Cisco CSR 1000V Series Cloud Services Router REST API Management Reference Guide

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Accessing and Initiating the REST API Interface Through an HTTPS Server

The Cisco CSR 1000V REST API interface in the **csr_mgnt** container is accessed and initiated through an HTTPS server session.

Note The REST API in the CSR 1000V container runs by default when the CSR 1000V boots.

Enabling an HTTPS Server Session for the REST API

- Enabling the HTTPS Server During Cisco CSR 1000V OVA Deployment
- Configuring HTTPS

Note The HTTPS session must have an identity certificate. For more information, see the "HTTPS--HTTP Server and Client with SSL 3.0" section of the *HTTP Services Configuration Guide, Cisco IOS XE Release 3S*.

Enabling the HTTPS Server During Cisco CSR 1000V OVA Deployment

Step 1 Install and use the free VMWare application called *VSphere Client* from VMware to enable the HTTPS server.

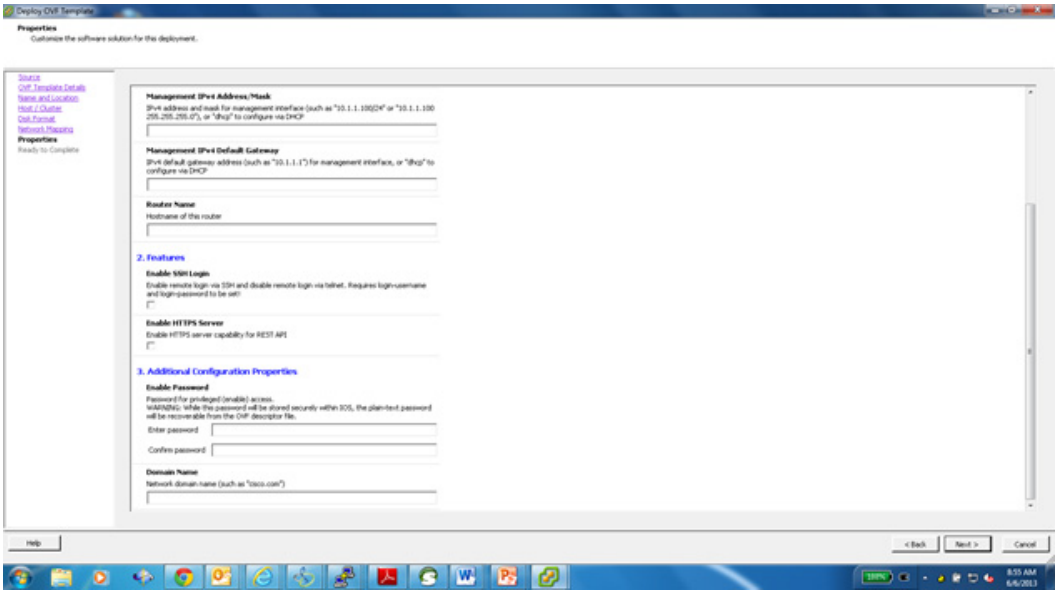
Note This method is supported for VMWare ESXi deployments in Cisco IOS XE Release 3.10S only.

Step 2 Enter the following Bootstrap Properties screen field parameters:

- **Login Username**
- **Login Password**
- **Management IPv4 Address/Mask**
- **Management IPv4 Default Gateway**
- Select check the **Enable HTTPS server capability for REST API** checkbox option.

Figure 1-1 shows the field on the Bootstrap Properties screen of the OVA Wizard where you select these options.

Figure 1-1 Properties Screen for Enabling the HTTPS Server Option



Step 3 Deploy the OVA template. See the "Deploying the Cisco CSR 1000V OVA Template to the VM" section in the *Cisco CSR 1000V Series Cloud Services Router Software Configuration Guid*e for more information.

Configuring HTTPS

Perform this task to configure the HTTPS server if you did not deploy the OVA template when installing the Cisco CSR 1000V.

Step 1 Connect to your router and enter the **configure terminal** command to enter global configuration mode.

Step 2 Enable HTTPS on port 443, the default HTTPS port by entering the **ip http secure-server** command. A self-signed identity certificate is automatically genterated.

Step 3 Create and name a persistent web user interface transport map by entering the **transport-map type persistent webui** *transport-map-name* command.

Step 4 Enable the secure HTTPS server by entering the **secure-server** command.

Step 5 Enable the transport map by entering the **transport type persistent webui input** *transport-map-name* global configuration command.

Viewing REST API Container Status

The following example shows the enabled status of the REST API container:

```
Device# show virtual-service detail

Virtual service csr_mgmt detail
  State                  : Activated
  Package information
    Name                 : containerjun7final.ova
    Path                 : bootflash:/containerjun7final.ova
    Application
      Name               : csrmgmt
      Installed version  : 1.0.0
      Description        : CSR-MGMT
    Signing
      Key type           : Cisco development key
      Method             : SHA-1
    Licensing
      Name               : CSR-MGMT
      Version            : 1.0

  Detailed guest status
    RESTful API Status: enabled
    Network eth0 Status: up, RX packets:2878072, TX packets:591
    FCGI interface Status: enabled, listenning on port: 8060
    Onep Session: Count: 1, username: ly
    Time Zone: Tue Aug 13 08:30:23 UTC 2013
    Coredump: None

  Activated profile name: None
  Resource reservation
    Disk                 : 240 MB
    Memory               : 512 MB
    CPU                  : 30% system CPU

  Attached devices
    Type              Name        Alias
    ---------------------------------------------
    Serial/Trace                  serial3
    Serial/Syslog                 serial2
    Serial/aux                    serial1
    Serial/shell                  serial0
    Disk              /opt/var
    Disk              _rootfs
    NIC               ieobc_2     ieobc

  Network interfaces
    MAC address             Attached to interface
    ------------------------------------------------------
    54:0E:00:0B:0C:03       ieobc_2

  Guest interface
  ---
  Interface: eth0
  ip address: 10.168.2.2/30
```

Initiating the Cisco CSR 1000V REST API Session

The first step for using the Cisco CSR 1000V REST API interface is to set up the token service authentication. This step creates the token ID that must appear in all subsequent API requests. The CSR bypasses the authentication phase if it recognizes the token. This step is required for using the REST API interface to configure the Cisco CSR 1000V.

You must enter the following REST API step:

Step 1 POST /api/v1/auth/token-services

See the "Client Authentication" section on page 3-1 for more information.

Introducing the Cisco CSR 1000V REST API

The Cisco CSR 1000V supports a Representation State Transfer (REST) set of APIs beginning with Cisco IOS XE 3.10S. The REST APIs provide an alternative method to the Cisco IOS XE CLI to provision selected functions on the Cisco CSR 1000V.

The Cisco CSR 1000V REST APIs support the following functions and Cisco IOS XE technologies in Cisco IOS XE 3.10S:

- Global configuration
- DNS
- NTP
- IP interfaces

Note IPv6 for REST API is not supported in this release.

- DHCP Server and Relay Agent
- Routing Protocols:
  - BGP
  - EIGRP
  - OSPF
- ACL
- NAT VPN
- Firewall inspection
- IP security Site-to-Site VPN
- Cisco CSR 1000V software licensing
- Cisco CSR 1000V memory and CPU usage reports

Important Notes

- There is a known issue in IOS which does not allow import and replace of an existing self-signed certificate. As a result, any running configuration being imported will fail if it contains a self signed certificate.
- To use the Firewall and VPN REST APIs, you must have the advanced or premium license package installed on the Cisco CSR 1000V.

Conventions

Cisco CSR 1000V REST API Request Methods

The Cisco CSR 1000V REST API uses the HTTP request methods described in Table 2-1.

Note All REST API requests and responses must be in JSON format. XML is not supported.

The JSON values of the *type* string should be in double-quotes. Values of type Boolean or Number should not be in double-quotes. The Boolean values are **true** or **false** in lower-case.

Table 2-1 HTTP Request Methods

HTTP Request Method	Description
GET	Retrieves the specified resource or representation. GET is a read-only operation that does not change the engine state or have any side effects. • The HTTP GET operation should not have a request body. If information is passed in a GET request, query parameters should be used instead. • Unless specified, the HTTP GET operation returns the configured state. An HTTP GET operation of the global routing table returns the dynamic run-time state.
POST	Submits data to be processed to the specified resource. The data to be processed is included in the request body. A POST operation can create a new resource. • The POST operation request contains the details of a new resource that is created in JSON. • Every POST request must include a JSON body. • For all POST operations to create a new resource, the Location header in the HTTP response contains the complete URL to be used for subsequent PUT, GET, and delete commands. • The HTTP POST response to a Create request must have a 201 return code and a Location header containing the URI of the newly created resource in the HTTP header.
PUT	Updates the specified resource with new information. The data that is included in the PUT operation replaces the previous data. • The PUT operation is used to replace or modify an existing resource. The PUT operation cannot be used to create a new resource. • The request body of a PUT operation must contain the complete representation of the mandatory attributes of the resource.
DELETE	Deletes a resource. If you delete a resource that has already been deleted, a 404 Not Found response is returned. • The HTTP DELETE operation should not have a request body. If information is passed in a GET request, query parameters should be used instead.

REST API Error Schema and Error Codes

JSON Error Response Schema

```
{
  "error-code": {number},
  "error-message": "{string}",
  "detail": "{string}"
}
```

Property	Type	Description
error-code	number	-1
error-message	string	A brief error description or a CLI error message.
detail	string	More detailed descriptions of error message where applicable/available.

JSON Error Response Example

```
400 Bad Request

Location: http://host/api/v1/global/dns-servers
Content-Type: application/json

{
  "error-code": -1,
  "error-message": "JSON syntax error in the request",
  "detail": "Property primary is mandatory and is not present in the request."
}
```

JSON Error Response Example

```
500 Internal Server Error

Location: http://host/api/v1/global/dns-servers
Content-Type: application/json

{
  "error-code": -1,
  "error-message": "Internal communication error",
  "detail": "Time-out received while communicating with the device"
}
```

Status Codes and Error Handling

The Cisco CSR 1000V REST API uses standard HTTP status codes to report the success or failure of the submitted requests:

- HTTP status codes from 200-299 indicate success
- HTTP status codes 400 and higher indicate failure

Table 2 describes the supported HTTP status codes and descriptions.

Table 2 HTTP Status Codes and Descriptions

Code	Status Reason	Description
200	OK	The request has succeeded.
201	Created	An asynchronous task has been completed, and the object has been created.
202	Accepted	An asynchronous task has been accepted, but the processing is not complete.

Table 2 HTTP Status Codes and Descriptions (continued)

Code	Status Reason	Description
204	Accepted but with no JSON body	An HTTP GET request is successful, but the response body does not have any data
400	Bad Request	An invalid request has been submitted. Verify that the request uses the correct syntax.
401	Unauthorized	The user is not authorized to invoke the request due to invalid authentication parameters, or lack of authority.
404	Not Found	The specified resource cannot be found.
405	Method not Allowed	The HTTP verb entered is not allowed, such as a POST on a read-only resource.
500	Internal Server Error	The request failed, and no other information is available.
503	Service Unavailable	The service is not up due to internal maintenance or an outage.

Deploying REST API Using cURL: Example

The following is an example of deploying a REST API using cURL. The following example shows the REST API using the POST, PUT, GET, DELETE request methods for a NAT pool.

```
[cisco@axp-4-7835-lnx ~]$ curl -v -X POST
https://172.19.153.222/api/v1/auth/token-services -H "Accept:application/json" -u
"cisco:cisco" -d "" --insecure -3
* About to connect() to 172.19.153.222 port 443
*   Trying 172.19.153.222... * connected
* Connected to 172.19.153.222 (172.19.153.222) port 443
* successfully set certificate verify locations:
*   CAfile: /usr/share/ssl/certs/ca-bundle.crt
  CApath: none
* SSL connection using AES256-SHA
* Server certificate:
*   subject: /CN=IOS-Self-Signed-Certificate-3474095688
*   start date: 2013-06-04 13:36:48 GMT
*   expire date: 2020-01-01 00:00:00 GMT
*   common name: IOS-Self-Signed-Certificate-3474095688 (does not match '172.19.153.222')
*   issuer: /CN=IOS-Self-Signed-Certificate-3474095688
* SSL certificate verify result: error number 1 (18), continuing anyway.
* Server auth using Basic with user 'cisco'
> POST /api/v1/auth/token-services HTTP/1.1
Authorization: Basic Y2lzY286Y2lzY28=
User-Agent: curl/7.12.1 (i686-redhat-linux-gnu) libcurl/7.12.1 OpenSSL/0.9.7a zlib/1.2.1.2
libidn/0.5.6
Host: 172.19.153.222
Pragma: no-cache
Accept:application/json
Content-Length: 0
Content-Type: application/x-www-form-urlencoded

< HTTP/1.1 201 Created
< Content-Type: application/json
< Content-Length: 204
< Date: Thu, 06 Jun 2013 09:05:31 GMT
```

```
< Server: cisco-IOSd..
* Connection #0 to host 172.19.153.222 left intact
* Closing connection #0
{"kind": "object#auth-token", "expiry-time": "Thu Jun  6 02:20:29 2013", "token-id":
"9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=", "link":
"https://172.19.153.222/api/v1/auth/token-services/2257880484"}[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$ curl -v -H "Accept:application/json" -H "X-Auth-Token:
9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=" -H "content-type: application/json" -X POST
https://172.19.153.222/api/v1/nat-svc/pool -d '{"nat-pool-id": "test4-nat-pool",
"start-ip-address": "172.16.10.1", "end-ip-address": "172.16.10.63", "prefix-length": 32}'
--insecure -3
* About to connect() to 172.19.153.222 port 443
*   Trying 172.19.153.222... * connected
* Connected to 172.19.153.222 (172.19.153.222) port 443
* successfully set certificate verify locations:
*   CAfile: /usr/share/ssl/certs/ca-bundle.crt
  CApath: none
* SSL connection using AES256-SHA
* Server certificate:
*   subject: /CN=IOS-Self-Signed-Certificate-3474095688
*   start date: 2013-06-04 13:36:48 GMT
*   expire date: 2020-01-01 00:00:00 GMT
*   common name: IOS-Self-Signed-Certificate-3474095688 (does not match '172.19.153.222')
*   issuer: /CN=IOS-Self-Signed-Certificate-3474095688
* SSL certificate verify result: error number 1 (18), continuing anyway.
> POST /api/v1/nat-svc/pool HTTP/1.1
User-Agent: curl/7.12.1 (i686-redhat-linux-gnu) libcurl/7.12.1 OpenSSL/0.9.7a zlib/1.2.1.2
libidn/0.5.6
Host: 172.19.153.222
Pragma: no-cache
Accept:application/json
X-Auth-Token: 9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=
content-type: application/json
Content-Length: 123

{"nat-pool-id": "test4-nat-pool", "start-ip-address": "172.16.10.1", "end-ip-address":
"172.16.10.63", "prefix-length": 32}< HTTP/1.1 201 Created
< Content-Type: application/json
< Content-Length: 4
< Location: https://172.19.153.222/api/v1/nat-svc/pool/test4-nat-pool
< Date: Thu, 06 Jun 2013 09:09:27 GMT
< Server: cisco-IOSd..
* Connection #0 to host 172.19.153.222 left intact
* Closing connection #0
null[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$ curl -v -H "Accept:application/json" -H "X-Auth-Token:
9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=" -H "content-type: application/json" -X PUT
https://172.19.153.222/api/v1/nat-svc/pool/test4-nat-pool -d '{"nat-pool-id":
"marketing-nat-pool", "start-ip-address": "1.16.10.17", "end-ip-address": "1.16.10.57",
"prefix-length": 16}' --insecure -3
* About to connect() to 172.19.153.222 port 443
*   Trying 172.19.153.222... * connected
* Connected to 172.19.153.222 (172.19.153.222) port 443
* successfully set certificate verify locations:
*   CAfile: /usr/share/ssl/certs/ca-bundle.crt
  CApath: none
* SSL connection using AES256-SHA
* Server certificate:
```

```
*   subject: /CN=IOS-Self-Signed-Certificate-3474095688
*   start date: 2013-06-04 13:36:48 GMT
*   expire date: 2020-01-01 00:00:00 GMT
*   common name: IOS-Self-Signed-Certificate-3474095688 (does not match '172.19.153.222')
*   issuer: /CN=IOS-Self-Signed-Certificate-3474095688
* SSL certificate verify result: error number 1 (18), continuing anyway.
> PUT /api/v1/nat-svc/pool/test4-nat-pool HTTP/1.1
User-Agent: curl/7.12.1 (i686-redhat-linux-gnu) libcurl/7.12.1 OpenSSL/0.9.7a zlib/1.2.1.2
libidn/0.5.6
Host: 172.19.153.222
Pragma: no-cache
Accept:application/json
X-Auth-Token: 9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=
content-type: application/json
Content-Length: 124

{"nat-pool-id": "marketing-nat-pool", "start-ip-address": "1.16.10.17", "end-ip-address":
"1.16.10.57", "prefix-length": 16}
< HTTP/1.1 204 No Content
< Content-Type: application/json
< Date: Thu, 06 Jun 2013 09:13:19 GMT
< Server: cisco-IOSd..
* Connection #0 to host 172.19.153.222 left intact
* Closing connection #0
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$ curl -v -H "Accept:application/json" -H "X-Auth-Token:
9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=" -H "content-type: application/json" -X GET
https://172.19.153.222/api/v1/nat-svc/pool/test4-nat-pool --insecure -3
* About to connect() to 172.19.153.222 port 443
*   Trying 172.19.153.222... * connected
* Connected to 172.19.153.222 (172.19.153.222) port 443
* successfully set certificate verify locations:
*   CAfile: /usr/share/ssl/certs/ca-bundle.crt
  CApath: none
* SSL connection using AES256-SHA
* Server certificate:
*   subject: /CN=IOS-Self-Signed-Certificate-3474095688
*   start date: 2013-06-04 13:36:48 GMT
*   expire date: 2020-01-01 00:00:00 GMT
*   common name: IOS-Self-Signed-Certificate-3474095688 (does not match '172.19.153.222')
*   issuer: /CN=IOS-Self-Signed-Certificate-3474095688
* SSL certificate verify result: error number 1 (18), continuing anyway.
> GET /api/v1/nat-svc/pool/test4-nat-pool HTTP/1.1
User-Agent: curl/7.12.1 (i686-redhat-linux-gnu) libcurl/7.12.1 OpenSSL/0.9.7a zlib/1.2.1.2
libidn/0.5.6
Host: 172.19.153.222
Pragma: no-cache
Accept:application/json
X-Auth-Token: 9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=
content-type: application/json

< HTTP/1.1 200 OK
< Content-Type: application/json
< Content-Length: 147
< Date: Thu, 06 Jun 2013 09:13:24 GMT
< Server: cisco-IOSd..
* Connection #0 to host 172.19.153.222 left intact
* Closing connection #0
```

```
{"nat-pool-id": "test4-nat-pool", "kind": "object#nat-pool", "prefix-length": 16,
"end-ip-address": "1.16.10.57", "start-ip-address": "1.16.10.17"}[cisco@axp-4-7835-lnx
~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$
[cisco@axp-4-7835-lnx ~]$ curl -v -H "Accept:application/json" -H "X-Auth-Token:
9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=" -H "content-type: application/json" -X
DELETE https://172.19.153.222/api/v1/nat-svc/pool/test4-nat-pool --insecure -3
* About to connect() to 172.19.153.222 port 443
*   Trying 172.19.153.222... * connected
* Connected to 172.19.153.222 (172.19.153.222) port 443
* successfully set certificate verify locations:
*   CAfile: /usr/share/ssl/certs/ca-bundle.crt
  CApath: none
* SSL connection using AES256-SHA
* Server certificate:
*   subject: /CN=IOS-Self-Signed-Certificate-3474095688
*   start date: 2013-06-04 13:36:48 GMT
*   expire date: 2020-01-01 00:00:00 GMT
*   common name: IOS-Self-Signed-Certificate-3474095688 (does not match '172.19.153.222')
*   issuer: /CN=IOS-Self-Signed-Certificate-3474095688
* SSL certificate verify result: error number 1 (18), continuing anyway.
> DELETE /api/v1/nat-svc/pool/test4-nat-pool HTTP/1.1
User-Agent: curl/7.12.1 (i686-redhat-linux-gnu) libcurl/7.12.1 OpenSSL/0.9.7a zlib/1.2.1.2
libidn/0.5.6
Host: 172.19.153.222
Pragma: no-cache
Accept:application/json
X-Auth-Token: 9qAm/T0etz5Bj84H2j+nkxC7aGmQ9rNxsgYsaQho5u8=
content-type: application/json

< HTTP/1.1 204 No Content
< Content-Type: application/json
< Date: Thu, 06 Jun 2013 09:13:50 GMT
< Server: cisco-IOSd..
* Connection #0 to host 172.19.153.222 left intact
* Closing connection #0
[cisco@axp-4-7835-lnx ~]$
```

Client Authentication

The Cisco CSR1000V RESTful API authentication works as follows:

- The authentication uses HTTPS as the transport for all the Cisco CSR 1000V RESTful API access.
- Clients perform authentication with this service by invoking a POST on this resource with HTTP Basic Auth as the authentication mechanism. The response of this request includes a token-id. Token-ids are short-lived, opaque objects that represents client's successful authentication with the token service.
- Clients then access other APIs by including the token id as a custom HTTP header "X-auth-token". If this token is not present or expired, then API access will return an HTTP status code of "401 Unauthorized"
- Clients can also explicitly invalidate a token by performing a DELETE operation on the token resource.

Resource Summary for Client Authentication

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Token-id	/api/v1/auth/token-services	Y	Y	N	N
	/api/v1/auth/token-services/{opaque-token-id}	Y	N	N	Y

Token Service Resource

The token service resource represents the authentication service that allows clients to perform authentication and obtain a token-id.

JSON Representation

{

```
  "kind": "collection#auth-token",
  "items: [ { auth-token JSON object }+ ]
}
```

Authenticate and Create a New Token

The initial HTTP request is performed by clients to authenticate and obtain a token so that it can invoke other APIs. The HTTP POST response contains an 'opaque' URL to be used for HTTP GET and DELETE requests.

Verb	URI
POST	/api/v1/auth/token-services

Sample JSON Request

```
POST  /api/v1/auth/token-services
Accept: application/json
```

Sample JSON Response

```
200 OK
Content-Type: application/json
{
  "kind": "object#auth-token",
  "token-id": "1ZA23BC",
  "link":http://host/api/auth/token-services/johnDoe,
  "expiry-time": "00:15:00"
}
In subsequent API accesses, the token-id must appear as a custom HTTP header for
successful invocation of APIs.
X-auth-token: {token-id}
```

For example:

```
X-auth-token: "12a23bc"
```

Retrieve Active Tokens

Verb	URI
GET	/api/v1/auth/token-services

Sample JSON Request

```
GET  /api/v1/auth/token-services
X-auth-token: "1za23bc"

Accept: application/json
```

Sample JSON Response

```
403 Access Denied
```

Token Resource

A token represents successful authentication of a client.

