <xs:simpleType name="ActionEnum">
        <xs:restriction base="xs:NCName">
            <xs:enumeration value="allow" />
            <xs:enumeration value="deny" />
        </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="PrecedenceEnum">
        <xs:restriction base="xs:NCName">
            <xs:enumeration value="default" />
            <xs:enumeration value="none" />
        </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="ConfigStateEnum">
        <xs:restriction base="xs:NCName">
            <!-- <xs:enumeration value="saved" /> -->
            <xs:enumeration value="published" />
            <xs:enumeration value="inprogress" />
            <xs:enumeration value="publishFailed" />
            <xs:enumeration value="Deleted" />
        </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="DatacenterStatusEnum">
        <xs:restriction base="xs:NCName">
            <xs:enumeration value="upgrading" />
            <xs:enumeration value="backwardCompatible" />
            <xs:enumeration value="backwardCompatibleReadyForSwitch" />
            <xs:enumeration value="migrating" />
            <xs:enumeration value="regular" />
        </xs:restriction>
    </xs:simpleType>

    <xs:simpleType name="ProtocolsTypeEnum">
        <xs:restriction base="xs:NCName">
            <xs:enumeration value="application" />
            <xs:enumeration value="ipv4" />
            <xs:enumeration value="icmp" />
            <xs:enumeration value="ethernet" />
        </xs:restriction>
    </xs:simpleType>

</xs:schema>
```

vShield App SpoofGuard Schema

The following schema details SpoofGuard configuration.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema"elementFormDefault="qualified">

    <xs:element name="VshieldConfiguration">
        <xs:complexType>
            <xs:choice>
                <xs:element name="globalSettings" type="GlobalSettingsDto" />
                <xs:element name="ipAssignmentStatistic" type="IpAssignmentStatisticDto" />
                <xs:element name="vnicIdList" type="VnicIdListDto" />
                <xs:element name="ipAssignmentDetailsList" type="IpAssignmentDetailsListDto" />
                <xs:element name="pagedIpAssignmentDetailsList" type="PagedIpAssignmentDetailsListDto" />
                <xs:element name="approveIpInfo" type="VnicInfoDto" />
            </xs:choice>
        </xs:complexType>
    </xs:element>

    <xs:complexType name="PagedIpAssignmentDetailsListDto">
        <xs:sequence>
```

```
            <xs:element name="ipAssignmentDetails" type="IpAssignmentDetailsDto" maxOccurs="unbounded" />
            <xs:element name="pagingDetails" type="PagingInfoDto" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="PagingInfoDto">
        <xs:sequence>
            <xs:element name="pageSize" type="xs:int" />
            <xs:element name="startIndex" type="xs:int" />
            <xs:element name="totalCount" type="xs:int" />
            <xs:element name="sortOrderAscending" type="xs:boolean" />
            <xs:element name="sortBy" type="PagingSortByEnum" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="IpAssignmentDetailsListDto">
        <xs:sequence>
            <xs:element name="ipAssignmentDetails" type="IpAssignmentDetailsDto"maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>

        <xs:complexType name="IpAssignmentDetailsDto">
        <xs:sequence>
            <xs:element name="vnicId" type="xs:string" />
            <xs:element name="macAddress" type="xs:string" />
            <xs:element name="ipAddress" type="xs:string" />
            <xs:element name="vnicName" type="xs:string" />
            <xs:element name="networkId" type="xs:string" />
            <xs:element name="vmId" type="xs:string" />
            <xs:element name="vmName" type="xs:string" />
            <xs:element name="approvedIpAddress" type="xs:string" />
            <xs:element name="approvedBy" type="xs:string" />
            <xs:element name="approvedOn" type="xs:long" />
            <xs:element name="publishedIpAddress" type="xs:string" />
            <xs:element name="publishedBy" type="xs:string" />
            <xs:element name="publishedOn" type="xs:long" />
            <xs:element name="reviewRequired" type="xs:boolean" />
            <xs:element name="duplicateCount" type="xs:int" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="IpAssignmentStatisticDto">
        <xs:sequence>
            <xs:element name="contextId" type="xs:string" />
            <xs:element name="inSync" type="xs:boolean" />
            <xs:element name="activeCount" type="xs:long" />
            <xs:element name="inactiveCount" type="xs:long" />
            <xs:element name="activeSinceLastPublishedCount" type="xs:long" />
            <xs:element name="requireReviewCount" type="xs:long" />
            <xs:element name="duplicateCount" type="xs:long" />
            <xs:element name="unpublishedCount" type="xs:long" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="VnicIdListDto">
        <xs:sequence>
            <xs:element name="vnicId" type="xs:string" maxOccurs="unbounded" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="VnicInfoDto">
        <xs:sequence>
            <xs:element name="vnicId" type="xs:string" />
            <xs:element name="ipAddress" type="xs:string" />
        </xs:sequence>
    </xs:complexType>

    <xs:complexType name="GlobalSettingsDto">
```

```
            <xs:sequence>
                <xs:element name="status" type="OperationStatusEnum" />
                <xs:element name="mode" type="OperationModeEnum" />
                <!-- optional parameters will be part of response only -->
                <xs:element name="timestamp" type="xs:long" minOccurs="0" />
                <xs:element name="publishedBy" type="xs:string" minOccurs="0" />
            </xs:sequence>
        </xs:complexType>

        <xs:simpleType name="OperationStatusEnum">
            <xs:restriction base="xs:NCName">
                <xs:enumeration value="enabled" />
                <xs:enumeration value="disabled" />
            </xs:restriction>
        </xs:simpleType>

        <xs:simpleType name="OperationModeEnum">
            <xs:restriction base="xs:NCName">
                <xs:enumeration value="trustOnFirstUse" />
                <xs:enumeration value="manual" />
            </xs:restriction>
        </xs:simpleType>

        <xs:simpleType name="PagingSortByEnum">
            <xs:restriction base="xs:NCName">
                <xs:enumeration value="VM_NAME" />
                <xs:enumeration value="MAC" />
                <xs:enumeration value="APPROVED_IP" />
                <xs:enumeration value="CURRENT_IP" />
            </xs:restriction>
        </xs:simpleType>

    </xs:schema>
```