JSON Representation of a token

```
{
  "kind": "object#auth-token",
  "token-id": "{string}",
  "link":      "{string}",
  "expiry-time": "{string}",
}
```

Field	Type	Description
kind	string	Must be "object#auth-token"
token-id	string	Authentication token that must be included as a custom HTTP header X-auth-token value in all API requests
link	string	Token resource URL.
expiry-time	string	Idle period in hh:mm:ss format.

Retrieve Token Details

Verb	URI
GET	/api/v1/auth/token-services/{opaque-token-id}

Sample JSON Request

```
GET  /api/v1/auth/token-services/johnDoe
X-auth-token: "1za23bc"
Accept: application/json
```

Sample JSON Request

```
200 OK

Content-Type: application/json

{
  "kind": "object#session-token",
  "token-id": "1za23bc"
  "expiry-time": "00:15:00"
}
```

Invalidate a Token

Typically tokens automatically expire after 15 minutes. However, clients can perform explicit invalidation of a token by doing a DELETE on the token resource.

Verb	URI
DELETE	/api/v1/auth/token-services/{opaque-token-id}

Global Configuration Requirements

Resource Summary for Global Configuration

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Host name	/api/v1/global/host-name	Y	N	Y	N
Domain name	/api/v1/global/domain-name	Y	N	Y	N
Collection of local users	/api/v1/global/local-users	Y	Y	N	N
A local user	/api/v1/global/local-users/{username}	Y	N	Y	Y
Global running configuration	/api/v1/global/running-config	Y	N	Y	N

Global Configuration – Hostname Resource

The hostname resource represents the global configuration hostname property.

Retrieve Device Hostname

Verb	URI
GET	/api/v1/global/host-name

Sample JSON Request

```
GET /api/v1/global/host-name
Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json

{
  "kind":     "object#host-name",
  "host-name":"{string}"
}
```

Property	Type	Description
kind	string	Object type. Always "object#hostname"
host-name	string	router name

Modify Device Hostname

Verb	URI
PUT	/api/v1/global/host-name

Sample JSON Request

```
PUT  /api/v1/global/host-name

Content-Type: application/json
Accept: application/json

{
  "host-name": "eng-router"
}
```

Sample JSON Response

```
200 Ok

Content-Type: application/json

{
  "host-name": "eng-router"
}
```

Sample JSON Response with no Response Body

```
204 No Content
```

Property	Type	Description
host-name	string	router name

Global Configuration – Domain Name Resource

Represents the domain name property of the global configuration.

Property	Type	Description
kind	string	Object type. Always "object#domain-name"
domain-name	string	Domain name

Retrieve Domain Name

Verb	URI
GET	/api/v1/global/domain-name

Sample JSON Request

```
GET /api/v1/global/domain-name
Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json
{
  "kind":     "object#domain-name",
  "domain-name": "cisco.com"
}
```

Modify Domain Name

Verb	URI
PUT	/api/v1/global/domain-name

Sample JSON Request

```
PUT  /api/v1/global/domain-name
```

```
Content-Type: application/json
Accept: application/json

{
  “domain-name”: cisco.com
}
```

Sample JSON Response

```
204 No Content
```

Global Configuration – Users Resource

Users resource represents the collection of local users who are allowed to access the Cisco CSR 1000V.

Create User Name

Verb	URI
POST	/api/v1/global/local-users

Sample JSON Request

```
POST /api/v1/global/local-users
Accept: application/json

Content-Type: application/json

{
   "username":  "jtod",
   "password" :  "re1st2",
   "privilege": 15
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/global/local-users/jtod
```

Property	Type	Description
kind	string	Object type. Has fixed value “object#local-user”
username	string	Name of the user. Once created, cannot be modified)
password	string	Password. Optional
privilege	number	Privilege level 0-15. Optional.

Retrieve All User Names

Resource URL: /api/v1/global/local-users

Verb	URI
GET	/api/v1/global/local-users

Sample JSON Request

```
GET /api/v1/global/local-users
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
  "kind": "collection#local-user"
  "users": [
             {
               "kind": "object#local-user",
               "username":  "jtod",
               "privilege":  15
              },
             {
               "kind": "object#local-user",
               "username":  "marym",
               "privilege":  7
              }
            ]
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "collection#local-user"
items	string	Array of user objects.

Global Configuration – User Resource

The user resource represents a locally defined user who is allowed to access the network element.

Resource URL: /api/v1/global/local-users/{username}

Retrieve User Name or Password

Verb	URI
GET	/api/v1/global/local-users/{user-name}

Sample JSON Request

```
GET /api/v1/global/local-users/marym
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
   "kind":       "object#local-user"
   "username" :  "marym",
   "password" :  "fi&p2",
   "privilege":  7
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "object#local-user"
username	string	Name of the user. Once created, cannot be modified
password	string	Password
privilege	number	Privilege level

Modify User Attributes

Verb	URI
PUT	/api/v1/global/local-users/{user-name}

Sample JSON Request

```
PUT /api/v1/global/local-users/marym
Accept: application/json

Content-Type: application/json

{
   "password" :  "78hello",
   "privilege":  15
}
```

Sample JSON Response

```
204 No Content
```

Property	Type	Description
kind	string	Object type. Has fixed value "object#local-user"

Property	Type	Description
password	string	Password. Optional
privilege	number	Privilege level 0-15. Optional.

Delete a User Name

Verb	URI
DELETE	/api/v1/global/local-users/{user-name}

Sample JSON Request

```
DELETE /api/v1/global/local-users/marym
```

Sample JSON Response

```
204 No Content
```

Global Configuration – Running-Config Resource

The Running-Config resource represents the Cisco IOS running configuration. Using this operation, you invoke a PUT operation by passing the snapshot of the running configuration as the request body.

Note There is no JSON representation for this resource. It supports only a text/plain representation that corresponds to IOS text configuration. GET and PUT operations correspond to Export and Import IOS actions.

Retrieving or Exporting the Running Configuration

Verb	URI
GET	/api/v1/global/running-config

Sample JSON Request

```
GET /api/v1/global/running-config
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: "text/plain"


!
! Last configuration change at 16:07:15 IST Fri Jun 15 2012
version 15.2
```

```
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
```

Import the Running Configuration

Note The running configuration file cannot contain a self-signed certificate. If the CSR already has a self-signed certificate, then the configuration file being imported cannot have a self-signed certificate unless the self-signed certificate is removed from CSR first.

Verb	URI
PUT	/api/v1/global/running-config

Sample JSON Request

```
PUT /api/v1/global/running-config

Content-Type: “text/plain”


!
! Last configuration change at 16:07:15 IST Fri Jun 15 2012
version 15.2
service timestamps debug datetime msec
service timestamps log datetime msec
no service password-encryption
!
hostname Router
!
```

Sample JSON Response

```
204 No Conten
```

Domain Name System (DNS) Server

Resource Summary for DNS Servers

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Collection of DNS servers	/api/v1/global/dns-servers	Y	Y	N	N
A DNS server	/api/v1/global/dns-servers/{dns-server-ip}	Y	N	N	Y

DNS Server Resource

The DNS server resource represents an individual DNS server configuration on the router.

Resource URL: /api/v1/global/dns-servers/(dns-server-id)

Retrieve a DNS Server

Verb	URI
GET	/api/v1/global/dns-servers/{dns-server-id}

Sample JSON Request

```
GET /api/v1/global/dns-server/172.25.25.25
```

```
Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json
{
  "kind":     "object#dns-server",
  "ip-address": "172.25.25.25",
  "primary":    true,
}
```

Delete a DNS Server

Verb	URI
GET	/api/v1/global/dns-servers/{dns-server-id}

Sample JSON Request

```
DELETE /api/v1/global/dns-servers/172.25.25.25
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

DNS Server Collection Resource

The DNS server collection resource epresents the DNS server configuration on the router. A POST on this resource is used to create individual DNS server resources.

Resource URL: /api/v1/global/dns

Property	Type	Description
kind	String	Object type. Always “collection#dns-server”
items	array	Array of DNS server objects
ip-address	ipaddress	DNS server’s IP address in x.x.x.x format
Primary	Boolean	“true” if the primary DNS server’s IP address is being configured, “false” otherwise.

Create a DNS Server

Verb	URI
POST	/api/v1/global/dns-servers

Sample JSON Request

```
POST /api/v1/global/dns-servers

Content-Type: application/json
Accept: application/json

{
  "ip-address": "173.25.25.25",
  "primary":   true
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/global/dns-servers/172.25.25.25
```

Retrieve All DNS Servers

Verb	URI
GET	/api/v1/global/dns-servers

The first DNS server listed is the primary one.

Sample JSON Request

```
GET /api/v1/global/dns-servers
Accept: application/json

Sample JSON Response

200 ok

Content-Type: application/json

{
  "kind":     "collection#dns-server"
  "items": [
            {
              "kind":     "object#dns-server",
              "ip-address": "173.25.25.25",
              "primary":true
            },
            {
              "kind":     "object#dns-server",
              "ip-address": "173.25.25.26",
              "primary":false
            },
         ]
```

```
}
```

Network Time Protocol (NTP)

Resource Summary for NTP

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Collection of NTP servers	/api/v1/global/ntp/servers	Y	Y	NA	N
A single NTP server	/api/v1/global/ntp/servers/{ntp-server}	Y	N	N	Y
Collection of active servers	/api/v1/global/ntp/servers/active	Y	N	N	Y
NTP status	/api/v1/global/ntp/status	Y	N	N	N

NTP Server Collection Resource

Resource URL: /api/v1/global/ntp/servers

JSON Representation

```
{
  "kind": "collection#ntp-server",
  "items": [
            { JSON object with kind "object#ntp-server" }
           ]
}
```

Property	Type	Description
kind	string	Object type. Always “collection#ntp-server”
ntp-servers	array	Array of ntp server objects
ntp-servers [ ].kind	string	Array object type. Always “object#ntp-server”
ntp-servers [ ].ip-address	string	CIDR format: x.x.x.x/nn or name

Create NTP Server

Verb	URI
POST	/api/v1/global/ntp/servers

Sample JSON Request

```
POST /api/v1/global/ntp/servers

Content-Type: application/json
Accept: application/json

{
  “ip-address”: “173.25.25.25”
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/global/ntp/servers/173.25.25.25
```

Retrieve all NTP Servers

Verb	URI
GET	/api/v1/global/ntp/servers

Sample JSON Request

```
GET /api/v1/global/ntp/servers
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-Type: application/json

{
  "kind":     "collection#ntp-server"
```

```
  "items": [
            {
             "kind": "object#ntp-server",
             "ip-address": "173.25.25.25"
            },
            {
             "kind": "object#ntp-server",
             "ip-address": "173.25.25.26"
            },
           ]
}
```

Property	Type	Description
Hostname	string	NTP server hostname. Either an IP address or a hostname must be configured. Read-only once the resource is created.

Retrieve a NTP Server

Verb	URI
GET	/api/v1/global/ntp/servers/{ntp-server-id}

Sample JSON Request

```
GET /api/v1/global/ntp/servers/172.25.25.25
Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json
{
  "kind":     "object#ntp-server",
  "ip-address": "172.25.25.25"
}
```

Delete a NTP Server

Verb	URI
DELETE	/api/v1/global/ntp/servers/{ntp-server-id}

Sample JSON Request

```
DELETE /api/v1/global/ntp/servers/172.25.25.25
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

NTP Status

Resource URL: /api/v1/global/ntp/status

JSON Representation

```
{
  "kind":     "object#ntp-status",
  "synchronized": {boolean},
  "statum": {number},
  "reference": "{ipaddress}",
  "nominal-freq": {number},
  "actual-freq": {number},
  "precision": {number},
  "reference-time": {number},
  "clock-offset": {number},
  "root-delay": {number},
  "root-dispersion": {number},
  "peer-dispersion": {number},
  "ntp-uptime": {number},
  "resolution": {number},

  "loop-filter-state": "{string}",
  "drift": {number},
  "system-poll-interval": {number},
  "last-update": {number}
}
```

Property	Type	Description
kind	string	“object#ntp-status”
synchronized	boolean	“false” if system is not synchronized to any NTP peer, “true” otherwise.
stratum	number	NTP stratum of this system.
reference	string	IP address of peer that the system is synchronized to. For IPv4 address, the address format is x.x.x.x Other possible values: INIT (initial state) when unsynchronized LOOP – Sync to local clock STEP – clock stepped DOWN – unspecified stratum case
nominal-freq	number	Nominal frequency of system hardware clock (in Hertz).
actual-freq	number	Measured frequency of system hardware clock (in Hertz).
precision	string	Precision of the clock of this system (in Hertz).
reference-time	number	Reference time stamp in hex UTC.
clock-offset	number	Offset of the system clock to synchronized peer. It is in ms.

Property	Type	Description
root-delay	number	Total delay along path to root clock. It is in ms.
root-dispersion	number	Dispersion of root path. It is in ms.
peer-dispersion	number	Dispersion of synchronized peer. It is in ms.
ntp-uptime	number	The uptime of the NTP entity, (i.e., the time since ntp was (re-)initialized not sysUptime!). The unit is timeticks (1/100 of seconds). "xx:xx:xx UTC"
resolution	number	The time resolution in integer format, where the resolution is represented as divisions of a second, e.g., a value of 1000 translates to 1.0 ms
last-update	number	Indicates when the clock was last updated in milliseconds. The value is 0 if it's never been updated.
loop-filter-state	string	The clock state: NSET(never set), FSET(drift set from file), SPIK(Spike), FREQ(Drift being measured),CTRL(normal controlled loop), UNSP(unspecified), UNKN (unknown)
drift	number	The frequency offset between the local clock hardware and the authoritative time from the NTP servers. The value is X seconds per second.
System-poll-interval	number	The value is in seconds.

Retrieve NTP Status

Verb	URI
GET	/api/v1/global/ntp/status

Sample JSON Request

```
GET /api/v1/global/ntp/status
Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json
{
  "kind":     "object#ntp-status",
  "synchronized": true,
```

```
  "statum": 4,
  "reference": 192.168.13.57,
  "nominal-freq": 250.0000,
  "actual-freq": 249.9990,
  "precision": 2**19,
  "reference-time": AFE2525E.70597B34,
  "clock-offset": 7.33,
  "root-delay": 133.36,
  "root-dispersion": 126.28,
  "peer-dispersion": 5.98,
  "loop-filter-state": "FSET",
  "drift": 0.0,
  "system-poll-interval": 8,
  "ntp-uptime": 0,
  "last-update": 0

}
}
```

NTP Associations

Resource URL: /api/v1/global/ntp/servers/active

JSON Representation

```
{
  "kind":     "collection#ntp-server-active",
  "items": [
             {
               "kind": "object#ntp-server-active",
               "address": "{ipaddress}",
               "peer-info": "{string}",
               "ref-clock": "{ipaddress}",
               "stratum": {number},
               "when": {number},
               "poll": {number},
               "reach": {number},
               "delay": {number},
               "offset": {number},
               "dispersion": {number}
              }
            ]
}
```

Field		Description
kind	string	Must be collection#ntp-server-active
peer-info	string	Can be one or more of the following: • “Synchronized to this peer” • “Almost synchronized to this peer” • “Peer selected for possible synchronization” • “Peer is a candidate for selection” • “Peer is statically configured”

Field		Description
Items	array	List of NTP servers' run-time information
Items-kind	string	Must be object#ntp-server-active
address	ipaddress	Address of peer.
Ref-clock	ipaddress	Address of reference clock of peer.
Stratum	number	Stratum of peer.
when	number	Time since last NTP packet was received from peer.
poll	number	Polling interval (in seconds).
reach	number	Peer reachability (bit string, in octal).
delay	number	Round-trip delay to peer (in milliseconds).
offset	number	Relative time of peer clock to local clock (in milliseconds).
dispersion	number	Dispersion

Retrieve NTP Server Run-time Information

Verb	URI
GET	/api/v1/global/ntp/servers/active

Sample JSON Request

```
GET /api/v1/global/ntp/servers/active
Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json
{
  "kind":     "collection#ntp-server-active",
  "items": [
             {
               "kind": "object#ntp-server-active",
               "address": "172.31.32.2",
               "peer-info": "peer is statically configured",
               "ref-clock": "172.31.32.1",
               "st": 5,
               "when": 29,
               "poll": 1024,
               "reach": 377,
               "delay": "4.2",
               "offset": "-8.59",
               "dispersion": "1.6"
             },

             {
```

```
                "kind": "object#ntp-server-active",
                "address": "192.168.13.57",
                "peer-info": "peer is statically configured. Peer selected for possible
synchronization"
                "ref-clock": "192.168.1.111",
                "st": 3,
                "when": 32,
                "poll": 128,
                "reach": 377,
                "delay": "7.9",
                "offset": "11.18",
                "dispersion": "3.6"
                }
            ]

}
```

IP Interface Configuration Requirements

Resource Summary for IP Interface

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Collection of interfaces	/api/v1/interfaces	Y	Y	N	N
An interface	/api/v1/interfaces/{if-id}	Y	N	Y	Y
Interface Statistics	/api/v1/interfaces/{if-id}/statistics	Y	Y	N	N
Interface State	/api/v1/interfaces/{if-id}/state	Y	N	Y	N

Interface Resourses

The following example is for a logical Ethernet network interface.

Sample JSON Request to Create a Loopback Interface

```
{
    "type":        "{string}",
    "if-name":      "{interface-name}",
```

```
    "description": "loopback interface",
    "ip-address":  "170.15.15.11",
    "subnet-mask": "255.255.255.0",
    "nat-direction": ""
}
```

Property	Type	Description
kind	string	Object type. Has the fixed value "object#interface"
type	string	Interface type. Read-only
if-name	string	Interface name. Note that the name follows the usual IOS slot/port convention.
description	string	Interface Description (Optional)
ip-address	ip-address	IP address in the format x.x.x.x
subnet-mask	ipsubnet	Subnet mask in the format x.x.x.x
nat-direction	string	Indicates if the interface is viewed as "inside" or "outside" from NAT point of view.

Retrieve Interface Details

Verb	URI
GET	/api/v1/interfaces/{if-id}

Sample JSON Request

```
GET /api/v1/interfaces/gigabitEthernet1
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json
{
    "kind":       "object#interface",
    "type":       "ethernet",
    "if-name":     "gigabitEthernet1",
    "description": "outside interface",
    "ip-address":  "172.15.15.15",
    "subnet-mask": "255.255.254.0",
    "nat-direction": "outside"
}
```

Modify an Interface Configuration

Verb	URI
PUT	/api/v1/interfaces/{if-id}

Sample JSON Request Changing the IP-address from 172.15.15.15 to 172.15.15.16

```
PUT /api/v1/interfaces/gigabitEthernet1

Content-Type: application/json
{
    "type":       "ethernet",
    "if-name":     "gigabitEthernet1",
    "description": "outside interface",
    "ip-address":  "172.15.15.16",
    "subnet-mask": "255.255.254.0",
    "nat-direction": "outside"
}
```

Sample JSON Response

```
204 No Content
```

Resource URL: /api/v1/interfaces/{if-id}

JSON Representation

```
{
    "kind":       "object#interface",
    "type":       "ethernet",
    "if-name":     "{string}",
    "if-id":       "{string}",
    "description": "{string}",
    "ip-address":  {ipaddress},
    "subnet-mask": {ipsubnet},
    "nat-direction": "{string}"

}
```

Delete an Interface

Verb	URI
DELETE	/api/v1/interfaces/{if-id}

Sample JSON Request

```
DELETE /api/v1/interfaces/11
```

Sample JSON Response

```
204 No Content
```

Interface Collection Resource

Property	Type	Description
kind	string	Object type. Has fixed value “collection#interface”
items	array	Array of interface objects

Create an Interface

Allows the creation of a loopback interface and an IP address. It cannot be on the same network as a physical interface. Once a loopback interface is configured, a router-id can be generated from it.

If the if-name in the HTTP POST body has a dash (e.g. myintf-0), the API controller code would add another dash to the if-name to make an if-id (e.g. myintf—0). The if-name with one dash should be passed to the 1-P API calls.

Example 1:

```
HTTP POST request body has “if-name”: “eth0/0”
HTTP header of the POST response returns “Location: http://host/api/v1/interfaces/eth0-0”
```

Later, in subsequent HTTP requests where eth0-0 appears in the URI, the REST API code replaces eth0-0 with eth0/0 to be passed to 1-P APIs.

Example 2:

```
HTTP POST request body has “if-name”: “eth0-0”
HTTP header of the POST response returns “Location: http://host/api/v1/interfaces/eth0--0”
```

Later, in subsequent HTTP requests containing eth0—0 in the URI, eth0-0 should be passed to the 1-P APIs.

Verb	URI
POST	/api/v1/interfaces

Sample JSON Request to Create a Loopback Interface

```
POST /api/v1/interfaces
Accept: application/json

Content-Type: application/json
{
    “type”:       “loopback”,
    “if-name”:     “loopback11”,
    “description”: “loopback interface”,
    “ip-address”:  “170.15.15.11”,
    “subnet-mask”: “255.255.255.0”,
    “nat-direction”: “”
}
```

Sample JSON Response Returning the Interface ID

```
201 Created
Location: http://host/api/v1/interfaces/loopback11_ifid
```

Sample JSON Request to create a sub-interface (post IOS-XE 3.10):

```
(conf t)# interface gigabitEthernet0.100

POST /api/v1/interfaces

Content-Type: application/json
Accept: application/json

{
    "type":       "ethernet",
    "if-name":     "gigabitEthernet0.100",
    "description": "sub-interface for Cisco",
    "ip-address":  "180.15.15.11",
    "subnet-mask": "255.255.255.0",
    "nat-direction": ""
}
```

Sample JSON Response

```
201 Created

Location: http://host/api/v1/interfaces/gigabitEthernet0.100
```

Retrieve All interfaces and Details

Verb	URI
GET	/api/v1/interfaces

Sample JSON Request

```
GET /api/v1/interfaces/gigabitEthernet

Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json
{
 "kind":       "collection#interface",
 "items": [
           {
             "kind":       "object#interface",
             "type":       "ethernet",
             "if-name":     "gigabitEthernet0",
             "description": "management interface",
             "ip-address":  "129.10.10.10",
             "subnet-mask": "255.255.254.0"
           },

           {
```

```
            "kind":       "object#interface",
            "type":       "ethernet",
            "if-name":     "gigabitEthernet1",
            "description": "outside interface",
            "ip-address":  "172.15.15.15",
            "subnet-mask": "255.255.254.0",
            "nat-direction": "outside"
          },
          {
            "kind":       "object#interface",
"type":       "ethernet",
            "if-name":     "gigabitEthernet2",
            "description": "inside interface",
            "ip-address":  "10.10.10.15",
            "subnet-mask": "255.255.254.0",
            "nat-direction": "inside"
          }
        ]
}
```

Interface State

Property	Type	Description
kind	string	Object type. Has the fixed value "object#interface-state"
if-name	string	Interface Name. Read-only
enabled	boolean	Enables (up) or Disables(down) interface

Retrieve Interface State

Verb	URI
GET	/api/v1/interfaces/{if-id}/state

Sample JSON Request

```
GET /api/v1/interfaces/gigabitEthernet1/state

Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json
Accept: application/json


{
```

```
    "kind":    "object#interface-state",
    "if-name": "gigabitEthernet1",
    "enabled": true
}
```

Bring an Interface Up or Down

Verb	URI
PUT	/api/v1/interfaces/{if-id}/state

Sample JSON Request to "no shut" GigabitEthernet1

```
PUT /api/v1/interfaces/gigabitEthernet1/state

Content-Type: application/json
Accept: application/json

{
    "if-name": "gigabitEthernet1",
    "enabled": true
}
```

Sample JSON Response

```
204 No Content
```

Interface Statistics

Property	Type	Description
kind	string	Object type. Has the fixed value "object#interface-statistics"
if-name	string	Interface Name. Read-only
in-errors	number	Sum of all input related errors
in-packet-drops	number	Input packet drop count is caused when the input queue is full.
in-current-packets	number	Total packets received since the last reset of statistics
in-packet-rate-bps	number	Input packet receive rate in bytes per second
in-packet-rate-pps	number	Input packet receive rate in packets per second
out-errors	number	Sum of all output related errors
out-packet-drops	number	Output packet drop count is caused when the output queue is full.

Property	Type	Description
out-current-packets	number	Total packets transmitted since the last statistics
out-packet-rate-bps	number	Output packet transmit rate in bytes per second
out-packet-rate-pps	number	Output packet transmit rate in packets per second

Retrieve Interface Statistics

Verb	URI
GET	/api/v1/interfaces/{if-id}/statistics

Sample JSON Request

```
GET /api/v1/interfaces/gigabitEthernet1/statistics

Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
    "kind":       "object#interface-statistics",
    "if-name":             "gigabitEthernet1",
    "in-errors" :          0,
    "in-packet-drops" :    0,
    "in-current-packets" : 17,
    "in-packet-rate-bps" : 0,
    "in-packet-rate-pps" : 0,

    "out-errors" :          0,
    "out-packet-drops" :    0,
    "out-current-packets" : 0,
    "out-packet-rate-bps" : 0,
    "out-packet-rate-pps" : 0
```

Clear Interface Statistics

This resource also supports clearing of interface statistics by doing a POST on the resource with the following request message. See Resource specific operations for more details & examples.

Sample JSON Request

```
POST /api/v1/interfaces/gigabitEthernet2/statistics

Content-Type: application/json
```

```
Accept: application/json

{
 "action": "clear"
}
```

Sample JSON Response

```
204 No Content
```

DHCP Server and Relay Agent

Resource Summary for DHCP Server and Relay Agent

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Collection of DHCP servers	/api/v1/dhcp	Y	N	Y	N
Collection of DHCP pools	/api/v1/dhcp/pool	Y	Y	N	N
DHCP pool	/api/v1/dhcp/pool/{pool-name}	Y	N	Y	Y
Collection of active bindings	/api/v1/dhcp/active/bindings	Y	Y	N	N
Host IP address for the active bindings	/api/v1/dhcp/active/bindings/{host-ip}	Y	N	N	Y

DHCP Server Resource

JSON Representation

```
{
    "kind":  "object#dhcp-server"
    "enable":{boolean},
    "excluded-addresses": [
                {
                  "kind": "object#dhcp-server-excluded-address"
                  "low-ip-address":"{ipaddress}",
                  "high-ip-address":"{ipaddress}"
                  }
       ],
    "relay-agents": [
                {
                     "kind": "object#dhcp-server-relay-agent",
                     "interface":  "{string}",
                     "addresses":  [ "{string}" ]
                }
         ]
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "object#dhcp-server"
enable	boolean	Enable/disable DHCP server and Relay agent features
excluded-addresses	array	Array of excluded addresses from this DHCP pool
excluded-addresses[ ].low-ip-address	ipaddress	Excluded low IP address in x.x.x.x format.
excluded-addresses[ ].high-ip-address	ipaddress	Excluded high IP address in x.x.x.x format. Optional
relay-agent	array	DHCP server IP address or network address in x.x.x.x format. Destination broadcast or host address to be used when forwarding UDP broadcasts. There can be more than one helper address per interface. Optional.
relay-agent interface-name	string	Interface name
relay-agent.address	string	List of DHCP server addresses or network addresses in x.x.x.x format.

Retrieve DHCP Server

Verb	URI
GET	/api/v1/dhcp

Sample JSON Request

```
GET /api/v1/dhcp
```

```
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
    "kind":  "object#dhcp-server""enable"
    "enable": true,
    "excluded-addresses": [
{
                "kind": "object#dhcp-server-excluded-address"
                "low-ip-address": "171.16.1.1",
                "high-ip-address": "171.16.1.50"
                }
       ],
    "relay-agents": [
                {
                     "kind": "object#dhcp-server-relay-agent",
                     "interface-name" :  "gigabitEthernet1",
                     "addresses":   [ "172.15.15.15" ]
                }
       ]
}
```

Modify Global DHCP Parameters

HTTP PUT is used to configure one or several DHCP relay-agents. Note that all the relay-agent (interface-name, address) that were previously configured and which the user does not want to delete should re-appear in the HTTP PUT request. Otherwise, they will be deleted. The same holds for the list of excluded-addresses.

Sample JSON Request to Modify the High-IP Address Excluded Address

```
PUT /api/v1/dhcp

Content-Type: application/json
Accept: application/json

{
    "enable": true,
    "excluded-addresses": [
                {
                  "low-ip-address": "172.16.1.1",
                  "high-ip-address": "171.16.1.30"
                }
       ],
    "relay-agents": [
                {
                     "interface-name" :  "gigabitEthernet1",
                     "addresses":   [ "172.15.15.15" ]
                }
        ]
}
```

Sample JSON Response

```
204 No Content
```

DHCP Server Address Pool Resource

Represents a DHCP address pool. An address pool can be a dynamic one where an address range is specified, or a manual binding specification. Only one of the types can exist in a given pool.

JSON Representation

```
{
    "kind":  "object#dhcp-server-pool"
    "poolName": "{string}",
    "dynamic": {
       "address-range":"{cidr_addr}",
       "lease-duration":
                {
                   "infinite" : {boolean},
                   "days": {number},
                   "hours": {number},
                   "minutes": {number},
                },
      }
    "manual": {
        "host-ip-address":"{ipaddress}",
        "mac-address": "{string}",
        "client-name": "{string}",
     }
    "options": {
       "domain-name": "{string}",
       "default-gateway": "{ipaddress}",
       "dns-servers": ["{ipaddress}","{ipaddress}"],
       "netbios-name-servers": ["{ipaddress}","{ipaddress}"],
       "netbios-node-type": "{string}"
      }
}
```

Property	Type	Description
kind	string	Object type. Has the fixed value "dhcp-server-pool"
pool-name	string	DHCP pool name
dynamic	object	Dynamic Address pool details. Optional. Only one of "dynamic" or "manual" objects must be present.
manual	object	Manual binding details. Optional. Only one of "dynamic" or "manual" objects must be present.
options	object	Pool options.
dynamic address-range	cidr-addr	The subnet network number and prefix length of the DHCP address pool in CIDR format: x.x.x.x/nn
dynamic.lease-duration	object	Duration of the lease for address assignment to host. The default is one-day lease. Optional.
dynamic.lease-duration.infinite	boolean	Specifies if lease duration never expires.
dynamic.lease-duration.days	number	Days part of the duration. Optional. If not specified, default of 1 day is used.
dynamic.lease-duration.hours	number	hours part of the duration. Optional. Days part is mandatory if hours is specified

Property	Type	Description
dynamic.lease-duration.minutes	number	minutes part of the duration. Optional. Hours part is mandatory if minutes is specified
manual.host-ip-address	ipaddress	IP address to be assigned to the host in x.x.x.x format.
manual.mac-address	string	Host Mac address xx:xx:xx:xx:xx:xx in hex format .
manual.client-name	string	Name of the client in any standard ASCII character. The client name should not include the domain name. For example, the name mars should not be specified as mars.cisco.com. Optional.
options.domain-name	string	Domain name for a DHCP client. Optional.
options.default-gateway	ipaddress	Default router for a DHCP client: IP address in x.x.x.x format. Up to 8 can be configured. Optional.
options.dns-servers	array	Array of IP addresses. Each element of the array should be an IP address in the format x.x.x.x. Up to 8 can be configured.
options.netbios-name-servers	array	Array of NETBIOS name server (WINS) IP addresses. Each element of the array should be an IP address in the format x.x.x.x. Up to 8 can be configured.
options.netbios-node-type	string	Netbios node type for windows hosts

Retrieve Address Pool

Verb	URI
GET	/api/v1/dhcp/pool/{pool-name}

Sample JSON Request

```
GET /api/v1/dhcp/pool/myDhcpPool
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
    "kind":  "object#dhcp-server-pool"
    "poolName": "myDhcpPool",
    "dynamic": {
       "address-range": "172.16.1.0/24",
       "lease-duration":
                {
                   "days": 30,
                },
      }
    "options": {
       "default-gateway": ["172.16.1.100", "172.16.1.101"]
```

```
      }
}
```

Modify a DHCP Address Pool

Verb	URI
PUT	/api/v1/dhcp/pool/{pool-name}

Sample JSON Request to Modify the Lease Days to 60

```
PUT /api/v1/dhcp/pool/myDhcpPool

Content-Type: application/json
Accept: application/json

{
    "poolName": "myDhcpPool",
    "dynamic": {
       "address-range": "172.16.1.0/24",
       "lease-duration":
                {
                   "days": 60
                },
      }
    "options": {
       "default-gateway": ["172.16.1.100", "172.16.1.101"]
      }
}
```

Sample JSON Response

```
204 No Content
```

Delete Address Pool

Verb	URI
DELETE	/api/v1/dhcp/pool/{pool-name}

Sample JSON Request

```
DELETE /api/v1/dhcp/pool/myDhcpPool
```

Sample JSON Response

```
204 No Content
```

DHCP Server Pool Collection Resource

Represents a collection of configured DHCP address pools.

Property	Type	Description
kind	string	Object type. Has fixed value “collection#dhcp-server-pool”
items	array	Array of DHCP pool objects.

Retrieve all DHCP Address Pools

Verb	URI
GET	/api/v1/dhcp/pool

Sample JSON Request

```
GET /api/v1/dhcp/pool
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json
Accept: application/json

{
    "kind":  "collection#dhcp-server-pool",
    "items": [
               {
                 "poolName": "myDynamicDhcpPool",
                 "dynamic":{"address-range": "172/16.0.0/16"},
                 "options": {
                           "domain-name": "cisco.com",
                           "dns-servers": [
                                          "172.16.1.102",
                                          "172.16.2.102"
                                        ],
                           "netbios-name-servers":[
                                                "172.16.1.103",
                                                    "172.16.2.103"],
                           "netbios-node-type": "h-node"
                          }
                },
              {
                 "poolName": "myManualBinding",
                 "manual": {
                             "host-ip-address": "172.16.2.254",
                             "mac-address": "02c7.f800.0422",
                             "client-name": "Mars",
                           }
            }
          ]
}
```

Create a DHCP Address Pool

Verb	URI
POST	/api/v1/dhcp/pool

Sample JSON Request

```
POST /api/v1/dhcp/pool

Content-Type: application/json
Accept: application/json

{
    "poolName": "myDhcpPool",
    "dynamic": {
       "address-range": "172.16.1.0/24",
       "lease-duration": { "days": 30 }
      },
    "options": {
       "default-gateway": ["172.16.1.100", "172.16.1.101"]
      }
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/dhcp/pool/myDhcpPool
```

DHCP Server Binding Resource

Represents a single DHCP active address binding. Includes both manual/automatic.

Resource URL: /api/v1/dhcp/bindings/{host-ip}

JSON Representation

```
{
  "kind": "object#dhcp-server-binding"
  "host-ip-address": "{ipaddress}",
  "mac-address":      "{string}",
  "lease-expiration-time": "{datetime}",
  "type":            "{string}"
}
```

Property	Type	Description
kind	string	Object type. Has fixed value “collection#dhcp-server-binding”
host-ip-address	ipaddress	IP address assigned to host
mac-address	string	Host’s mac address in xxxx.xxxx.xxxx format

Property	Type	Description
lease-expiration-time	string	Lease expiration time in the format YYYY:MM:DD HH:MM or “infinite”
type	string	Binding Type with values “Automatic” or “Manual”

Retrieve a Host Binding

Verb	URI
GET	/api/v1/dhcp/active/bindings/{host-ip}

Sample JSON Request

```
GET /api/v1/dhcp/active/bindings/172.16.1.11
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
  "kind": "object#dhcp-server-binding"
  "host-ip-address":  "172.16.1.11",
  "mac-address":      "00a0.9802.32de",
  "lease-expiration-time": "2013:02:01 01:00" ,
  "type":             "automatic"
}
```

Clear an Active Binding

Verb	URI
DELETE	/api/v1/dhcp/active/bindings/{host-ip}

Sample JSON Request

```
DELETE /api/v1/dhcp/active/bindings/172.16.1.11
```

Sample JSON Response

```
204 No Content
```

DHCP Server Active Bindings Collection Resource

Represents DHCP active address bindings.

Resource URL: /api/v1/dhcpbindings

JSON Representation

```
{
  "kind": "collection#dhcp-server-bindings"
  "items": [
      {DHCP binding json object}*
   ]
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "collection#dhcp-server-bindings"
items	array	Array of DHCP binding objects with the kind "object#dhcp-server-binding"

This resource also supports clearing of all automatic bindings by doing a POST on the resource with the following request message. See Resource specific operations for more details & examples.

JSON Representation

```
{
 "action": "clear"
}
```

Retrieve all Active Bindings

Verb	URI
GET	/api/v1/dhcp/active/bindings

```
show ip dhcp binding

IP address     Hardware address    Lease expiration      Type
172.16.1.11    00a0.9802.32de      Feb 01 2013 01:00 AM  Automatic
172.16.2.254   02c7.f800.0422      Infinite              Manual
```

Sample JSON Request

```
GET /api/v1/dhcp/active/bindings
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
  "kind": "collection#dhcp-server-bindings"
  "items": [
            {
              "kind": "object#dhcp-server-binding",
              "host-ip-address":  "172.16.1.11",
```

```
            "mac-address":      "00a0.9802.32de",
            "lease-expiration-time": "2013:02:01 01:00" ,
                "type":             "automatic"
          },
          {
            "kind": "object#dhcp-server-binding"
            "host-ip-address":  "172.16.2.254",
            "mac-address":      "02c7.f800.0422",
            "lease-expiration-time": "infinite" ,
            "type":             "manual"
          }
   ]
}
```

Clear Active Binding

Verb	URI
POST	/api/v1/dhcp/active/bindings

Sample JSON Request

```
POST /api/v1/dhcp/active/bindings
Accept: application/json

{
  "action": "clear"
}
```

Sample JSON Response

```
204 No Content
```

Routing Protocol (OSPF, BGP, EIGRP) Requirements

Resource Summary for Routing Protocols

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
All OSPF passive interfaces	/api/v1/routing-svc/ospf/{routing-protocol-id}/passive	Y	N	N	N

		HTTP Method			
All EIGRP passive interfaces	/api/v1/routing-svc/eigrp/{routing-protocol-id}/passive	Y	N	N	N
Enables/ Disables the OSPF route updates on an interface	/api/v1/routing-svc/ospf/{routing-protocol-id}/passive/{if-id}	Y	N	Y	N
Enables/ Disables the route updates on an interface	/api/v1/routing-svc/eigrp/{routing-protocol-id}/passive/{if-id}	Y	N	Y	N
OSPF process id	/api/v1/routing-svc/ospf	N	Y	N	N
BGP ASN	/api/v1/routing-svc/bgp	N	Y	N	N
EIGRP ASN	/api/v1/routing-svc/eigrp	N	Y	N	N
OSPF routing process instance	/api/v1/routing-svc/ospf/{routing-protocol-id}	N	N	N	Y
BGP routing process instance	/api/v1/routing-svc/bgp/{routing-protocol-id}	N	N	N	Y
EIGRP routing process instance	/api/v1/routing-svc/eigrp/{routing-protocol-id}	N	N	N	Y
OSPF network	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks	Y	Y	N	N
EIGRP Networks	/api/v1/routing-svc/eigrp/{routing-protocol-id}/networks	Y	Y	N	N
BGP Networks	/api/v1/routing-svc/bgp/{routing-protocol-id}/networks	Y	Y	N	N
An OSPF network	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks/{network-id}	Y	N	N	Y
An EIGRP network	/api/v1/routing-svc/eigrp/{routing-protocol-id}/networks/{network-id} {network-id} is the ipaddress_prefixLen	Y	N	N	Y
A BGP network	/api/v1/routing-svc/bgp/{routing-protocol-id}/networks/{network-id} The network-id appears in the URL as ipaddr_prefixLen (CIDR format).	Y	N	N	Y

		HTTP Method			
BGP neighbors	/api/v1/routing-svc/bgp/{asn-id}/neighbors Only BGP requires neighbor configuration. OSPF and EIGRP learn their neighbors.	Y	Y	N	N
BGP neighbor	/api/v1/routing-svc/bgp/{asn-id}/neighbors/<neighbor-ip-address>	Y	N	Y	Y
Routing table	/api/v1/routing-svc/routingTable	Y	N	N	N
Static routes	/api/v1/routing-svc/static-routes	Y	Y	N	N
A static route	/api/v1/routing-svc/static-routes/{destination-network_next-hop} - or - /api/v1/routing-svc/static-routes/{destination-network_next-hop_intf-name} - or - /api/v1/routing-svc/static-routes/{destination-network_next-hop_intf-name}	Y	N	N	Y

Routing Protocol Instance Identifier Creation

Verb	URI
POST	/api/v1/routing-svc/{routing-protocol}

URI Property	Description
{routing-protocol}	BGP, OSPF, or EIGRP

Property	Type	Description
Routing-protocol-type	string	“OSPF”, “BGP”, or “EIGRP”. Optional in request, must appear in response.
routing-protocol-id	string	Unique routing protocol ID. Ex: EIGRP ASN, BGP ASN, OSPF process ID. Note that for now, IOS supports only 1 BGP routing instance.
Router-id	ipaddress	IP address in x.x.x.x format. Optional.

Create a BGP Instance

Sample JSON Request

```
POST  /api/v1/routing-svc/bgp

Content-Type: application/json
Accept: application/json

{
  "routing-protocol-id": 100
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/routing-svc/bgp/100
```

Create an OSPF Process ID

Sample JSON Request

```
POST  /api/v1/routing-svc/ospf

Content-Type: application/json
Accept: application/json

{
  "routing-protocol-id": "100"
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/routing-svc/ospf/100
```

Create an EIGRP ASN

Sample JSON Request

```
POST  /api/v1/routing-svc/eigrp

Content-Type: application/json
Accept: application/json

{
  "routing-protocol-id": "100"
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/routing-svc/eigrp/100
```

HTTP Deleting of a Routing Protocol Instance Identifier

Verb	URI
DELETE	/api/v1/routing-svc/{routing-protocol}/{routing-protocol-id}

URI Property	Description
{routing-protocol}	BGP, OSPF, or EIGRP
{routing-protocol-id}	EIGRP ASN, BGP ASN, or OSPF process id.

Delete a BGP ASN

Sample JSON Request

```
DELETE  /api/v1/routing-svc/bgp/100
```

Sample JSON Response

```
204 No Content
```

Delete an EIGRP ASN

Sample JSON Request

```
DELETE  /api/v1/routing-svc/eigrp/100
```

Sample JSON Response

```
204 No Content
```

Delete an OSPF Process ID

Sample JSON Request

```
DELETE  /api/v1/routing-svc/ospf/100
```

Sample JSON Response

```
204 No Content
```

Retrieve all Routing Protocol IDs

Verb	URI
GET	/api/v1/routing-svc/{routing-protocol}

URI Property	Description
{routing-protocol}	BGP, OSPF, or EIGRP

Retrieve all BGP ASN

Sample JSON Request

```
GET  /api/v1/routing-svc/bgp
Accept: application/json
```

Sample JSON Response

```
200 ok
Content-type: application/json

{
   "kind": "collection#bgp-asn",
   "items": [
              {
                "kind": "object#bgp-asn",
                "routing-protocol-id": "100"
               },
               …
             ]
}
```

Retrieve all EIGRP ASNs

Sample JSON Request

```
GET  /api/v1/routing-svc/eigrp
Accept: application/json
```

Sample JSON Response

```
200 ok
Content-type: application/json

{
   "kind": "collection#eigrp-asn",
   "items": [
              {
                 "kind": "object#eigrp-asn",
                 "routing-protocol-id": "100"
               },
              …
             ]
}
```

Retrieve all OSPF Process IDs

Sample JSON Request

```
GET  /api/v1/routing-svc/ospf
```

```
Accept: application/json
```

Sample JSON Response

```
200 ok
Content-type: application/json

{
   "kind": "collection#ospf-process-id",
   "items": [
              {
                "kind": "object#ospf-process-id",
                "routing-protocol-id": "100"
              },
              …
            ]
}
```

BGP Network Collection Resource

Configure a BGP network

Verb	URI
POST	/api/v1/routing-svc/bgp/{routing-protocol-id}/networks

URI Property	Description
{routing-protocol-id}	BGP ASN

Sample JSON Request

```
POST  /api/v1/routing-svc/bgp/100/networks

Content-type: application/json
Accept: application/json

{
   "network": "172.17.1.0/24"
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/routing-svc/bgp/100/networks/172.17.1.0_24
```

Property	Type	Description
network	ipaddress	Destination network in CIDR format x.x.x.x/nn

Retrieve All BGP Networks

Verb	URI
GET	/api/v1/routing-svc/bgp/{routing-protocol-id}/networks

URI Property	Description
{routing-protocol-id}	BGP ASN

Sample JSON Request

```
GET  /api/v1/routing-svc/bgp/100/networks
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind": "collection#bgp-network",
  "routing-protocol": "bgp",
  "routing-protocol-id": "100",
  "items": [
             {
               "kind": "object#bgp-network",
               "network": "172.17.1.0/24"
             },
             {
               "kind": "object#bgp-network",
               "network": "173.17.1.0/24"
             },
                …
           ]
}
```

Property	Type	Description
network	string	Destination network CIDR format x.x.x.x/nn

BGP Network Resource

Retrieve a BGP Network

Sample JSON Request

```
GET  /api/v1/routing-svc/bgp/100/networks/10.0.0.0_24
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind": "object#bgp-network",
  "routing-protocol": "bgp",
  "routing-protocol-id": "100",
  "network": "10.0.0.0/24"
}
```

Delete a BGP Network

Sample JSON Request

```
DELETE  /api/v1/routing-svc/bgp/100/networks/10.0.0.0_24
```

Sample JSON Response

```
204 No Content
```

EIGRP Network Collection Resource

Create an EIGRP Network

Verb	URI
POST	/api/v1/routing-svc/eigrp/{routing-protocol-id}/networks

URI Property	Description
{routing-protocol-id}	EIGRP ASN

Sample JSON Request

```
POST  /api/v1/routing-svc/eigrp/145/networks

Content-type: application/json
Accept: application/json

{
    "network": "131.108.0.0/24"
}
```

Sample JSON Response

```
201 Created
```

```
Location: http://host/api/v1/routing-svc/eigrp/145/networks/131.108.0.0_24
```

Property	Type	Description
network	string	Destination network CIDR format x.x.x.x/nn

Retrieve all the Configured EIGRP Networks

Verb	URI
GET	/api/v1/routing-svc/eigrp/{routing-protocol-id}/networks

URI Property	Description
{routing-protocol-id}	EIGRP ASN

Sample JSON Request

```
GET  /api/v1/routing-svc/eigrp/145/networks
Accept: application/json
```

Sample JSON Response

```
200 ok


Content-type: application/json
{
    "kind": "collection#eigrp-network"
    "routing-protocol-id": "145",
    "routing-protocol": "eigrp",
    "items": [
            {
              "kind": "object#eigrp-network",
              "network": "172.17.1.0/24"
            },
            {
              "kind": "object#eigrp-network",
              "network": "173.17.1.0/24"
            },
               …
          ]
}
```

Property	Type	Description
network	string	Destination network CIDR format x.x.x.x/nn

EIGRP Network Resource

Retrieve an EIGRP Network

Verb	URI
GET	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks/{network_mask}

URI Property	Description
{routing-protocol-id}	EIGRP ASN
{network_mask}	Network and the prefix length joined by an underscore.