vShield App Namespace Schema

The following schema details namespace configuration.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" targetNamespace="vmware.vshield.global.20.namespace"
                    xmlns:vsns="vmware.vshield.global.20.namespace" elementFormDefault="qualified">

    <xs:element name="VshieldConfiguration">
        <xs:complexType>
            <xs:choice>
                <xs:element maxOccurs="unbounded" name="namespace" type="vsns:NamespaceDto" />
                <xs:element maxOccurs="3" name="namespacesType" type="vsns:NamespacesTypeEnum" />
            </xs:choice>
        </xs:complexType>
    </xs:element>

    <xs:complexType name="NamespaceDto">
        <xs:sequence>
<xs:element minOccurs="0" maxOccurs="unbounded" name="namespacePortGroup" type="vsns:PortGroupDto" />
</xs:sequence>
<xs:attribute name="type" use="required" type="vsns:NamespacesTypeEnum" />
<xs:attribute name="id" use="optional" type="xs:long" />
</xs:complexType>

<xs:complexType name="PortGroupDto">
<xs:sequence>
<xs:element maxOccurs="1" name="Id" type="xs:string" />
</xs:sequence>
</xs:complexType>

<xs:simpleType name="NamespacesTypeEnum">
<xs:restriction base="xs:NCName">
<xs:enumeration value="DEFAULT" />
```

```
<xs:enumeration value="PORTGROUP" />
<xs:enumeration value="NONE" />
</xs:restriction>
</xs:simpleType>

</xs:schema>Retrieved from "https://wiki.eng.vmware.com/NS_DEV/vShieldManager/nsxmgr30/App/ipad/xsd"
```

Error Message Schema

This schema details error messages.

```
<?xml version="1.0" encoding="UTF-8"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" elementFormDefault="qualified">

    <xs:element name="Errors">
        <xs:complexType>
            <xs:sequence>
                <xs:element maxOccurs="unbounded" name="Error" type="ErrorType"/>
            </xs:sequence>
        </xs:complexType>
    </xs:element>

    <xs:complexType name="ErrorType">
        <xs:sequence>
            <xs:element name="code" type="xs:unsignedInt"/>
            <xs:element name="description" type="xs:string"/>
            <xs:element minOccurs="0" name="detailedDescription" type="xs:string"/>
            <xs:element minOccurs="0" name="index" type="xs:int"/>
            <xs:element minOccurs="0" name="resource" type="xs:NMTOKEN"/>
            <xs:element minOccurs="0" name="requestId" type="xs:NMTOKEN"/>
            <xs:element minOccurs="0" name="module" type="xs:NMTOKEN"/>
    </xs:sequence>
    </xs:complexType>

</xs:schema>
```

If a REST API call results in an error, the HTTP reply contains the following information.

- An XML error document as the response body
- Content-Type: application/xml
- An appropriate 2xx, 4xx, or 5xx HTTP status code

Table 17-1. Error Message Status Codes

Code	Description
200 OK	The request was valid and has been completed. Generally, this response is accompanied by a body document (XML).
201 Created	The request was completed and new resource was created. The Location header of the response contains the URI of newly created resource.
204 No Content	Same as 200 OK, but the response body is empty (No XML).
400 Bad Request	The request body contains an invalid representation or the representation of the entity is missing information. The response is accompanied by Error Object (XML).
401 Unauthorized	An authorization header was expected. Request with invalid or no vShield Manager Token.
403 Forbidden	The user does not have enough privileges to access the resource.
404 Not Found	The resource was not found. The response is accompanied by Error Object (XML).
500 Internal Server Error	Unexpected error with the server. The response is accompanied by Error Object (XML).
503 Service Unavailable	Cannot proceed with the request, because some of the services are unavailable. Example: vShield Edge is Unreachable. The response is accompanied by Error Object (XML).