Sample JSON Request

```
GET /api/v1/routing-svc/eigrp/10/networks/131.108.200.0_24
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
   "kind": "object#eigrp-network",
   "routing-protocol": "eigrp",
   "routing-protocol-id": "10",
   "network": "131.108.200.0/24"
}
```

Property	Type	Description
kind	string	“object#eigrp-network”. Read-only.
routing-protocol	string	“eigrp”
routing-protocol-id	number	EIGRP ASN
network	string	Destination network CIDR format x.x.x.x/nn.

Delete an EIGRP Network

Verb	URI
DELETE	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks/{network_mask}

URI Property	Description
{routing-protocol-id}	EIGRP ASN
{network_mask}	Network and the prefix length joined by an underscore.

Sample JSON Request

```
DELETE /api/v1/routing-svc/eigrp/10/networks/131.108.200.0_24
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

OSPF Network Collection Resource

Configure an OSPF Network

Verb	URI
POST	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks

URI Property	Description
{routing-protocol-id}	OSPF process ID

Sample JSON Request

```
POST  /api/v1/routing-svc/ospf/10/networks

Content-type: application/json
Accept: application/json

{
   "network" : "131.108.200.0/24",
   "area" : 0
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/routing-svc/ospf/10/networks/131.108.200.0_24_0
```

Property	Type	Description
area	string	OSPF area as a decimal value or IP address format x.x.x.x
network	string	Destination network CIDR format x.x.x.x/nn

Retrieve All Configured OSPF Networks

Verb	URI
GET	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks

URI Property	Description
{routing-protocol-id}	OSPF process ID

Sample JSON Request

```
GET  /api/v1/routing-svc/ospf/10/networks
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json
{
   "kind": "collection#ospf-network",
   "routing-protocol": "ospf",
   "routing-protocol-id": 10,
   "networks": [
                 {
                   "kind": "object#ospf-network",
                   "network" : "171.108.201.0/24",
                   "area" : 0
                  },
                 {
                   "kind": "object#ospf-network",
                   "network" : "171.108.202.0/24",
                   "area" : 1
                  },
               ]
```

Property	Type	Description
area	string	OSPF area as a decimal value or IP address format x.x.x.x.
network	string	Destination network CIDR format x.x.x.x/nn

OSPF Network Resource

Retrieve an OSPF Network

Verb	URI
GET	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks/{network_mask_area}

URI Property	Description
{routing-protocol-id}	OSPF process ID
{network_mask_area}	Network, the prefix length, and the OSPF area joined by an underscore.

Sample JSON Request

```
GET /api/v1/routing-svc/ospf/10/networks/131.108.200.0_24_0
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
   "kind": "object#ospf-network",
   "routing-protocol": "ospf",
   "routing-protocol-id": "10",
   "network": "131.108.200.0/24",
   "area": 0
```

Property	Type	Description
kind	string	“object#ospf-network”. Read-only.
routing-protocol	string	“ospf”
routing-protocol-id	number	OSPF process ID.
network	string	Destination network CIDR format x.x.x.x/nn.
area	string	OSPF area as a decimal value or IP address format x.x.x.x. The HTTP PUT can modify the area.

Delete an OSPF Network

Verb	URI
DELETE	/api/v1/routing-svc/ospf/{routing-protocol-id}/networks/{network_mask_mask}

URI Property	Description
{routing-protocol-id}	OSPF process ID
{network_mask_area}	Network, the prefix length, and the OSPF area joined by an underscore.

Sample JSON Request

```
DELETE /api/v1/routing-svc/ospf/10/networks/131.108.200.0_24_0
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

BGP Neighbor Collection Resource

Configure a BGP Neighbor

Verb	URI
POST	/api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors

URI Property	Description
{routing-protocol-id}	BGP ASN

Sample JSON Request

```
POST  /api/v1/routing-svc/bgp/100/neighbors

Content-type: application/json
Accept: application/json

{
  "routing-protocol-id": "100",
  "address": "152.13.25.25",
  "remote-as": 100
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/bgp/100/neighbors/152.13.25.25
```

Property	Type	Description
Routing-protocol-id	Number	BGP ASN. Cannot be modified.
address	ipaddress	Neighbor IP address format x.x.x.x. Once it is provisioned, it cannot be modified.
remote-as	string	Neighbor's AS as a decimal 1-4294967295 (4 byte), or a <1.0-XX.YY> . Can be modified later.

Retrieve all Static BGP Neighbors

Verb	URI
GET	/api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors

URI Property	Description
{routing-protocol-id}	BGP ASN

Sample JSON Request

```
GET  /api/v1/routing-svc/bgp/100/neighbors
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind": "collection#bgp-neighbor",
  "routing-protocol-id": "100",
  "items": [
                {
                 "kind": "object#bgp-neighbor",
                 "address": "152.13.25.25",
                 "remote-as": "100"
                },
                {
                 "kind": "object#bgp-neighbor",
                 "address": "144.12.13.1",
                 "remote-as": "10"
                }
```

```
                ]
}
```

BGP Neighbor Resource

JSON Representation for BGP Neighbor Configuration

```
{
  "kind": "object#bgp-neighbor"
  "routing-protocol-id": {number},
  "neighbor":"{ipaddress}",
  "remote-asn": "{string}"
}
```

Property	Type	Description
kind	string	Can only be "object#bgp-neighbor"
routing-protocol-id	number	BGP ASN
neighbor	ipaddress	IP address format x.x.x.x
remote-asn	string	Neighbor's ASN

Modify a BGP Neighbor

Verb	URI
PUT	/api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors/{neighbor-id}

URI Property	Description
{routing-protocol-id}	BGP ASN
{neighbor-id}	Neighbor IP address in x.x.x.x format

Sample JSON Request

```
PUT  /api/v1/routing-svc/bgp/100/neighbors/152.13.25.25

Content-type: application/json
Accept: application/json

{
   "routing-protocol-id": 100,
    "address": "152.13.25.25",
    "remote-as": "222"
}
```

Sample JSON Response

```
204 No Content
```

Property	Type	Description
neighbor	ipaddress	Neighbor IP address format x.x.x.x. Cannot be modified.
remote-as	string	Neighbor's ASN

Retrieve a BGP Neighbor

Verb	URI
GET	/api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors/{neighbor-id}

URI Property	Description
{routing-protocol-id}	BGP ASN
{neighbor-id}	Neighbor IP address in x.x.x.x format

Sample JSON Request

```
GET  /api/v1/routing-svc/bgp/100/neighbors/152.13.25.25

Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json
{
  "kind": "object#bgp-neighbor",
  "routing-protocol-id": 100,
  "address": "152.13.25.25",
  "remote-as": 222
}
```

Delete a BGP neighbor

Verb	URI
DELETE	/api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors/{neighbor-id}

URI Property	Description
{routing-protocol-id}	BGP ASN
{neighbor-id}	Neighbor IP address in x.x.x.x format

Sample JSON Request

```
DELETE  /api/v1/routing-svc/bgp/100/neighbors/152.13.25.25
```

Sample JSON Response

```
204 No Content
```

Enabling and Disabling Routing Updates on an Interface (Passive Interface for OSPF and EIGRP)

JSON Representation

```
{
   "routing-protocol-id": "{string}",
   "routing-protocol-type": "{string}",
   "if-name": "{string}",
   "passive": {boolean}
}
```

Property	Type	Description
routing-protocol-type	string	Ospf or eigrp (not case-sensitive)
routing-protocol-id	string	EIGRP ASN or OSPF process ID.
if-name	string	Name of an interface
passive	boolean	“true” to disable sending routing updates on the interface, or “false” to re-enable.

Suppress Sending of Routing Updates through a Specified Interface

Note This command is not applicable to BGP.

This command has no meaning or effect unless the routing protocol is running on the interface through the network commands.

Verb	URI
PUT	/api/v1/routing-svc/{routing-protocol}/{routing-protocol-id}/passive/{if-id}

Sample JSON Request to disable sending routing updates on GigabitEthernet0

```
PUT  /api/v1/routing-svc/eigrp/100/passive/GigabitEthernet0
Content-type: application/json
Accept: application/json

{
   "passive": true
}
```

Sample JSON Response

```
204 No Content
```

Retrieve a passive interface

Verb	URI
GET	/api/v1/routing-svc/{routing-protocol}/{routing-protocol-id}/passive/{if-id}

Sample JSON Request

```
GET  /api/v1/routing-svc/eigrp/passive/GigabitEthernet0

Accept: application/json
```

Sample JSON Response

```
200 OK
Content-type: application/json

{
   "kind": "object#passive-interface",
   "routing-protocol-id": "100",
   "routing-protocol-type": "eigrp",
   "if-name": "GigabitEthernet0",
   "passive": true
}
```

Routing Table Display

URI: /api/v1/routing-svc/routing-table

The routing table may be larger than the HTTP response could handle, so the REST client needs to indicate the range and size of the routes in the HTTP GET request.

Query Parameters	Type	Description
start-prefix	string	Start prefix in CIDR format x.x.x.x/nn.
range-type	string	"eq-or-gt" (equal or greater) or "gt" (greater) relative to the start-prefix.
count	number	The number of routes to be returned

Retrieve the Global Routing Table

Verb	URI
GET	/api/v1/routing-svc/routing-table?start-prefix={cidr}&range-type={string}&count={number}

Sample JSON Request: 1st Request

```
GET  /api/v1/routing-svc/routing-table?start-prefix=0.0.0.0/0& range-type=eq-or-gt&count=2
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
   "kind": "collection#route-entry",
   "items": [
                {
                  "kind": "object#route-entry",
                  "routing-protocol": "OSPF",
                  "route-type": "E1",
                  "network": "172.50.0.0/16",
                  "distance": 160,
                  "metric": 5,
                  "next-hop-router": "10.19.254.6",
                  "outgoing-interface": "GigabitEthernet2"
                 },
                {
                  "kind": "object#route-entry",
                  "routing-protocol": "BGP",
                  "route-type": "",
                  "network": "173.50.24.0/24",
                  "distance": 160,
                  "metric": 5,
                  "next-hop-router": "10.19.254.6",
                  "outgoing-interface": "GigabitEthernet2"
                 }
             ]
  "end-of-table": false
}
```

Sample JSON Request: 2nd Request

```
GET  /api/v1/routing-svc/routing-table?start-prefix=173.50.24.0/24&range-type=gt&count=1

Accept: application/json
```

Sample JSON Response to 2nd Response

```
200 ok

Content-type: application/json

{
   "kind": "collection#route-entry",
   "items": [
```

```
                {
                  "kind": "object#route-entry",
                  "routing-protocol": "OSPF",
                  "route-type": "E1",
                  "network": "173.50.0.0/16",
                  "admin-distance": 160,
                  "metric": 5,
                  "next-hop-router": "10.19.254.6",
                  "outgoing-interface": "GigabitEthernet2"
                 }

             ],
  "end-of-table": true
}
```

Property	Type	Description
kind	string	Object type. Always “collection#route-entry”
end-of-table	boolean	“true” if this is the last of the route entry and/or there is no more. “false” if there are more route entries in the global routing table.
items	array	List of object#route-entry
Routing-protocol	string	Protocol that derived the route. • Application route. • Connected route. • Static route. • BGP route. • Mobile route. • RIP route. • OSPF route. • ISIS route. • EIGRP route. • OSPFv3 route. • ODR route. • HSRP route. • NHRP route. • LISP route. • IPv6 NEMO route. • IPv6 ND route. • IPv6 RPL route.

Property	Type	Description
route-type	string	• OSPF route type, route within an area. • OSPF route type, route across different areas. • OSPF external route of type 1. • OSPF external route of type 1. • OSPF NSSA external route of type 1. • OSPF NSSA external route of type 2. • BGP internal routes(iBGP) • BGP external routes (iBGP) • BGP local routes. • BGP internal routes(iBGP) or BGP external routes or BGP local routes. • IS-IS level-1 route. • IS-IS level-1 route. • IS-IS level-2 route. • IS-IS level-1 inter area route. • IGRP2 derived routes. • IGRP2 redestributed routes.
network	cidr	Network in CIDR format x.x.x.x/nn
admin-distance	string	The administrative distance of the information source.
metric	number	Metric for the route
Next-hop-router	ipaddress	Specifies the address of the next router to the remote network.
Outgoing-interface	string	Specifies the interface through which the specified network can be reached.
uptime	string	Specifies the last time the route was updated (in hours:minutes:seconds).

Static Route Collection Resource

URI: /api/v1/routing-svc/static-routes

JSON Representation

```
{
    "kind": "collection#static-route",
```

```
    "items": [ { json object of kind object#static-route } ]
}
```

Property	Type	Description
kind	string	Must be “collection#static-route”
items	array	Array of static route json objects

Configure a Static Route

Verb	URI
POST	/api/v1/routing-svc/static-routes

The static route is identified by both the prefix (CIDR) and next hop. Next hop could be an interface, an IP address or both.

Sample JSON Request

```
POST  /api/v1/routing-svc/static-routes

Content-type: application/json
Accept: application/json

{
  "destination-network": "20.20.20.20/32",
  "next-hop-router":"30.30.30.1",
  "outgoing-interface": "gigabitEthernet1",
  "admin-distance": 3
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/routing-svc/static-routes/20.20.20.20_32_30.30.30.1_gig1
```

Retrieve all the Static Routes

This API retrieves only static routes that are in the routing information base (RIB).

Verb	URI
GET	/api/v1/routing-svc/static-routes

Sample JSON Request

```
GET  /api/v1/routing-svc/static-routes
Accept: application/json
```

Sample JSON Response

```
200 ok
```

```
Content-type: application/json
{
  "kind": "collection#static-route",
  "items": [
             {
              "kind": "object#static-route",
              "destination-network": "20.20.20.20/32",
              "next-hop-router":"30.30.30.1",
              "outgoing-interface": "gigabitEthernet1",
              "admin-distance": 3
             },
            {
              "kind": "object#static-route",
              "destination-network": "20.20.20.20/32",
              "next-hop-route":"20.30.30.1",
              "admin-distance": 5
             }
           ]
}
```

Static Route Resource

JSON Representation for Static Route

```
{
    "kind": "object#static-route",
    "destination-network": "{string}",
    "next-hop": "{ipaddress}",
    "outgoing-interface": "{string}",
    "admin-distance": {number}
}
```

Property	Type	Description
kind	string	Must be "object#static-route"
destination-network	string	Destination network in CIDR format x.x.x.x/nn
next-hop	ipaddress	IP address in x.x.x.x format or outgoing interface name (gigEthernet 0).
outgoing-interface	string	Outgoing interface name (gigabitEthernet1). Optional if next-hop is specified.
admin-distance	number	1-255. When there are multiple routes to the same destination, the route with the smaller admin-distance value is chosen. The smaller the admin-distance, the higher the preference. Default is 1. Optional.

Retrieve a Static Route

Verb	URI
GET	/api/v1/routing-svc/static-routes/{destination-network_next-hop}
GET	/api/v1/routing-svc/static-routes/{destination-network_intf-name }
GET	/api/v1/routing-svc/static-routes/{destination-network_next-hop_intf-name}

Sample JSON Request

```
GET  /api/v1/routing-svc/static-routes/20.20.20.20_32_30.30.30.1
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json
{
  "kind": "object#static-route",
  "destination-network": "20.20.20.20/32",
  "next-hop":"30.30.30.1"
}
```

Delete a Static Route

Verb	URI
DELETE	/api/v1/routing-svc/static-routes/{destination-network_next-hop}
DELETE	/api/v1/routing-svc/static-routes/{destination-network_intf-name }
DELETE	/api/v1/routing-svc/static-routes/{destination-network_next-hop_intf-name}

Sample JSON Request

```
DELETE  /api/v1/routing-svc/static-routes/20.20.20.20_32_30.30.30.1
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

ACL Requirements for Subnets or IP Ranges

Resource Summary for ACL

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
ACL	/api/v1/acl	Y	Y	NA	NA
	/api/v1/acl/{acl-id}	Y	NA	Y	Y
	/api/v1/acl/statistics	Y	Y	NA	NA
	/api/v1/acl/statistics/{acl-id}	Y	Y	NA	NA
	/api/v1/acl/{acl-id}/interfaces	Y	Y	NA	NA
	/api/v1/acl/{acl-id}/interfaces/{if-id}/{direction}	Y	NA	NA	Y

ACL Resource

Resource URL: /api/v1/acl/{acl-id}

JSON Representation

```
{
    "kind": "object#acl",
    "acl-id": "{string}",
    "description": "{string}",
    "rules": [
```

```
                {  /* ace/rule */
                    "sequence" :   {number},
                    "protocol":    "{string}",
                    "source":      "{string}",
                    "destination": "{string}",
                    "action":      "{string}",
                    "l4-options" : {
                            "src-port-start": "{string}",
                            "src-port-end": "{string}",
                            "src-port-op" : "{string}",
                            "dest-port-start": "{string}",
                            "dest-port-end"  : "{string}",
                            "dest-port-op": "{string}"
                            }
                }
            ]

}
```

Property	Type	Description
kind	string	Object type. Has the fixed value "object#acl"
acl-id	string	ACL name (not a number).
description	string	ACL Description (Optional)
rules	array	Contains zero or more access control rule objects
• rules[ ].sequence	number	Sequence number to order the rules and serves as a rule ID.
• rules[ ].protocol	string	A protocol number or any of the keywords "all", "tcp", "udp", "icmp", "ip"
• rules[ ].source	cidr_address	Traffic source in cidr format, hostname, host IP, or keyword "any"
• rules[ ].destination	cidr_address	Traffic destination in cidr format, hostname, host IP, or keyword "any". The default is "any".
• rules[ ].action	string	Allow or deny if traffic matches the rule
• rules[ ].action	string	Allow or deny if traffic matches the rule
• rules[ ].l4-options		Options applicable for tcp/udp protocols

Property	Type	Description
– rules[ ].l4-options. src-port-start – rules[ ].l4-options. src-port-end	string	A source port number 0-65535, starting and ending source port-range, or one of the following source ports can be configured: bgp Border Gateway Protocol (179) chargen Character generator (19) cmd Remote commands (rcmd, 514) connectedapps-plain ConnectedApps Cleartext (15001) connectedapps-tls ConnectedApps TLS (15002) daytime Daytime (13) discard Discard (9) domain Domain Name Service (53) echo Echo (7) exec Exec (rsh, 512) finger Finger (79) ftp File Transfer Protocol (21) ftp-data FTP data connections (20) gopher Gopher (70) hostname NIC hostname server (101) ident Ident Protocol (113) irc Internet Relay Chat (194) klogin Kerberos login (543) kshell Kerberos shell (544) login Login (rlogin, 513) lpd Printer service (515) msrpc MS Remote Procedure Call (135) nntp Network News Transport Protocol (119) pim-auto-rp PIM Auto-RP (496) pop2 Post Office Protocol v2 (109) pop3 Post Office Protocol v3 (110) smtp Simple Mail Transport Protocol (25) sunrpc Sun Remote Procedure Call (111) syslog Syslog (514) tacacs TAC Access Control System (49) talk Talk (517) telnet Telnet (23) time Time (37) uucp Unix-to-Unix Copy Program (540) whois Nicname (43) www World Wide Web (HTTP, 80)

Property	Type	Description

• rules[ ].l4-options.dst-port-start
• rules[ ].l4-options.dst-port-end
	string	A destination port number (0-65535), starting and ending destination port-range, or one of the following destination ports can be configured:
		`<0-65535> Port number`
		`bgp Border Gateway Protocol (179)`
		`chargen Character generator (19)`
		`cmd Remote commands (rcmd, 514)`
		`connectedapps-plain ConnectedApps Cleartext (15001)`
		`connectedapps-tls ConnectedApps TLS (15002)`
		`daytime Daytime (13)`
		`discard Discard (9)`
		`domain Domain Name Service (53)`
		`echo Echo (7)`
		`exec Exec (rsh, 512)`
		`finger Finger (79)`
		`ftp File Transfer Protocol (21)`
		`ftp-data FTP data connections (20)`
		`gopher Gopher (70)`
		`hostname NIC hostname server (101)`
		`ident Ident Protocol (113)`
		`irc Internet Relay Chat (194)`
		`klogin Kerberos login (543)`
		`kshell Kerberos shell (544)`
		`login Login (rlogin, 513)`
		`lpd Printer service (515)`
		`msrpc MS Remote Procedure Call (135)`
		`nntp Network News Transport Protocol (119)`
		`pim-auto-rp PIM Auto-RP (496)`
		`pop2 Post Office Protocol v2 (109)`
		`pop3 Post Office Protocol v3 (110)`
		`smtp Simple Mail Transport Protocol (25)`
		`sunrpc Sun Remote Procedure Call (111)`
		`syslog Syslog (514)`
		`tacacs TAC Access Control System (49)`
		`talk Talk (517)`
		`telnet Telnet (23)`
		`time Time (37)`
		`uucp Unix-to-Unix Copy Program (540)`
		`whois Nicname (43)`
		`www World Wide Web (HTTP, 80) (optional)`

• rules[ ].l4-options.src-port-op • rules[ ].l4-optionsdest-port-op	string	Indicates how the port number should be matched. One of the keywords "eq", "gt", "lt". If omitted, defaults to "eq"

Modify an ACL

Verb	URI
PUT	/api/v1/acl/{acl-id}

Sample JSON Request

```
PUT /api/v1/acl-svc/acl/abc

Content-type: application/json
Accept: application/json

{
"kind": "object#acl",
    "rules": [
                {  /* ace/rule */
                    "sequence" :   1,
                    "protocol":    "tcp",
                    "source":      "192.168.10.0/24",
                    "destination": "192.168.200.0/24",
                    "action":      "permit",
                    "14-options" : {
                            "src-port-start"   : "ftp",
                            "src-port-op" : "eq",
                            "dest-port-start"  : "ftp",
                            "dest-port-op": "eq"
                           }
              }
            ]
    }
```

Sample JSON Response

```
200 OK
```

Retrieve an ACL

Verb	URI
GET	/api/v1/acl/{acl-id}

Sample JSON Request

```
GET /api/v1/acl/in_to_out
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json
Accept: application/json

{
    "kind": "object#acl",
```

```
"acl-id": "in_to_out",
"rules": [
             {  /* ace/rule */
                 "sequence" :   20,
                 "protocol":    "tcp",
                 "source":      "10.1.1.2/32",
                 "destination": "172.16.1.1/32",
                 "action":      "permit",
                 "l4-options" : {
                         "dest-port"  : "telnet",
                         "dest-port-op": "eq"
                        }
            }
          ]
}
```

Delete an ACL

Verb	URI
DELETE	/api/v1/acl/{acl-id}

Sample JSON Request

```
DELETE /api/v1/acl/abc

Accept: application/json
```

Sample JSON Response

```
204 No Content
```

Property	Type	Description
kind	string	Object type. Has fixed value "collection#acl"
items	array	Array of ACL objects with the kind "object#acl"

Configure an ACL

Verb	URI
POST	/api/v1/acl

Sample JSON Request

```
POST /api/v1/acl

Content-type: application/json
Accept: application/json
```

```
{
    "kind": "object#acl",
    "rules": [
                {  /* ace/rule */
                    "sequence" :   1,
                    "protocol":    "ip",
                    "source":      "192.168.10.0/24",
                    "destination": "192.168.200.0/24",
                    "action":      "permit"
                }
              ],

    }
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/acl-svc/acl/test
```

Retrieve All ACLs

Verb	URI
GET	/api/v1/acl

Sample JSON Request

```
GET /api/v1/acl-svc/acl
Accept: application/json
```

JSON Response

```
200 OK

Content-type: application/json

{
    "kind": "collection#acl",
    "items": [
               {
                 "kind": "object#acl",
                 "acl-id": "test",
                 "rules": [
                           {  /* ace/rule */
                              "sequence" :   10,
                              "protocol":    "ip",
                              "source":      "192.168.10.0/24",
                              "destination": "192.168.200.0/24",
                              "action":      "permit"
                           },
                           {  /* ace/rule */
                              "sequence" :   100,
                              "protocol":    "ip",
                              "source":      "any",
                              "destination": "any",
                              "action":      "permit"
                           }
```

```
                    ]
                },
                {
                  "kind": "object#acl",
                  "acl-id": "xyc",
                  "rules": [
                            {  /* ace/rule */
                               "sequence" :   10,
                               "protocol":    "ip",
                               "source":      "192.168.10.0/24",
                               "destination": "192.168.200.0/24",
                               "action":      "permit"
                            },
                            {  /* ace/rule */
                               "sequence" :   100,
                               "protocol":    "ip",
                               "source":      "any",
                               "destination": "any",
                               "action":      "permit"
                            }
                           ]
                 }

               ]
    }
```

All ACL Match Statistics Resource

The all ACL match statistics resource represents ACL match statistics (match counters for rules of ACLs).

Resource URL: /api/v1/acl/statistics

JSON Representation

```
{
  "kind": "collection#acl-statistics"
  "items" : [
          {single ACL statistics JSON}*
      ]
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "collection#acl-statistics"
items	array	Collection of ACL statistics objects

This resource also supports clearing of all statistics by doing a POST on the resource with the following request message. See Resource specific operations for more details & examples.

JSON Representation

```
{
 "action": "clear"
}
```

Retrieve All ACL Statistics

Verb	URI
GET	/api/v1/acl/statistics

Sample JSON Request

```
GET /api/v1/acl/statistics
Accept: application/json
```

Sample JSON Response

```
200 OK
Content-type: application/json
{
  "kind": "collection#acl-statistics",
  "items": [
             {
               "kind": "object#acl-statistics",
               "acl-id":  "test1",
               "rules": [
                          {
                           "sequence":      10,
                           "protocol":      "ip",
                           "source":        "any",
                           "destination":   "any",
                           "action":        "deny",
                           "match-count":   65951975
                          },
                          {
                           "sequence":      20,
                           "protocol":      "tcp",
                           "source":        "10.10.10.10",
                           "destination":   "any",
                           "action":        "deny",
                           "match-count":   65
                          }

                         ]
              },
             {
               "kind": "object#acl-statistics",
               "acl-id":  "test2",
               "rules": [
                          {
                           "sequence":      10,
                           "protocol":      "tcp",
                           "source":        "192.168.35.1",
                           "destination":   "any",
                           "action":        "permit",
                           "match-count":   0
                          }
                         ]
             },
   ]
}
```

Single ACL Match Statistics Resource

Resource URL: /api/v1/acl/statistics/{acl-id}

JSON Representation

```
{
  "kind": "object#acl-statistics"
  "acl-id":  "{string}",
  "rules": [
      {
        "sequence":      {number},
        "protocol":      "{string}",
        "source":        "{string}",
        "destination":   "{string}",
        "action":        "{string}",
        "ip-options" : {
                              "src-port-start"   : {number},
                              "src-port-op" : "{string}",
                              "dest-port-start"  : {number},
                              "dest-port-op": "{string}"
                        },

        "match-count":   {number}
      }
   ]
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "collection#acl-statistics".
acl-id	string	Unique ACL ID, name of the ACL resource.
rules	array	Contains zero or more access control rule objects.
rules[ ].sequence	number	Sequence number to order the rules and serves as a rule ID.
rules[ ].source	cidr_address	Traffic source in cidr format, hostname, host IP, or keyword "any".
rules[ ].destination	cidr_address	Traffic destination in cidr format, hostname, host IP, or keyword "any".
rules[ ].action	string	Allow or deny if traffic matches the rule.
rules[ ].l4-options		Options applicable for tcp/udp protocols.

Property	Type	Description
rules[ ].l4-options.src-port-start rules[ ].l4-options.src-port-end	string	Source Port Number 0-65535, or a port range, or one of the following: bgp Border Gateway Protocol (179) chargen Character generator (19) cmd Remote commands (rcmd, 514) connectedapps-plain ConnectedApps Cleartext (15001) connectedapps-tls ConnectedApps TLS (15002) daytime Daytime (13) discard Discard (9) domain Domain Name Service (53) echo Echo (7) exec Exec (rsh, 512) finger Finger (79) ftp File Transfer Protocol (21) ftp-data FTP data connections (20) gopher Gopher (70) hostname NIC hostname server (101) ident Ident Protocol (113) irc Internet Relay Chat (194) klogin Kerberos login (543) kshell Kerberos shell (544) login Login (rlogin, 513) lpd Printer service (515) msrpc MS Remote Procedure Call (135) nntp Network News Transport Protocol (119) pim-auto-rp PIM Auto-RP (496) pop2 Post Office Protocol v2 (109) pop3 Post Office Protocol v3 (110) smtp Simple Mail Transport Protocol (25) sunrpc Sun Remote Procedure Call (111) syslog Syslog (514) tacacs TAC Access Control System (49) talk Talk (517) telnet Telnet (23) time Time (37) uucp Unix-to-Unix Copy Program (540) whois Nicname (43) www World Wide Web (HTTP, 80) (optional)

Property	Type	Description
rules[ ].l4-options.dst-port-start rules[ ].l4-options.dst-port-end		Destination Port Number (1-65535), destination port range, or one of the following destination ports can be configured: bgp Border Gateway Protocol (179) chargen Character generator (19) cmd Remote commands (rcmd, 514) connectedapps-plain ConnectedApps Cleartext (15001) connectedapps-tls ConnectedApps TLS (15002) daytime Daytime (13) discard Discard (9) domain Domain Name Service (53) echo Echo (7) exec Exec (rsh, 512) finger Finger (79) ftp File Transfer Protocol (21) ftp-data FTP data connections (20) gopher Gopher (70) hostname NIC hostname server (101) ident Ident Protocol (113) irc Internet Relay Chat (194) klogin Kerberos login (543) kshell Kerberos shell (544) login Login (rlogin, 513) lpd Printer service (515) msrpc MS Remote Procedure Call (135) nntp Network News Transport Protocol (119) pim-auto-rp PIM Auto-RP (496) pop2 Post Office Protocol v2 (109) pop3 Post Office Protocol v3 (110) smtp Simple Mail Transport Protocol (25) sunrpc Sun Remote Procedure Call (111) syslog Syslog (514) tacacs TAC Access Control System (49) talk Talk (517) telnet Telnet (23) time Time (37) uucp Unix-to-Unix Copy Program (540) whois Nicname (43) www World Wide Web (HTTP, 80) (optional)
rules[ ].l4-options.src-port-op rules[ ].l4-optionsdest-port-op	string	Indicates how the port number should be matched. One of the keywords "eq", "gt", "lt", or "range". If omitted, defaults to "eq".
rules[ ].match-count	number	Rule match counters.

The single ACL match statistics resource also supports clearing of ACL statistics by doing a POST on the resource with the following request message. See Resource specific operations for more details & examples.

JSON Representation

```
{
 "action": "clear"
}
```

Retrieve Statistics for a Single ACL

Verb	URI
GET	/api/v1/acl/statistics/{acl-id}

Sample JSON Request

```
GET /api/v1/acl/abc/interfaces/gigabitEthernet0_inside

Accept: application/json
```

Sample JSON Response

```
200 OK

Accept: application/json
{
  "kind": "object#acl-statistics",
  "acl-id":  "abc",
  "rules": [
      {
        "sequence":      10,
        "protocol":      "ip",
        "source":        "any",
        "destination":   "any",
        "action":        "deny",
        "match-count":   65951975
     },
     { … }
   ]
}
```

ACL Associated with Single Interface Resource

JSON Representation

```
{
  "kind": "object#acl-interface"
  "if-id":  "{string}",
  "direction":"{string}"
}
```

Property	Type	Description
Kind	string	Object type. Has fixed value "collection#acl-interface"
if-id	string	Interface to which the ACL is applied.
direction	string	Direction of traffic to which the ACL is applied. Valid values are "inside" and "outside". The interface is viewed as “inside” or “outside” from NAT point of view.

Retrieve ACL Associated with an Interface

Verb	URI
GET	/api/v1/acl/{acl-id}/interfaces/{if-id_direction}

Sample JSON Request

```
GET /api/v1/acl/abc/interfaces/gigabitEthernet0_inside

Accept: application/json
```

Sample JSON Response

```
200 OK
Content-type: application/json

{
  "kind": "object#acl-interface",
  "acl-id": "abc",
  "if-id": "gigabitEthernet0",
  "direction": "inside"
}
```

Delete ACL Associated with an Interface

Verb	URI
DELETE	/api/v1/acl/{acl-id}/interfaces/{if-id_direction}

Sample JSON Request

```
DELETE /api/v1/acl/abc/interfaces/gigabitEthernet0_inside
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

ACL Associated with Interfaces Resource

The ACL associated interface resource is a collection of interfaces to which an ACL is applied.

Resource URL: /api/v1/acl/{acl-id}/interfaces

JSON Representation

```
{
  "kind": "collection#acl-interface"
  "items": [
      {JSON object with kind "object#acl-interface"}*
   ]
}
```

Property	Type	Description
kind	string	Object type. Has fixed value "collection#acl-interface"
items	array	Array of ACL objects with the kind "object#acl-interface"

ACL is applied to an interface by doing a POST on this resource with the following request content.

```
{
  "if-id":     "{string}",
  "direction":"{string}"
}
```

Apply an ACL to Interfaces

Verb	URI
POST	/api/v1/acl/{acl-id}/interfaces

Sample JSON Request

```
POST /api/v1/acl/abc/interfaces

Accept: application/json
{
  "if-id":     "gigabitEthernet0",
  "direction": "inside"
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/acl/abc/interfaces/gigabitEthernet0_inside
```

Retrieve All ACL Interfaces

Verb	URI
GET	/api/v1/acl/{acl-id}/interfaces

Sample JSON Request

```
GET /api/v1/acl/abc/interfaces

Accept: application/json
```

Sample JSON Response

```
200 OK
Content-type: application/json

{
  "kind": "collection#acl-interface",
  "items": [
             {
               "kind": "object#acl-interface",
               "acl-id": "abc",
               "if-id": "gigabitEthernet0",
               "direction": "inside"
             },
             {
               "kind": "object#acl-interface",
               "acl-id": "abc",
               "if-id": "gigabitEthernet2",
               "direction": "inside"
             }
            ]
}
```

Network Address Translation (NAT)

Resource Summary for NAT

The attribute “pat” (port address translation) in the REST API is equivalent to the Cisco IOS NAT term “overload”.

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
NAT pool	/api/v1/nat-svc/pool	Y	Y	N	N
NAT pool id	/api/v1/nat-svc/pool/{nat-pool-id}	Y	N	Y	Y
Static NAT	/api/v1/nat-svc/static	Y	Y	N	N
Static NAT rule	/api/v1/nat-svc/static/{nat-rule-id}	Y	N	Y	Y
Dynamic NAT	/api/v1/nat-svc/dynamic	Y	Y	N	N
Dynamic NAT rule	/api/v1/nat-svc/dynamic/{nat-rule-id}	Y	N	Y	Y
NAT translations	/api/v1/nat-svc/translations	Y	Y	N	N

NAT Pool Resource

A NAT Pool models a pool of global IP addresses used during dynamic NAT translation.

Retrieve a NAT Pool

Verb	URI
GET	/api/v1/nat-svc/pool/{nat-pool-id}

Sample JSON Request

```
GET  /api/v1/nat-svc/pool/marketing-nat-pool
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind": "object#nat-pool"
  "nat-pool-id": "marketing-nat-pool",
  "start-ip-address": "172.16.10.1",
  "end-ip-address":  "172.16.10.63",
  "prefix-length":   24
}
```

Property	Type	Description
kind	string	Object type. Always "object#nat-pool"
nat-pool-id	string	Unique NAT pool name.
start-ip-address	string	First IP address of public IP address range in the format x.x.x.x
end-ip-address	string	Last IP address of public IP address range in the format x.x.x.x
prefix-length	number	IP Address prefix length

Modify a NAT Pool

A NAT pool update results in the delete of the existing pool and the creation of the new pool of the same pool-id.

Verb	URI
PUT	/api/v1/nat-svc/pool/{nat-pool-id}

Sample JSON Request

```
PUT  /api/v1/nat-svc/pool/marketing-nat-pool

Accept: application/json
Content-type: application/json

{
  "nat-pool-id": "marketing-nat-pool",
  "start-ip-address": "172.16.10.1",
  "end-ip-address":  "172.16.10.57",
  "prefix-length":   24
}
```

Sample JSON Response

```
204 No Content
```

Property	Type	Description
nat-pool-id	string	Unique NAT pool name.
start-ip-address	string	First IP address of public IP address range in the format x.x.x.x
end-ip-address	string	Last IP address of public IP address range in the format x.x.x.x
prefix-length	number	IP Address prefix length

Delete a NAT Pool

Verb	URI
DELETE	/api/v1/nat-svc/pool/{nat-pool-id}

Sample JSON Request

```
DELETE  /api/v1/nat-svc/pool/marketing-nat-pool
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

NAT Pool Collection Resource

Retrieve all NAT Pools

Verb	URI
GET	/api/v1/nat-svc/pool

Sample JSON Request

```
GET  /api/v1/nat-svc/pool
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind": "collection#nat-pool"
  "items": [
            {
             "kind": "object#nat-pool",
             "nat-pool-id":       "marketing",
             "start-ip-address": "172.16.10.1",
             "end-ip-address":  "172.16.10.63",
             "prefix-length":   24
            },
            {
             "kind": "object#nat-pool",
             "nat-pool-id":       "engineering",
             "start-ip-address": "172.16.10.63",
             "end-ip-address":  "172.16.10.100",
             "prefix-length":   24
            }
          ]
```

Property	Type	Description
kind	string	Object type. Always "collection#nat-pool"
items	array	Collection of NAT pools.
nat-pool-id	string	Unique NAT pool name.
start-ip-address	string	First IP address of public IP address range in the format x.x.x.x
end-ip-address	string	Last IP address of public IP address range in the format x.x.x.x
prefix-length	number	IP Address prefix length

Create a NAT Pool

Verb	URI
POST	/api/v1/nat-svc/pool

Sample JSON Request

```
POST  /api/v1/nat-svc/pool

Content-type: application/json
Accept: application/json
```

```
{
    "nat-pool-id":      "marketing-nat-pool",
    "start-ip-address": "172.16.10.1",
    "end-ip-address":   "172.16.10.63",
    "prefix-length":    24
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/nat-svc/pool/marketing-nat-pool
```

Property	Type	Description
nat-pool-id	string	Unique NAT pool name.
start-ip-address	string	First IP address of public IP address range in the format x.x.x.x
end-ip-address	string	Last IP address of public IP address range in the format x.x.x.x
prefix-length	number	IP Address prefix length

Static NAT Rule Resource

A static NAT resource models static address translation where there is a one-to-one mapping between local and global IP addresses.

There are three types of one-to-one mapping NAT: static NAT, port static NAT, and network static NAT.

Retrieve a Static NAT Rule

Verb	URI
GET	/api/v1/nat-svc/static/{nat-pool-id}

Sample JSON Request

```
GET  /api/v1/nat-svc/static/eng-nat
Accept: application/json
```

Sample JSON Response of a Static NAT

```
200 OK

Content-Type: application/json
{
  "kind":           "object#nat-static-rule",
  "nat-rule-id" :   "eng-nat",
  "mode":           "inside-source",
  "ip-mapping": {
       "local-ip" :       "172.16.50.8",
       "global-ip" :      "172.16.10.8"
    }
}
```

Sample JSON Response of a Port Static NAT Rule

```
200 OK

Content-Type: application/json

{
  "kind":           "object#nat-static-rule",
  "nat-rule-id" :   "eng-nat",
  "mode":           "inside-source",
  "ip-port-mapping":{
       "protocol":        "tcp",
       "local-ip" :       "172.16.10.8",
       "local-port":      8080,
       "global-ip" :      "172.16.10.8",
       "global-port":     80
    }
}
```

Sample JSON Response of a Network Static NAT

```
200 OK

Content-Type: application/json
{
  "kind":           "object#nat-static-rule",
  "nat-rule-id" :   "eng-nat",
  "mode":           "outside-source",
  "ip-network-mapping":{
        "local-network": "10.10.10.0",
        "global-network": "172.19.32.0",
        "mask": "255.255.255.0"
    }
}
```

Property	Type	Description
kind	string	Object type. Always “nat-static-rule”
nat-rule-id	string	Unique NAT rule id
mode	string	Indicates the source/destination IP field and the direction of traffic to apply NAT to. Allowed values are: “inside-source” and “outside-source”. • “inside-source” refers to translating the source IP address for packets that enter the router from the inside interface, or to translating the destination address for packets that enter the router from the outside interface. • “outside-source” refers to translating the source IP address for packets that enter the router through the outside interface, or to translating the destination IP address of packets that enter the router from the inside interface. “mode” is optional for ip-network-mapping as the mode can only be “inside-source”.
ip-mapping	object	Specifies IP address based static NAT mapping. Mutually exclusive with ip-port-mapping and network-nat-mapping

Property	Type	Description
ip-mapping-local-ip	ipaddress	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x
ip-mapping-global-ip	ipaddress	Establishes the globally unique IP address of an inside host as it appears to outside world. Specified in the x.x.x.x format
ip-port-mapping	object	Specifies IP address based static NAT mapping. Mutually exclusive with ip-port-mapping and network-nat-mapping.
ip-port-mapping-local-ip	ipaddress	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x
ip-port-mapping-global-ip	ipaddress	Establishes the globally unique IP address of an inside host as it appears to outside world. Specified in the x.x.x.x format
ip-port-mapping-protocol	ipaddress	Protocol used. One of “TCP” or “UDP”. If protocol is not used, this property can be absent.
ip-port-mapping-local-port	number	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x
ip-port-mapping-global-port	number	Global TCP/UDP port in the range 1-65535. Mandatory when local-port is used
ip-network-mapping	object	Specifies the subnet/network based static NAT translation
ip-network-mapping-local-network	string	Specifies the local subnet translation.
ip-network-mapping-global-network		Specifies the global subnet translations.
ip-network-mapping-mask	string	Specifies the IP network mask to be used with subnet translations.

Modify a Static NAT Rule

Verb	URI
PUT	/api/v1/nat-svc/static/{nat-pool-id}

Sample JSON Request of a Static NAT Rule

```
PUT  /api/v1/nat-svc/static/eng-nat

Content-type: application/json
Accept: application/json

{
  "nat-rule-id" :   "eng-nat",
  "mode":           "inside-source",
  "ip-mapping": {
       "local-ip" :       "172.16.50.8",
       "global-ip" :      "172.15.15.1"
    }
}
```

Sample JSON Request of a Port Static NAT Rule

```
{
  "kind":           "object#nat-static-rule",
  "nat-rule-id" :   "doc-nat",
  "mode":           "inside-source",
  "ip-port-mapping":{
       "protocol":        "tcp",
       "local-ip" :       "172.16.10.7",
       "local-port":      8080,
       "global-ip" :      "172.16.10.8",
       "global-port":     80
    }
}
```

Sample JSON Request of a Network Static NAT

```
{
  "kind":           "object#nat-static-rule",
  "nat-rule-id" :   "finance-nat",
  "mode":           "outside-source",
  "ip-network-mapping":{
        "local-network": "10.10.20.0",
        "global-network": "172.19.32.0",
        "mask": "255.255.255.0"
    }
}
```

Sample JSON Response

```
204 No Content
```

Delete a Static NAT Rule

Verb	URI
DELETE	/api/v1/nat-svc/static/{nat-pool-id}

Sample JSON Request

```
DELETE  /api/v1/nat-svc/static/marketing-nat-pool
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

Static NAT Rule Collection Resource

JSON Representation

```
{
  "kind":           "object#nat-static-rule",
  "nat-rule-id" :   "{string}",
  "mode":           "{string}",
  "ip-mapping": {
       "local-ip" :       "{ipaddress}",
       "global-ip" :      "{ipaddress}"
```

```
    },
  "ip-port-mapping":{
       "protocol" :       "{string}",

       "local-ip" :       "{ipaddress}",
       "local-port":      {number},

       "global-ip" :       "{ipaddress}",
       "global-port":      {number}
    },

  "ip-network-mapping":{
        "local-network": "{string}",
        "global-network": "{string}",
        "mask": "{string}"
    }

}
```

Property	Type	Description
kind	string	Object type. Always “collection#nat-static-rule”
items	array	Collection of static NAT rules with objects of type “object#nat-static-rule”
nat-rule-id	string	Unique NAT rule id
mode	string	Indicates the source/destination IP field and the direction of traffic to apply NAT to. Allowed values are: “inside-source” and “outside-source”. “inside-source” refers to translating source address for packets that enter router through inside interface. “outside-source” refers to translating source address for packets that enter router through outside interface.
ip-mapping	object	Specifies IP address based static NAT mapping. Mutually exclusive with ip-port-mapping and network-nat-mapping
ip-mapping-local-ip	ipaddress	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x
ip-mapping-global-ip	ipaddress	Establishes the globally unique IP address of an inside host as it appears to outside world. Specified in the x.x.x.x format
ip-port-mapping	object	Specifies IP address based static NAT mapping. Mutually exclusive with ip-port-mapping and network-nat-mapping.
ip-port-mapping-local-ip	ipaddress	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x
ip-port-mapping-global-ip	ipaddress	Establishes the globally unique IP address of an inside host as it appears to outside world. Specified in the x.x.x.x format
ip-port-mapping-protocol	ipaddress	Protocol used. One of “TCP” or “UDP”. If protocol is not used, this property can be absent.
ip-port-mapping-local-port	number	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x

Property	Type	Description
ip-port-mapping-global-port	number	Global TCP/UDP port in the range 1-65535. Mandatory when local-port is used
ip-network-mapping	object	Specifies the subnet/network based static NAT translation
ip-network-mapping-local-network	string	Specifies the local subnet translation.
ip-network-mapping-global-network	N/A	Specifies the global subnet translations.
ip-network-mapping-mask	string	Specifies the IP network mask to be used with subnet translations.

Retrieve All Static NAT Rules

Verb	URI
GET	/api/v1/nat-svc/static

Sample JSON Request

```
GET  /api/v1/nat-svc/static
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind": "collection#nat-static-rule,
  "items": [
             {
               "kind":            "object#nat-static-rule",
               "nat-rule-id" :    "eng-nat",
               "mode":            "inside-source",
               "ip-mapping": {
                               "local-ip" : "172.16.50.8",
                               "global-ip": "172.15.15.1"
                             }
              },
              {
                "kind":            "object#nat-static-rule",
                "nat-rule-id" :    "doc-nat",
                "mode":            "inside-source",
                "ip-port-mapping":{
                                    "protocol": "tcp",
                                    "local-ip" :  "172.16.10.7",
                                    "local-port": 8080,
                                    "global-ip" : "172.16.10.8",
                                    "global-port":80
                                   }
              },
              {
                "kind":            "object#nat-static-rule",
                "nat-rule-id" :    "finance-nat",
```

```
                "mode":           "outside-source",
                "ip-network-mapping":{
                                "local-network": "10.10.20.0",
                                "global-network": "172.19.32.0",
                                "mask": "255.255.255.0"
                                }
            }
          ]
}
```

Create a Static NAT Rule

Verb	URI
POST	/api/v1/nat-svc/static

Sample JSON Request of a Static NAT Rule

```
POST  /api/v1/nat-svc/static

Content-type: application/json
Accept: application/json

{
  "nat-rule-id" :   "eng-nat",
  "mode":           "inside-source",
  "ip-mapping": {
       "local-ip" :       "172.16.50.8",
       "global-ip" :      "172.15.15.1",
    }
}
```

Sample JSON Request of a Port Static NAT Rule

```
POST  /api/v1/nat-svc/static

Content-type: application/json
Accept: application/json
{
  "nat-rule-id" :   "doc-nat",
  "mode":           "inside-source",
  "ip-port-mapping":{
       "protocol":        "tcp",
       "local-ip" :       "172.16.10.7",
       "local-port":      8080,
       "global-ip" :       "172.16.10.8",
       "global-port":      80,
    }
}
```

Sample JSON Request of a Network Static NAT

```
POST  /api/v1/nat-svc/static

Content-type: application/json
Accept: application/json

{
  "nat-rule-id" :   "finance-nat",
  "mode":           "outside-source",
```

```
  "ip-network-mapping":{
        "local-network": "10.10.20.0",
        "global-network": "172.19.32.0",
        "mask": "255.255.255.0"
    }
}
```

Sample JSON Response

```
201 Created

Location: http://host/api/v1/nat-svc/static/finance-nat
```

Dynamic NAT Rule Resource

Packets with source and/or destination addresses that pass the access list are dynamically translated using global addresses from the named pool.

JSON Representation

```
{
  "kind":          "object#nat-dynamic-rule",
  "nat-rule-id" : "{string}",
  "mode":          "{string}",
  "acl-id" :       {number},
  "nat-pool-id" : "{string}",
  "pat-enabled":  {boolean}

}
```

Property	Type	Description
kind	string	Object type. Always “object#nat-dynamic-rule”
nat-rule-id	string	Unique NAT rule id
mode	string	Indicates the source/destination IP field and the direction of traffic to apply NAT to. Allowed values are: “inside-source” and “outside-source” & “inside-destination” “inside-source” refers to translating source address for packets that enter router through inside interface. “outside-source” refers to translating source address for packets that enter router through outside interface. “inside-destination” refers to translating destination address for packets that enter router through inside interface
acl-id	name	ACL resource id that defines the ACL for this dynamic NAT
nat-pool-id	string	NAT pool to use. Refers to the NAT pool resource id.
pat-enabled	boolean	Specifies if Port Address translation to be enabled.

Retrieve a Dynamic NAT Rule

Verb	URI
GET	/api/v1/nat-svc/dynamic/{nat-rule-id}

Sample JSON Request

```
GET  /api/v1/nat-svc/dynamic/dyn-nat
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind":          "object#nat-dynamic-rule"
  "nat-rule-id" : "dyn-nat",
  "mode":          "outside-source",
  "acl-id" :       "natacl",
  "nat-pool-id" : "nat-pool",
  "pat-enabled":  false
}
```

Modify a Dynamic NAT Rule

Verb	URI
PUT	/api/v1/nat-svc/dynamic/{nat-rule-id}

Sample JSON Request

```
PUT /api/v1/nat-svc/dynamic/dyn-nat

Content-type: application/json
Accept: application/json

{
  "nat-rule-id" : "dyn-nat",
  "mode":          "outside-source",
  "acl-id" :       "natacl",
  "nat-pool-id" : "nat-pool",
  "pat-enabled":  true
}
```

Sample JSON Response

```
204 No Content
```

Delete a Dynamic NAT Rule

Verb	URI
DELETE	/api/v1/nat-svc/dynamic/{nat-rule-id}

Sample JSON Request

```
DELETE /api/v1/nat-svc/dynamic/dyn-nat
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

Dynamic NAT Rule Collection Resource

The dynamic NAT rule collection resource represents a collection of all specified dynamic NAT rules.

JSON Representation

```
{
  "kind"  : "collection#nat-dynamic-rule"
  "items" :
     [
        {dynamic nat rule json object}+
     ]
}
```

Property	Type	Description
kindg	string	Object type. Always "collection#nat-dynamic-rule"
items	array	Collection of nat-dynamic-rule objects
nat-rule-id	string	Unique NAT rule id
mode	string	Indicates the source/destination IP field and the direction of traffic to apply NAT to. Allowed values are: "inside-source" and "outside-source" & "inside-destination" "inside-source" refers to translating source address for packets that enter router through inside interface. "outside-source" refers to translating source address for packets that enter router through outside interface. "inside-destination" refers to translating destination address for packets that enter router through inside interface
acl-id	name	ACL resource id that defines the ACL for this dynamic NAT
nat-pool-id	string	NAT pool to use. Refers to the NAT pool resource id.
pat-enabled	boolean	Specifies if Port Address translation to be enabled.

Retrieve All Dynamic NAT Rules

Verb	URI
GET	/api/v1/nat-svc/dynamic

Sample JSON Request

```
GET /api/v1/nat-svc/dynamic
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#nat-dynamic-rule",
  "items": [
            {
             "kind":              "object#nat-dynamic-rule",
             "nat-rule-id" :      "dyn-nat1",
             "mode":              "outside-source",
             "acl-id" :           "eng-acl",
             "nat-pool-id" :      "nat-pool",
             "pat-enabled":       true

            },
            {
              "kind":              "object#nat-dynamic-rule",
              "nat-rule-id" :      "dyn-nat2",
              "mode":              "outside-source",
              "acl-id" :           "mktg-acl",
              "nat-pool-id" :      "natPool",
              "pat-enabled":       false
             }
           ]
}
```

Sample JSON Response

```
204 No Content
```

Create a Dynamic NAT Rule

Verb	URI
POST	/api/v1/nat-svc/dynamic

Sample JSON Response

```
POST /api/v1/nat-svc/dynamic
```

```
Accept: application/json
Content-type: application/json

{
   "nat-rule-id" :      "dyn-nat1",
   "mode":              "outside-source",
   "acl-id" :           "qa-acl",
   "nat-pool-id" :      "nat-pool",
   "pat-enabled":       true
 }
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/nat-svc/dynamic/dyn-nat-1
```

NAT Translations Resource

NAT Translation resource represents the active NAT translations.

JSON Representation

```
{
  "kind":              "collection#nat-translation"
  "items": [
        {
           "kind": "object#nat-translation",
           "protocol":  "{string}",
           "inside-global-address" : "{ipaddress}",
           "inside-global-port" : {number},
           "inside-local-address" : "{ipaddress}",
           "inside-local-port" : {number},
           "outside-global-address" : "{ipaddress}",
           "outside-global-port" : {number},
           "outside-local-address" : "{ipaddress}",
           "outside-local-port" : {number}
        },
  ]
}
```

Property	Type	Description
kind	string	Object type. Always “object#nat-translation”
protocol	string	Protocol of the port identifying the address.
Inside-global-address	ipaddress	The legitimate IP address that represents one or more inside local IP addresses to the outside world.
Inside-local-address	ipaddress	The IP address assigned to a host on the inside network
Inside-global-port	number	The port identifying the inside global address.
Inside-local-port	number	The port identifying the inside local address
Outside-local-address	ipaddress	IP address of an outside host as it appears to the inside network
Outside-global-address	ipaddress	The port identifying the outside local address.

Property	Type	Description
Outside-local-port	number	The port identifying the outside local address.
Outside-global-port	number	The port identifying the outside global address.

Property	Type	Description
kind	string	Object type. Always “collection#nat-translation”
items [ ]	array	Collection of NAT translation objects

Retrieve all NAT Translations

Verb	URI
GET	/api/v1/nat-svc/translations

Sample JSON Request

```
GET /api/v1/nat-svc/translations
Accept: application/json
```

Sample JSON Response

```
200 ok

Content-type: application/json

{
  "kind":  "collection#nat-translation",
  “items”: [
        {
           “kind”: “object#nat-translation”,
           “protocol”:  "TCP",
           “inside-global-address” : "172.16.223.288",
           “inside-global-port” : 0,
           “inside-local-address” : "192.168.1.95",
           “inside-local-port” : 0,
           “outside-global-address” : "",
           “outside-global-port” : 0,
           “outside-local-address” : "",
           “outside-local-port” : 0
        },
        {
           “kind”: “object#nat-translation”,
           “protocol”:  "TCP",
           “inside-global-address” : "172.16.233.209",
           “inside-global-port” : 11012,
           “inside-local-address” : "192.168.1.89",
           “inside-local-port” : 11012,
           “outside-global-address” : "172.16.1.220",
           “outside-global-port” : 23,
           “outside-local-address” : "172.16.1.220",
           “outside-local-port” : 23
        },
```

```
  ]
}
```

Clear All NAT Translations

The NAT translations resource supports the clearing of active translations and all automatic bindings by doing a POST on the resource as shown in the following request message below.

Sample JSON Request

```
POST /api/v1/nat-svc/translations
Accept: application/json

{
 "action": "clear"
}
```

Sample JSON Response

```
204 No Content
```

Firewall Inspection Requirements

You should configure the firewall inspection in the following order:

1. Zone
2. ACL if applicable (see the "ACL Requirements for Subnets or IP Ranges" section on page 10-1)
3. Filters
4. Firewall policy

Note The CSR 1000V internally generates the zone-based firewall policy-map.

Resource Summary for Firewall Inspection

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
A collection of zones	/api/v1/zbfw-svc/zones A source zone and a destination zone must be created before configuring a zone-base firewall policy.	Y	Y	N	N
A zone	/api/v1/zbfw-svc/zones/{zone-name}	Y	N	Y	Y

		HTTP Method			
A collection of filters	/api/v1/zbfw-svc/filters	Y	Y	N	N
A filter	/api/v1/zbfw-svc/filters/{filter-id}	Y	N	Y	Y
A collection of policies	/api/v1/zbfw-svc/policies	Y	Y	N	N
A policy	/api/v1/zbfw-svc/policies/<policy-id>	Y	N	Y	Y
FW global log of number of packet dropped	/api/v1/zbfw-svc/log	Y	N	Y	N
Sessions Report, including allowed traffic	/api/v1/zbfw-svc/active-sessions	Y	N	N	N
Dropped traffic and allowed traffic	/api/v1/zbfw-svc/statistics	Y	Y	N	N

ZBFW Zone Collection Resource

JSON Representation

```
{
  "kind": "collection#zbfw-zone",
  "items: { { zbfw-zone JSON object }+ ]
}
```

Property	Type	Description
kind	string	Must be collection#zbfw-zone
items	array	Collection of zbfw zones.

Create a ZBFW Zone

Verb	URI
POST	/api/v1/zbfw-svc/zones

Sample JSON Request

```
POST /api/v1/zbfw-svc/zone
```

```
Accept: application/json
Content-type: application/json

{
   "zone-name": "inside",
   "interface-list": { "tunnel0", "gig0" }
 }
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/zbfw-svc/zone/inside
```

Retrieve All ZBFW Zones

Verb	URI
GET	/api/v1/zbfw-svc/zones

Sample JSON Request

```
GET /api/v1/zbfw-svc/zones
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#zbfw-zone",
  "items":{
           {
             "kind": "object#zbfw-zone",
             "zone-name": "inside",
             "interface-list": { "tunnel0", "gig0" }
           },
           {
             "kind": "object#zbfw-zone",
             "zone-name": "outside",
             "interface-list": { "gig1" }
           }
         ]
}
```

ZBFW Zone Resource

JSON Representation

```
{
  "kind": "object#zbfw-zone",
  "zone-name":"{string}",
  "interface-list": {"{string}"]
}
```

Property	Type	Description
zone-name	string	Name of a zone. “self” and “default” are not allowed.
interface-list	array of string	One or more interfaces that belong to the zone.

Modify a ZBFW Zone

Verb	URI
PUT	/api/v1/zbfw-svc/zones/inside

Sample JSON Request

```
PUT /api/v1/zbfw-svc/zones/inside
Content-type: application/json
Accept: application/json

{
   “zone-name”: “inside”,
   “interface-list”: { “gig0” }
}
```

Sample JSON Response

```
204 No Content
```

Retrieve a ZBFW Zone

Verb	URI
GET	/api/v1/zbfw-svc/zones/{zone-name}

Sample JSON Request

```
GET /api/v1/zbfw-svc/zones/inside
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  “kind”: “object#zbfw-zone”,
  “zone-name”: “inside”,
  “interface-list”: { “tunnel0”, “gig0” }
}
```

Delete a ZBFW Zone

Verb	URI
DELETE	/api/v1/zbfw-svc/zones/{zone-name}

Sample JSON Request

```
DELETE /api/v1/zbfw-svc/zones/inside
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

ZBFW Filter Collection Resource

JSON Representation

```
{
  "kind": "collection#zbfw-filter",
  "items: { { zbfw-filter JSON object }+ ]
}
```

Property	Type	Description
kind	string	Must be collection#zbfw-filter
items	array	Collection of zone-base-firewall filters.

Create a ZBFW Filter

Verb	URI
POST	/api/v1/zbfw-svc/filters

Sample JSON Request

```
POST /api/v1/zbfw-svc/filters

Accept: application/json
Content-type: application/json

{
  "filter-name": "engFilter",
  "match-type": "any",
  "match-list": [ {"acl":"eng1Acl"},
                  {"protocol":"egp"},
                  {"acl":"eng2Acl"}
                ]
  }
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/zbfw-svc/filter/engFilter
```

Retrieve All ZBFW Filters

Verb	URI
GET	/api/v1/zbfw-svc/filters

Sample JSON Request

```
GET /api/v1/zbfw-svc/filters
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#zbfw-filter",
  "items":[
            {
              "kind": "object#zbfw-filter",
              "filter-name": "engFilter",
              "match-type": "any",
              "match-acl-list":[{"dosAcl"}],
              "match-list": [{"protocol":"egp"}]
            },
            {
              "kind": "object#zbfw-filter",
              "filter-name": "engFilter",
              "match-type": "any",
              "match-list": [{"protocol":"ip"}]
            }
           ]
}
```

ZBFW Filter Resource

JSON Representation (IOS Class-map with "type inspect" by Default)

```
{
  "kind": "object#zbfw-filter",
  "filter-name": "{string}",
  "match-type": "{string}",
  "match-acl-list":{"{string}"],
  "match-protocol-list":{"{string}"]
}
```

Property	Type	Description
kind	string	Must be object#zbfw-filter
filter	string	“class-default” or a name to describe the traffic (the IOS class-map name). The name can not be modified once it is created.
match-type	string	“Any” or “All”. “Any”(match any of the traffic criteria) is the default. “Any” refers to the OR operator, and “All” refers to the AND operator. Optional.
match-acl-list	array of string	0 or n types of ACL traffic we want to monitor: one or n acl-id that were configured using the ACL resource. Optional, if the traffic protocol-list attribute is set.
match-protocol-list	array of string	0 to n traffic protocols to monitor. All protocols supported by the CLI are supported. Optional if the traffic ACL-list attribute is set.

Modify a ZBFW Filter

Sample JSON Request

```
PUT /api/v1/zbfw-svc/filters/engFilter
Content-type: application/json
Accept: application/json

{
   “filter-name”: “engFilter”,
   “match-type”: “any”,
   “match-list”: [
                     {“acl”:”dosAcl”},
                     {“protocol”:”egp”},
                     {“acl”:”dos2Acl”}
                 ]
}
```

Sample JSON Response

```
204 No Content
```

Retrieve a ZBFW Filter

Verb	URI
GET	/api/v1/zbfw-svc/filters/{filter-name}

Sample JSON Request

```
GET /api/v1/zbfw-svc/filter/engFilter
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
   "kind": "object#zbfw-filter",
   "filter-name": "engFilter",
   "match-type": "any",
   "match-list": [{"acl":"dosAcl"}, {"protocol":"egp"}]
}
```

Delete a ZBFW Filter

Verb	URI
DELETE	/api/v1/zbfw-svc/filters/{filter-name}

Sample JSON Request

```
DELETE /api/v1/zbfw-svc/filter/engFilter
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

ZBFW Policy Collection Resource

URI: /api/v1/zbfw-svc/policy

JSON Representation

```
{
  "kind": "collection#zbfw-policy",
  "items: { { zbfw-policy JSON object }+ ]
}
```

Property	Type	Description
kind	string	Must be collection#zbfw-policy
items	array	Collection of zone base firewall policies.

Create a Firewall Policy

Verb	URI
POST	/api/v1/zbfw-svc/policies

Sample JSON Request

```
POST /api/v1/zbfw-svc/policies

Content-type: application/json
Accept: application/json

{
  "name": "zonePair_in2out",
  "description": "",
  "source-zone": "inside",
  "destination-zone": "outside",
  "rule-list": {
                  {
                     "filter-name":"class_map_in_to_out",
                     "filter-action":"inspect"
                   }
                  ]
}
```

Sample JSON Response

```
201 Created
Location:http://host/api/v1/zbfw-svc/policy/zonePair_in2out
```

Retrieve All Firewall Policies

Verb	URI
GET	/api/v1/zbfw-svc/policies

Sample JSON Request

```
GET /api/v1/zbfw-svc/policies
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json
Accept: application/json

{
  "kind": "collection#zbfw-policy"
  "items": {
              {
                 "kind": "object#zbfw-policy",
                 "name": "zone_pair_in_to_out",
                 "source-zone": "inside",
                 "destination-zone": "outside",
                 "rule-list": {
                      {
                        "filter-name":"class_map_in_to_out",
                        "filter-action":"inspect"
                      }
                     ]
               },
               {
                 "kind": "object#zbfw-policy",
```

```
                    "name": "myFirewallPolicy",
                    "source-zone": "inside",
                    "destination-zone": "outside",
                    "rule-list": {
                         {
                           "filter-name":"myClassMap1",
                           "filter-action":"inspect",
                         },
                         {
                           "filter-name":"myClassMap2",
                           "filter-action":"inspect"
                         },

                        ]
                  }
               ]
}
```

ZBFW Policy Resource

JSON Representation of ZBFW Policy

```
{
  "kind": "object#zbfw-policy"
  "name":"{string}",
  "description": "{string}",
  "source-zone": "{string}",
  "destination-zone": "{string}",
  "rule-list": {
                    {
                      "filter-name":"{string}",
                      "filter-action":"{string}"
                    }
                   ]
}
```

Property	Type	Description
kind	string	Must be object#zbfw-policy
name	string	Name of the firewall inspection policy resource (the IOS zone-pair security name).
description	string	FW Description (Optional)
source-zone	string	Source zone name. “self” and “default” are not allowed.
destination-zone	string	Destination zone name. “self” and “default” are not allowed.
{rule-list]	array	List of pairs of filter name and action.
filter-name	string	“class-default” or a filter name.
filter-action	string	Optional, default is “drop”. “inspect”, “drop”, “drop-log”, “pass”, and “pass-log”

Modify a Firewall Policy

Verb	URI
PUT	/api/v1/zbfw-svc/policies/{policy-id}

Sample JSON Request

```
PUT /api/v1/zbfw-svc/policy

Content-type: application/json
Accept: application/json

{
  "name": "zone_pair_in_to_out",
  "description": "Inside to Outside firewall",
  "source-zone": "inside",
  "destination-zone": "outside",
  "rule-list": {
                  {
                    "filter-name":" class_map_in_to_out",
                    "filter-action":"inspect",
                  },
                  {
                    "filter-name":" class_map_in_to_out2",
                    "filter-action":"inspect"
                  }

                 ]
}
```

Sample JSON Response

```
204 No Content
```

Retrieve a Firewall Policy

Verb	URI
GET	/api/v1/zbfw-svc/policies/{policy-id}

Sample JSON Request

```
GET /api/v1/zbfw-svc/policies/zone_pair_in_to_out
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  “kind”: “object#zone-pair-fw-policy”,
  “policy-name”: “zone_pair_in_to_out”,
  “description”: “”,
```

```
  "sourcename": "inside",
  "rule-list": {
                  {
                    "filter-name":" class_map_in_to_out",
                    "filter-action":"inspect"
                  },
                  {
                    "filter-name":" class_map_in_to_out2",
                    "filter-action":"inspect"
                  }

                 ]

}
```

Delete a Firewall Policy

Verb	URI
DELETE	/api/v1/zbfw-svc/policies/{policy-id}

Sample JSON Request

```
DELETE /api/v1/zbfw-svc/policy/zone_pair_in_to_out
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

Firewall Session Collection Resource

URI: /api/v1/zbfw-svc/active-sessions

JSON Representation

```
{
  "kind": "collection#firewall-session",
  "items": {
             {
               "kind": "object#firewall-session",
               "policy-id": "{string}",
               "source-ip": "{ipaddress}",
               "destination-ip": "{ipaddress}",
               "traffic-protocol": "{string}",
               "source-protocol-port": {number},
               "destination-protocol-port": {number}
              }
           ]
}
```

Retrieve All Firewall "Sessions"

Verb	URI
GET	/api/v1/zbfw-svc/active-sessions

Sample JSON Request

```
GET /api/v1/zbfw-svc/active-sessions
Accept: application/json
```

Sample JSON Response

```
204 No Content

Content-type: application/json

{
  "kind": "collection#zbfw-session",
  "items": {
             {
               "kind": "object#zbfw-session",
               "policy-id": "in-to-out",
               "source-ip": "36.1.1.4",
               "destination-ip": "37.1.1.2",
               "traffic-protocol": "udp",
               "source-protocol-port": 63,
               "destination-protocol-port": 63

              },
              {
               "kind": "object#zbfw-session",
               "policy-id": "in-to-out",
               "source-ip": "36.1.1.5",
               "destination-ip": "37.1.1.2",
               "traffic-protocol": "udp",
               "source-protocol-port": 63,
               "destination-protocol-port": 63
              }
           ]
}
```

Set Firewall High-Speed Logger

The high-speed logger will log the alert messages by default, which include packet drops.

URI: /api/v1/zbfw-svc/log

JSON Representation

```
{
   "kind": "object#firewall-log",
   "enable": "{string}",
   "dest-ip-address": (ipaddress),
   "dest-udp-port": {number}
}
```

Property	Type	Description
kind	string	Object#firewall-log
enable	boolean	“true” to enable the logging, or “false” to disable it.
dest-address	ipaddress	IP address in x.x.x.x format of where the log should be redirected to.
dest-udp-port	number	Destination UDP port

Retrieval of Firewall Log Server Parameters

Verb	URI
GET	/api/v1/zbfw-svc /log

Sample JSON Request

```
GET /api/v1/zbfw-svc/log
Accept: application/json
```

Sample JSON Response

```
204 No Content

Content-type: application/json

{
  “kind”: “object#firewall-log”,
  “enable”: true,
  “dest-ip-address”: “25.25.25.25”,
  “dest-udp-port”: 25
}
```

Modify the Firewall Log Server

Verb	URI
PUT	/api/v1/zbfw-svc /log

Sample JSON Request

```
PUT /api/v1/zbfw-svc/policy/log

Content-type: application/json
Accept: application/json

{
  “kind”: “object#firewall-log”,
  “enable”: false,
  “dest-ip-address”: “”,
  “dest-udp-port”:
}
```

Sample JSON Response

```
204 No Content
```

Firewall Statistics (Global Count) Collection Resource

URI: /api/v1/zbfw-svc /statistics

JSON Representation

```
{
  "kind": "collection#firewall-statistics",
  "drop-count": {
      {
        "firewall-back-pressure":
           {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-invalid-zone":
           {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-l4-insp":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-no-forwarding-zone":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-non-session":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-policy":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-L4":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-L7":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-not-initiator":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-no-new-session":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-syn-cookie-max-dst":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-syn-cookie":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
```

```
        "firewall-AR-standby":
            {"packet-count":{number},"byte-count": {number}}
      },
      {
        "firewall-not-from-init":
            {"packet-count":{number},"byte-count": {number}}
      },

   },
   "items": {
             {
                "kind": "object#zbfw-session-stats",
                "policy-id": "{string}",
                "byte-stats": {
                       {
                         "source-ip": "{ipaddress}",
                         "destination-ip": "{ipaddress}",
                         "traffic-protocol": "{string}",
                         "source-protocol-port": {number},
                         "destination-protocol-port":{number},
                         "tx-byte-count": {number},
                   "rx-byte-count": {number}
                        }
                      ],
                "packet-stats": {
                           {
                             "traffic-protocol": "{string}",
                             "packet-count": {number}
                           }
                         ]
             }
           ]
}
```

Retrieval of Firewall Statistics

Verb	URI
GET	/api/v1/zbfw-svc/statistics

Sample JSON Request

```
GET /api/v1/zbfw-svc/statistics
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#firewall-statistics",
  "drop-count": {
      {
        "firewall-back-pressure":
           {"packet-count":{number},"byte-count": 0}
      },
      {
```

```
      "firewall-invalid-zone":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-l4-insp":
         {"packet-count":7,"byte-count": 616}
    },
    {
      "firewall-no-forwarding-zone":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-non-session":
         {"packet-count":0",byte-count": 0}
    },
    {
      "firewall-policy":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-L4":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-L7":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-not-initiator":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-no-new-session":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-syn-cookie-max-dst":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-syn-cookie":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-AR-standby":
         {"packet-count":0,"byte-count": 0}
    },
    {
      "firewall-not-from-init":
         {"packet-count":0,"byte-count": 0}
    },
},
"items": {
          {
             "kind": "object#zbfw-session-stats",
             "policy-id": "in-to-out",
             "byte-stats": {
                       {
                         "source-ip": "36.1.1.4",
                         "destination-ip": "37.1.1.2"
                         "traffic-protocol": "udp"
                         "source-protocol-port": 63,
                         "destination-protocol-port": 63,
                         "tx-byte-count": 54,
```

```
                                "rx-byte-count": 0
                               }
                              ],
                    "packet-stats": {
                               {
                                 "traffic-protocol": "udp",
                                 "packet-count": 5
                                }
                              ]
                  }
                ]
}
```

Clear Firewall Statistics

Sample JSON Request

```
POST /api/v1/zbfw-svc/statistics
Accept: application/json
{
  “action”: “clear”
}
```

Sample JSON Response

```
204 No Content
```

IPSec Site-to-Site VPN (SVTI)

The REST API client can use the default IOS isakmp profile and IOS ipsec policy. If the defaults are not used, the REST API client must define an IKE policy and/or IPSec policy before configuring the IPSec site-to-site VPN.

Resource Summary for IPSec VPN

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
IPSec VPN site-to-site	/api/v1/vpn-svc/site-to-site	Y	Y	N	N
IPSec VPN site-to-site interface	/api/v1/vpn-svc/site-to-sitevpn-interface-id}	Y	N	Y	Y
Global keyrings	/api/v1/vpn-svc/global/keyrings	Y	Y	N	N
Keyring ID	/api/v1/vpn-svc/global/keyrings/{keyring-id}	Y	N	Y	Y
IKE policies	/api/v1/vpn-svc/ike/policies	N	N	N	N

		HTTP Method			
IKE policy	/api/v1/vpn-svc/ike/policies/{policy-id}	N	N	N	N
IPSec policies	/api/v1/vpn-svc/ipsec/policies	Y	Y	N	N
IPSec policy	/api/v1/vpn-svc/ipsec/policies/{policy-id}	Y	N	Y	Y
Active sessions	/api/v1/vpn-svc/site-to-site/active/sessions	Y	N	N	N
Site-to-site statistics	/api/v1/vpn-svc/site-to-site/statistics	Y	N	N	N

The VPN URL is /api/v1/vpn-svc/{vpn-type}.

IKE Crypto Key Ring Resource

JSON Representation for REST API IKE Profile (IOS Crypto Keyring)

```
{
  "kind"  : "object#ike-keyring",
  "keyring-id": "{string}",
  "pre-shared-key-list":
                      [
                        {
                          "key": "{string}",
                          "peer-address": "{string}"
                        }
                      ]
}
```

Property	Type	Description
kind	string	Must be object#ike-keyring.
keyring-id	string	IKE key ring name. This cannot be changed once it is configured.
pre-shared-key-list	array	List of pre-shared-key information. This is equivalent to the IOS "crypto keyring" with one or more (key, remote-address) pairs.
key	string	Pre-shared-key value
peer-address	string	Host name or IP address in CIDR format x.x.x.x/nn

Retrieve an IKE Keyring

Verb	URI
GET	/api/v1/vpn-svc/ike/keyrings/{keyring-id}

Sample JSON Request

```
GET /api/v1/vpn-svc/ike/keyrings/myKeyring
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "object#ike-policy"
  "keyring-id": "myKeyring",
  "pre-shared-key-list":
                    [
                      {
                        "key": "cisco123",
                        "peer-address": "pepsi-1"
                      }
                    ]
}
```

Update an IKE Keyring

Verb	URI
PUT	/api/v1/vpn-svc/ike/keyrings/{keyring-id}

Sample JSON Request to Add Another Key and Peer-address

```
POST /api/v1/vpn-svc/ike/myIkeKeyring

Content-type: application/json
Accept: application/json

{
  "keyring-id": "myIkeKeyring",
  "pre-shared-key-list":
         [
           {"key": "cisco123", "peer-address": "pepsi-1"},
           {"key": "root123", "peer-address": "coke"},
         ]
}
```

Sample JSON Response

```
201 Created
Location: http://http/host/api/v1/vpn-svc/ike/myIkeKeyring
```

Delete an IKE Keyring

Verb	URI
DELETE	/api/v1/vpn-svc/ike/keyrings/{keyring-id}

Sample JSON Request

```
DELETE /api/v1/vpn-svc/ike/profiles/myIkeKeyring
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

IKE Keyring Collection Resource

JSON Representation

```
{
  "kind": "collection#ike-keyring",
  "items": [
             { IKE keyring JSON object } *
           ]
}
```

Property	Type	Description
kind	string	Object#ike-keying
items	array	List of IKE keyring objects.

Retrieve All IKE Keyrings

Verb	URI
GET	/api/v1/vpn-svc/ike/keyrings

Sample JSON Request

```
GET /api/v1/vpn-svc/ike/keyrings
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#ike-keyring",
  "items": [
             {
               "kind": "object#ike-keyring",
               "keyring-id": "myIkeKeyring",
                "pre-shared-key-list":
                     [
                       {
                         "key": "cisco123",
                         "peer-address": "pepsi-1"
                       }
                     ]
              },
```

```
                {
                 "kind": "object#ike-keyring",
                 "keyring-id": "myOtherIkeKeyring",
                 "pre-shared-key-list":
                       [
                         {
                           "key": "mag33ks",
                           "peer-address": "marketing"
                         }
                       ]
                }
}
```

Create an IKE Keyring

Verb	URI
POST	/api/v1/vpn-svc/ike/keyrings

Sample JSON Request

```
POST /api/v1/vpn-svc/ike/keyrings

Content-type: application/json
Accept: application/json

{
  "keyring-name": "myIkeKeyring",
  "pre-shared-key-list":
                     [
                       {
                         "key": "XnX1B0I9Z4CWNCGzeEhlNuTFxWBD1vng",
                         "peer-address": "10.0.149.217/32"
                       }
                     ]
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/vpn-svc/ike/keyrings/myIkeKeyring
```

IKE Policy Resource

An IKE policy resource must be created before creating a VPN site-to-site tunnel. The policy is a global configuration and can be applied to more than one VPN tunnel.

JSON Representation for REST API IKE Policy (IOS ISAKMP Policy)

```
{
  "kind"  : "object#ike-policy",
  "priority-id": "{string}",
  "version": "{string}",
  "local-auth-method": "{string}",
  "encryption": "{string}",
  "hash": "{string}",
  "dhGroup": {number},
```

```
  "lifetime":{number}
}
```

IKE Policy

Property	Type	Description
kind	string	Must be object#ike-policy.
priority-id	string	This is the ISAKMP policy priority number, so it must be a number in IKEv1 (it is different for ikev2).
version	string	IKE version: "v1" or "v2". In IOS-XE 3.10, it is only "v1". Optional.
local-auth-method	string	"pre-share" for pre-shared key (default). "rsa-sig" and "rsa-encr" are not supported. Optional.
encryption	string	Optional. The values are • "3des"- triple DES • "aes": AES - Advanced Encryption Standard. • "des": DES - Data Encryption Standard (56 bit keys)
hash	string	• md5: Message Digest 5 • sha: Secure Hash Standard There is a default. Optional.
dhGroup	number	• 1 Diffie-Hellman group 1 (768 bit) • 2 Diffie-Hellman group 2 (1024 bit) • 5 Diffie-Hellman group 5 (1536 bit) There is a default. Optional.
lifetime	number	<60-86400> lifetime in seconds. There is a default. Optional.

Retrieve an IKE Policy

Verb	URI
GET	api/v1/vpn-svc/ike/policies/{policy-id}

Sample JSON Request

```
GET /api/v1/vpn-svc/ike/policies/2
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
```

```
  "kind": "object#ike-policy"
  "priority-id": "2",
  "version": "v1",
  "local-auth-method": "pre-share",
  "encryption": "aes128",
  "hash": "sha",
  "dhGroup": 2,
  "lifetime": 600
}
```

Update an IKE Policy

Verb	URI
PUT	/api/v1/vpn-svc/ike/policies/{policy-id}

Sample JSON Request to Modify the Protection-suite Encryption from 3DES to AES128

```
PUT /api/v1/vpn-svc/ike/2

Content-type: application/json
Accept: application/json

{
  "priority-id": "2",
  "version": "v1",
  "local-auth-method": "pre-share",
  "encryption": "aes128",
  "hash": "sha",
  "dhGroup": 2,
  "lifetime": 600
}
```

Sample JSON Response

```
201 Created
Location: http://http/host/api/v1/vpn-svc/ike/2
```

Delete an IKE Policy

Verb	URI
DELETE	/api/v1/vpn-svc/ike/policies/{policy-id}

Sample JSON Request

```
DELETE /api/v1/vpn-svc/ike/policies/2
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

IKE Policy Collection Resource

JSON Representation

```
{
  "kind": "collection#ike-policy",
  "items": [
             { IKE policy JSON object } *
           ]
}
```

Property	Type	Description
kind	string	Must be "collection#ike-policy"
items	array	List of IKE policy objects.

Retrieve All IKE Policies

Verb	URI
GET	/api/v1/vpn-svc/ike/policies

Sample JSON Request

```
GET /api/v1/vpn-svc/ike/policies
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#ike-policy",
  "items": [
             {
               "kind": "object#ike-policy",
               "priority-id": "2",
               "version": "v1",
               "local-auth-method": "pre-share",
               "encryption": "3des",
               "hash": "sha",
               "dhGroup": 2,
               "lifetime": 600
             },
             {
               "kind": "object#ike-policy",
               "priority-id": "3",
               "version": "v1",
               "local-auth-method": "pre-share",
               "encryption": "3des",
               "hash": "md5",
               "dhGroup": 2,
               "lifetime": 600
             }
```

```
}
```

Create an IKE Policy

Verb	URI
POST	/api/v1/vpn-svc/ike/policies

Sample JSON Request

```
POST /api/v1/vpn-svc/ike/policies

Content-type: application/json
Accept: application/json

{
  "priority-id": "2",
  "version": "v1",
  "local-auth-method": "pre-share",
  "encryption": "3des",
  "hash": "sha",
  "dhGroup": 2,
  "lifetime": 600
}
```

Sample JSON Response

```
201 Created
Location: http://host/api/v1/vpn-svc/ike/policies/2
```

IPSec Policy Resource

An IPSec policy resource must be created before creating a VPN site-to-site tunnel. the policy is a global configuration and can be applied to more than one VPN tunnel.

Property	Type	Description
df-bit	string	Indicates whether the IPSec tunnel mode outer IP header has the DF bit set, cleared, or copied from the original packet: "Set", "Clear", or "Copy". Optional. Not supported in Cisco IOS XE 3.10.
fragment-before-encrypt	string	"Enable" or "Disable" the pre-fragmentation of the outgoing packet (fragment first, then encrypt). Optional.
udp-encapsulation	string	Not supported in Cisco IOS-XE 3.10 release. After the IPsec packet is encrypted, a UDP header and a non-IKE marker (which is 8 bytes in length) are inserted between the outer IP header and ESP header. This is for NAT transparency. Optional.

JSON Representation

```
{
```

```
  "kind": "object#ipsec-policy",
  "policy-id": "{string}",
  "protection-suite":
                       {
                         "esp-encryption": "{string}",
                         "esp-authentication": "{string}",
                         "ah": "{string}"
                       },
  "anti-replay-window-size": "{string}",
  "lifetime-sec": {number},
  "lifetime-kb": {number},
  "idle-time": {number},
  "pfs": "{string}"
}
```

Property	Type	Description
kind	string	Object#ipsec-policy
policy-id	string	IPSec policy name
protection-suite		Optional as there is a default protection suite (IOS transform-set).
esp-encryption	string	ESP encryption transform. There is a default. • esp-3des: ESP transform using 3DES(EDE) cipher (168 bits) • esp-aes: ESP transform using AES cipher. Default. • esp-des: ESP transform using DES cipher (56 bits) • esp-null: ESP transform w/o cipher • esp-seal: ESP transform using SEAL cipher (160 bits)
Esp-authentication	string	ESP authentication transform (Optional). • esp-md5-hmac: ESP transform using HMAC-MD5 auth • esp-sha-hmac: ESP transform using HMAC-SHA auth. Default.
ah	string	AH transform (Optional): • ah-md5-hmac: AH-HMAC-MD5 transform • ah-sha-hmac: AH-HMAC-SHA transform
Anti-replay-window-size	string	"Disable" or one of these numbers • 1024: Window size of 1024 • 128: Window size of 128 • 256: Window size of 256 • 512: Window size of 512 • 64: Window size of 64 (default).

Property	Type	Description
lifetime-sec	number	Default of 3600 seconds. Optional.
lifetime-kb	number	Default is 4608000. Optional.
idle-time	number	IPSec idle timer in seconds. Optional.
pfs	string	Default is Disable. If enable, specifies DH group. Optional. • group1: D-H Group1 (768-bit modp) • group14: D-H Group14 (2048-bit modp) • group15: D-H Group15 (3072-bit modp) • group16: D-H Group16 (4096-bit modp) • group19: D-H Group19 (256-bit ecp) • group2: D-H Group2 (1024-bit modp) • group20: D-H Group20 (384-bit ecp) • group24: D-H Group24 (2048-bit modp, 256 bit subgroup) • group5: D-H Group5 (1536-bit modp)

Retrieve an IPSec Policy

Verb	URI
GET	/api/v1/vpn-svc/ipsec/policies/{policy-id}

Sample JSON Request

```
GET /api/v1/vpn-svc/ipsec/policies/myIpsecPolicy
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "object#ipsec-policy",
  "policy-id": "myIpsecPolicy",
  "protection-suite":
                      {
                        "esp-encryption": "esp-3des",
                        "esp-authentication": "esp-sha-hmac"
                      },
  "anti-replay-window-size": 64,
  "lifetime-sec": 3600,
  "lifetime-kb": 4068000,
  "idle-time": 10000000,
  "pfs": "disable"
}
```

Modify an IPSec Policy

Verb	URI
PUT	/api/v1/vpn-svc/ipsec/policies/{policy-id}

Sample JSON Request

```
PUT /api/v1/vpn-svc/ipsec/policies/myIpsecPolicy

Content-type: application/json
Accept: application/json


{
  "policy-id": "myIpsecPolicy",
  "protection-suite":
                      {
                        "esp-encryption": "esp-3des",
                        "esp-authentication": "esp-sha-hmac"
                      },
  "anti-replay-window-size": 64,
  "lifetime-sec": 3600,
  "lifetime-kb": 4068000,
  "idle-time": 10000000,
  "pfs": "disable"
}
```

Sample JSON Response

```
204 No Content
```

Delete an IPSec Policy

Verb	URI
DELETE	/api/v1/vpn-svc/ipsec/policies/{policy-id}

Sample JSON Request

```
DELETE /api/v1/vpn-svc/ipsec/policies/myIpsecPolicy
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

IPSec Policy Collection Resource

JSON Representation

```
{
  "kind": "collection#ipsec-policy",
```

```
  "items": [
            { IPSec policy JSON object } *
          ]
}
```

Property	Type	Description
kind	string	Must be "collection#ipsec-policy"
Items	array	List of IPSec policy objects.

Retrieve All IPSec Policies

Verb	URI
GET	/api/v1/vpn-svc/ipsec/policies

Sample JSON Request

```
GET /api/v1/vpn-svc/ipsec/policies
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json
Accept: application/json

{
  "kind": "collection#ipsec-policy",
  "items": [
             {
               "kind": "object#ipsec-policy",
               "policy-id": "myIpsecPolicy",
               "protection-suite":
                       {
                         "esp-encryption": "esp-aes",
                         "esp-authentication": "esp-md5-hmac",
                         "ah": "ah-md5-hmac"
                       },
               "mode": "tunnel",
               "anti-replay-window-size": 512,
               "lifetime-sec: 1000,
               "lifetime-kb: 1000000,
               "idle-time: 10000,
               "pfs": "group1"
             },
             {
               "kind": "object#ipsec-policy",
               "policy-id": "testPolicy",
               "protection-suite":
                       {
                         "esp-encryption": "esp-aes",
                       },
               "mode": "tunnel",
               "anti-replay-window-size": "512",
               "lifetime-sec: 1000,
               "lifetime-kb: "",
```

```
                "idle-time: 10000,
                "pfs": "group1"
              },
]
```

Create an IPSec Policy

Verb	URI
POST	/api/v1/vpn-svc/ipsec/policies

Sample JSON Request

```
POST /api/v1/vpn-svc/ipsec/policies

Content-type: application/json
Accept: application/json

{
  "policy-id": "myIpsecPolicy",
  "protection-suite":
                       {
                         "esp-encryption": "esp-aes",
                         "esp-authentication": "esp-md5-hmac",
                         "ah": "ah-md5-hmac"
                       },
  "mode": "tunnel",
  "anti-replay-window-size": 512,
  "lifetime-sec": 1000,
  "lifetime-kb": 1000000,
  "idle-time": 10000,
  "pfs": "group1"
}
```

Sample JSON Response

```
201 Created

Location: http://host/api/v1/vpn-svc/ipsec/policies/myIpsecPolicy
```

IPSec VPN Collection Resource

JSON Representation

```
{
  "kind": "collection#vpn-site-to-site",
  "items" :
     [
        {vpn site-to-site json object}+
     ]
}
```

Property	Type	Description
kind	string	Must be “collection#vpn-site-to-site”.
items	array	List of VPN objects.

Retrieve All Site-to-Site VPN Tunnels

Verb	URI
GET	/api/v1/vpn-svc/site-to-site

Sample JSON Request

```
GET /api/v1/vpn-svc/vpn/site-to-site
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  “kind”: “collection#vpn-site-to-site”,
  “items”: [
             {
               “kind”: “object#vpn-site-to-site”,
               “vpn-type”: “site-to-site”,
               “vpn-interface-name”: “tunnel100”,
               “ip-version”: “ipv4”,
               “ipsec-policy-id”: “myIpsecPolicy”,
               “local-device”: {
                   “ip-address”: “10.0.51.203/24”,
                   “tunnel-ip-address”: “10.0.149.203”,
                  },
               “remote-device”: {
                      “tunnelIpAddress”: “10.0.149.217”
                   }
              },
              {
               “kind”: “object#vpn-site-to-site”,
               “vpn-type”: “site-to-site”,
               “vpn-interface-name”: “tunnel33”,
               “ip-version”: “ipv4”,
               “ipsec-policy-id”: “ciscoIpsecPolicy”,
               “local-device”: {
                   “ip-address”: “100.0.51.203/24”,
                   “tunnel-ip-address”: “100.0.149.203”,
                  },
               “remote-device”: {
                    “tunnelIpAddress”: “100.0.149.217”
                   }
              }
        ]
}
```

Configure a Site-to-Site VPN

Verb	URI
POST	/api/v1/vpn-svc/site-to-site

Sample JSON Request of the above tunnel example

```
POST /api/v1/vpn-svc/site-to-site

Content-type: application/json
Accept: application/json

{
  "vpn-type": "site-to-site",
  "vpn-interface-name": "tunnel100",
  "ip-version": "ipv4",
  "ipsec-policy-id": "myIpsecPolicy",
  "local-device": {
                     "ip-address": "10.0.51.203/24",
                     "tunnel-ip-address": "10.0.149.203"
                  },
  "remote-device": {
                      "tunnel-ip-address": "10.0.149.217"
                   }
}
```

Sample JSON Response

```
204 No Content

Location: http://host/api/v1/vpn-svc/site-to-site/tunnel100
```

IPSec VPN Resource

JSON Representation

```
{
  "kind": "object#vpn-site-to-site"
  "vpn-type": "site-to-site",
  "vpn-interface-name": "{string}",
  "ip-version": "{string}",
  "ipsec-policy-id": "{string}",
  "local-device": {
                     "ip-address": "{string}",
                     "tunnel-ip-address": "{string}",
                  },
  "remote-device": {
                      "tunnel-ip-address": "{string}",
                   }
}
```

Property	Type	Description
vpn-interface-name	string	A unique name of the form “tunnel<number>”. For example, “tunnel1”.
vpn-type	string	Must be “site-to-site”.
ip-version	string	“ipv4” or “ipv6”. The default is IPv4. Optional.
ipsec-policy-id	string	IPSec policy name. Optional.
local-device • ip-address • tunnel-ip-address	string	The local Cisco CSR 1000V device: • Inner IP header’s source IP address in CIDR format x.x.x.x/nn. • Required for svti and dvti. Interface name or IP address in x.x.x.x format.
remote-device • tunnel-ip-address	string	Remote peer IP address in x.x.x.x format.

Retrieve a Site-to-Site VPN Tunnel

Verb	URI
GET	/api/v1/vpn-svc/site-to-site/{vpn-interface-id}

Sample JSON Request

```
GET /api/v1/vpn-svc/site-to-site/tunnel100
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  “kind”: “object#vpn-site-to-site”,
  “vpn-interface-name”: “tunnel100”,
  “vpn-type”: “site-to-site”,
  “ip-version”: “ipv4”,
  “ipsec-policy-id”: “myIpsecPolicy”,
  “local-device”: {
                    “ip-address”: “10.0.51.203/24”,
                    “tunnel-ip-address”: “10.0.149.203”,
                  },
  “remote-device”: {
                     “tunnel-ip-address”: “10.0.149.217”
                   }
}
```

Modify a Site-to-Site VPN

Verb	URI
PUT	/api/v1/vpn-svc/site-to-site/{vpn-interface-id}

Sample JSON Request to Modify the Remote Tunnel IP Address

```
PUT /api/v1/vpn-svc/site-to-site/tunnel100

Content-type: application/json
Accept: application/json

{
  "vpn-interface-name": "tunnel100",
  "vpn-type": "site-to-site",
  "ip-version": "ipv4",
  "ipsec-policy-id": "myIpsecPolicy",
  "local-device": {
                     "ip-address": "10.0.51.203/24",
                     "tunnel-ip-address": "10.0.149.203",
                  },
  "remote-device": {
                      "tunnel-ip-address": "10.0.149.218"
                    }
}
```

Sample JSON Response

```
204 No Content
```

HTTP DELETE a VPN Site-to-Site Tunnel

Verb	URI
DELETE	/api/v1/vpn-svc/site-to-site/{vpn-interface-id}

Sample JSON Request

```
DELETE /api/v1/vpn-svc/site-to-site/tunnel100
Accept: application/json
```

Sample JSON Response

```
204 No Content
```

VPN Active Sessions Collection Resource

JSON Representation

```
{
  "kind": "collection#vpn-active-session",
  "items": [
            {
```

```
            "kind": "object#vpn-active-session",
            "vpn-type": "site-to-site",
            "vpn-interface-name": "{string}",
            "status": "{string}",
            "local-address": "{ipaddress}",
            "remote-address": "{ipaddress}",
            "ike-remaining-lifetime": "hh:mm:ss",
            "ipsec-tx-remaining-lifetime-in-KB": {number},
            "ipsec-rx-remaining-lifetime-in-KB": {number},
            "ipsec-tx-remaining-lifetime-in-sec": {number},
            "ipsec-rx-remaining-lifetime-in-sec": {number}
        }
       ]
}
```

Property	Type	Description
kind	string	Must be collection#vpn-active-session
items	array	List of vpn-active-session JSON object
vpn-type	string	Must be “site-to-site”.
vpn-interface-name	string	Unique number identifying the VPN tunnel.
status	string	See the next table for a description of the possible tunnel states.
local-address	ipaddress	Tunnel source IP address in x.x.x.x format.
remote-address	string	Tunnel destination IP address in x.x.x.x format.
ike-remaining-lifetime	number	IKE SA remaining lifetime in HH:MM:SS format.
ipsec-tx-remaining-lifetime-kb	number	IPSec outbound SA remaining lifetime in KB.
ipsec-rx-remaining-lifetime-kb	number	IPSec inbound SA remaining lifetime in KB.
ipsec-tx-remaining-lifetime-sec	number	IPSec outbound SA remaining lifetime in seconds.
ipsec-rx-remaining-lifetime-sec	number	IPSec inbound SA remaining lifetime in seconds.

The following table lists the tunnel states.

IKE SA	IPSec SA	Tunnel Status
Exist, Active	Exist (flow exists)	UP-ACTIVE
Exist, active	None (flow exists)	UP-IDLE
Exist, inactive	Exist (flow exists)	UP-NO-IKE
Exist, inactive	None (flow exists)	DOWN-NEGOTIATING
Exist, inactive	None (no flow)	DOWN-NEGOTIATING
None	Exist (flow exists)	UP-NO-IKE
None	None (flow exists)	DOWN
None	None (no flow)	DOWN

Retrieve VPN Active Sessions

Verb	URI
GET	/api/v1/vpn-svc/site-to-site/active/sessions

Sample JSON Request

```
GET /api/v1/vpn-svc/site-to-site/active/sessions
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#vpn-active-session",
  "items": [
            {
              "kind": "object#vpn-active-session",
              "vpn-interface-name": "tunnel100",
              "vpn-type": "site-to-site",
              "status": "UP-ACTIVE",
              "local-address": "10.1.1.4",
              "remote-address": "10.1.1.3",
              "ike-remaining-lifetime": "22:03:24",
              "ipsec-tx-remaining-lifetime-in-KB": 4605665,
              "ipsec-rx-remaining-lifetime-in-KB": 4605400,
              "ipsec-tx-remaining-lifetime-in-sec": 2949,
              "ipsec-rx-remaining-lifetime-in-sec": 2949

             }
            ]
}
```

VPN Statistics Collection Resource

JSON Representation

```
{
  "kind": "collection#vpn-statistics",
  "items": [
            {
              "kind": "object#vpn-statistics",
              "vpn-type": "site-to-site",
              "vpn-interface-name": "{string}",
              "local-address": "{ipaddress}",
              "remote-address": "{ipaddress}",
              "encapsulated": {number},
              "decapsulated": {number},
              "encrypted": {number},
              "decrypted": {number},
              "send-errors": {number},
              "receive-errors": {number}
             }
            ]
```

```
}
```

Property	Type	Description
kind	string	Must be “collection#vpn-statistics”.
items	array	List of object#vpn-statistics
vpn-type	string	Must be “site-to-site” in IOS-XE 3.10
vpn-interface-name	string	The IOS tunnel number in “tunnel<number>” format, such as “tunnel2”.
local-address	ipaddress	Tunnel source IP address in x.x.x.x format.
remote-address	ipaddress	Tunnel destination IP address in x.x.x.x format.
encapsulated	number	Number of encapsulated packets.
decapsulated	number	Number of decapsulated packets.
encrypted	number	Number of encrypted packets.
decrypted	number	Number of decrypted packets.
send-errors	number	Number of transmit error packets.
receive-errors	number	Number of receive error packets.

Retrieve All VPN Session Statistics

Verb	URI
GET	/api/v1/vpn-svc/site-to-site/active/sessions

Sample JSON Request

```
GET /api/v1/vpn-svc/site-to-site/statistics
Accept: application/json
```

Sample JSON Response

```
200 OK

Content-type: application/json
{
  “kind”: “collection#vpn-statistics”,
  “items”: [
            {
              “kind”: “object#vpn-statistics”,
              “vpn-type”: “site-to-site”,
              “vpn-interface-name”: “tunnel100”,
              “local-address”: “10.10.10.1”,
              “remote-address”: “13.13.13.1”,
              “encapsulated”: 7767918,
              “decapsulated”: 7760812,
              “encrypted”: 7767918,
              “decrypted”: 7760812,
              “send-errors”: 0,
              “receive-errors”: 0
             }
```

```
                    ]
                }
```

License Requirements

Resource Summary for Licenses

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
EULA	/api/v1/license/eula	Y	Y	N	N
License installation	/api/v1/license/install	N	Y	N	N
License call-home	/api/v1/license/call-home	N	Y	N	N
License UDI	/api/v1/license/udi	Y	Y	N	N
License detail	/api/v1/license?detail={Boolean}	Y	N	N	N

Installing a License Through the Call-home Feature

Verb	URI
POST	/api/v1/license/call-home

Parameter	Type	Required?	Value Rules
username	string	Y	N/A
password	string	Y	N/A
license-server-url	string	Y	N/A
pak-id	string	Y	N/A
send-to-email-id	string	Y	N/A

Sample JSON Request

```
POST /api/v1/license/call-home

Content-Type: application/json
Accept: application/json

{
   "username": "{string}",
   "password": "{string}",
   "license-server-url": "https://tools-stage-was5.cisco.com/SWIFT/Licensing/",
    "pak-id": "{string}",
   "send-to-mail-id": "{string}"
}
```

Sample JSON Response

```
204 No Content
```

Installing a License Obtained Out-of-band

Verb	URI
POST	/api/v1/license/install

Parameter	Type	Required?	Value Rules
license-location	string	Y	The location where the license is stored outside of the Cisco CSR 1000V . Example: tftp://user@linux-box.cisco.com/home/user/csr.lic bootflash:Install from bootflash: file system flash: Install from flash: file system ftp: Install from ftp: file system http: Install from http: file system https: Install from https: file system null: Install from null: file system nvram: Install from nvram: file system pram: Install from pram: file system rcp: Install from rcp: file system scp: Install from scp: file system syslog: Install from syslog: file system system: Install from system: file system tftp: Install from tftp: file system tmpsys: Install from tmpsys: file system

Sample JSON Request

```
POST /api/v1/license/install
Content-Type: application/json
Accept: application/json

{
 "license-location":     "tftp://user@linuxbox.cisco.com/home/user/csr.lic"
}
```

Sample JSON Response

```
204 No Content
```

Retrieving License Information

Parameter	Type	Required?	Value Rules
detail	boolean	Y	"true" to show the details "false" to show a summary

Verb	URI
GET	/api/v1/license?detail={Boolean}

Sample JSON Request

```
GET  /api/v1/license?detail=TRUE
```

Sample JSON Response

```
200 OK
```

```
Content-Type: application/json

{
  "kind": "collection#licenses",
  "items": [
            {
              "kind": "object#license",
              "index": "1"
              "feature": "csr1kv_50m",
              "version": "1.0"
              "license-type": "Paid Subscription",
              "start-date"  : "0000-00-00",
              "end-date" : "2013-12-17",
              "license-state" : "Active, Not in Use",
              "lock-type": "Node locked",
              "vendor-info":
                   {
                     "product-id": "CSR1000V",
                     "serial-number": "9DHICRRBJEL",
                     "udi": "CSR1000V:9DHICRRBJEL"
                    },
              "license-addition": "exclusive",
              "license-generation-version": "0x8200000",
              "license-count": 0,
              "license-priority": "medium",
              "store-index": 0,
              "storage-name": "primary license storage"
              },
            {
              "kind": "object#license",
              "index": 1,
              "feature": "csr1kv_eval",
              "version": 1.0,
              "license-type": "evaluation",
              "license-state" : "Active, In Use",
              "evaluation-period": "P0Y0M8W4D",
              "evaluation-period-left": "P0Y0M8W3D",
              "evaluation-period-used": "P0Y0M0DT3H6M",
              "evaluation-expiry-date" : "2013-02-03T16:35:58",
              "lock-type": "Node locked",
              "license-generation-version": "0x8200000",
              "license-count": 0,
              "license-priority": "medium",
              "store-index": 0,
              "storage-name": "primary license storage"
              },
        ]
}
```

Field	Type	Description
Storage-name	string	storage name; for example, Primary License Storage
version	number	Version of license.
store-index	number	Index of the license line in the license storage
feature	name	Name of feature
license-type	string	Type of license; for example, Paid Subscription or Evaluation
start-date	string	Starting date of a non-evaluation license in YYYY-MM-DD forma

Field	Type	Description
end-date	string	Ending date of a non-evaluation license in YYYY-MM-DD format
license-state	string	Status of the license; for example, “Active, In Use”
evaluation-period	string	Evaluation license’s total period per the ISO 8601 format: PnYnMnDTnHnMnS
evaluation-period-left	string	How much time the evaluation license has left in IOS 8601 format: PnYnMnDTnHnMnS
evaluation-period-used	string	How much time the evaluation license has used so far in ISO 8601 format: PnYnMnDTnHnMnS
evaluation-expiry-date	string	An evaluation license’s expiration date in YYYY-MM-DDTHH:MM:SS format per ISO 8601
lock-type	string	Association of a license to a specific device; for example, Node locked
vendor-info	string	Information about the vendor associated with the device UDI
serial-number	string	The device serial number
product-id	string	The device product ID
udi	string	The device UDI
license-addition	string	Additive or exclusive status of the license; for example, Additive
license-generation-version	string	Version of license generated in hex
license-count	number	Number of available count and in use.
license-priority	string	Priority of the license; for example, high, medium, or low.

Retrieving a License UDI

Verb	URI
GET	/api/v1/license/udi

A GET request on the license UDI returns the UDI in the desired format.

Sample JSON Request

```
GET  /api/v1/license/udi

Accept: application/json
```

Sample JSON Response

```
200 Ok

Content-Type: application/json
```

```
{
    "kind": "object#license-udi",
    "udi": "AS54XM-AC-RPS:JAE948QT6R"
}
```

Requesting a New license UDI

When a VM is cloned, the cloned VM should get a new UDI so the previous VM and the cloned VM have different licenses. A POST request on a new license UDI returns a new UDI in the desired format.

Verb	URI
POST	/api/v1/license/udi

Sample JSON Request

```
POST  /api/v1/license/udi

Accept: application/json

{
  "request": "udi"
}
```

Sample JSON Response

```
200 ok

Content-Type: application/json

{
    "kind": "object#license-udi",
    "udi": "CSRXM-AC-RPS:JAE948QX12"
}
```

Accepting the End-user Agreement

The user should call the GET end-user agreement license (EULA) to view the license agreement before executing the POST EULA. The POST EULA is a one-time acceptance to the terms of the license.

Accepting the One-time Acceptance of the EULA

A POST request creates an acceptance of the end-user license agreement (EULA).

The user must enter in the POST request the link to the GET request for the EULA and indicate whether it accepts the EULA via true or false. Providing these two pieces of information would be the user's acknowledgement of the content of the EULA and acceptance of the EULA (if true is entered for the EULA-accept attribute).

Verb	URI
POST	/api/v1/license/eula

Parameter	Type	Required?	Value Rules
eula-uri	string	Y	Link to the EULA object. It is the GET EULA request URI. For example “/api/v1/license/eula”
eula-accept	boolean	Y	“true” or “false” to indicate whether the user accepts the EULA terms.

Sample JSON Request

```
POST  /api/v1/license/eula

Content-Type: application/json
Accept: application/json

{
   “eula-uri”: “/api/v1/license/eula”,
    “eula-accept”: true
}
```

Sample JSON Response

```
204 No Content
```

Retrieving the License EULA

Verb	URI
GET	/api/v1/license/eula

Sample JSON Request

```
GET  /api/v1/license/eula

Accept: application/json

Sample JSON Response
200 OK

Content-Type: application/json

{
    “kind”: “object#license-eula”,
    “features”: [
                    {
                        “feature-name”:  “csr”,
                        “eula-accepted”: true
```

```
                    }
                ]

"EULA": "PLEASE READ THE FOLLOWING TERMS CAREFULLY. INSTALLING THE LICENSE OR
LICENSE KEY PROVIDED FOR ANY CISCO PRODUCT FEATURE OR USING SUCH
PRODUCT FEATURE CONSTITUTES YOUR FULL ACCEPTANCE OF THE FOLLOWING
TERMS. YOU MUST NOT PROCEED FURTHER IF YOU ARE NOT WILLING TO BE BOUND
BY ALL THE TERMS SET FORTH HEREIN.

You hereby acknowledge and agree that the product feature license
is terminable and that the product feature enabled by such license
may be shut down or terminated by Cisco after expiration of the
applicable term of the license (e.g., 30-day trial period). Cisco
reserves the right to terminate or shut down any such product feature
electronically or by any other means available. While alerts or such
messages may be provided, it is your sole responsibility to monitor
your terminable usage of any product feature enabled by the license
and to ensure that your systems and networks are prepared for the shut
down of the product feature. You acknowledge and agree that Cisco will
not have any liability whatsoever for any damages, including, but not
limited to, direct, indirect, special, or consequential damages related
to any product feature being shutdown or terminated. By clicking the
"accept" button or typing "yes" you are indicating you have read and
agree to be bound by all the terms provided herein."
```

Memory and CPU Usage Report

Resource Summary for Memory and CPU

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST/ Create**	**PUT**	**DELETE**
Memory	/api/v1/global/memory/processes	Y	N	N	N
CPU	/api/v1/global/cpu	Y	N	N	N

Memory Usage

JSON Representation of Memory

```
{
    "kind": "object#memory-processes",
    "total-used": {number},
    "total-free": {number},
    "processes": [
                    {
                      "process-id": {number},
                      "process-name": "{string}",
                      "memory-used": {number}
                    }
                  ]
}
```

The table below lists the fields and descriptions in the **show processes memory** command output:

Field	Type	Description
total-used	number	Total amount of used memory
total-free	number	Total amount of free memory
process-id	number	Process ID
allocated	number	Bytes of memory allocated by the process
process-name	string	Process name.

Retrieve the Memory Usage

Verb	URI
GET	/api/v1/global/memory/processes

Sample JSON Request

```
GET  /api/v1/global/memory/processes

Accept: application/json
```

Sample JSON Response

```
200 OK


Content-Type: application/json

{
    "kind": "object#memory-process",
    "total-used": "6294296",
    "total-free": "832",
    "processes": [
                    {
                      "process-id": 0,
                      "process-name": "Init",
                      "memory-used": 340949904
                     },
                    {
                      "process-id": 2,
                      "process-name": "Load Meter",
                      "memory-used": 448
                     },
                    …
                   ]
}
```

CPU Utilization

The REST API provides the total CPU consumption.

JSON Representation of CPU

```
{
  "kind": "object#cpu",
  "last-5-secs-utilization": "{string}",
  "last-1-mn-utilization": "{string}",
  "last-5-mns-utilization": "{string}"
}
```

Field	Type	Description
kind	string	Must be "object#cpu"
last-five-secs-utilization	string	The percent of CPU utilization for the last five seconds
last-one-mn-utilization	string	The percent of CPU utilization for the last minute
last-five-mns-utilization	string	The percent of CPU utilization for the last five minutes

Retrieve the CPU Utilization

Verb	URI
GET	/api/v1/global/memory/cpu

Sample JSON Request

```
GET  /api/v1/global/cpu

Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
  "kind": "object#cpu",
  "last-5-secs-utilization": "8%",
  "last-1-mn-utilization": "6%",
  "last-5-mns-utilization": "5%"
}
```

Syslog Resource

		HTTP Method			
Resource	URL (BaseURL)	GET	POST/ Create	PUT	DELETE
syslog	/api/v1/global/syslog	Y	N	N	N

JSON Representation

```
{
  "kind": "object#syslog-buffer",
  "messages": "{string}"
}
```

The following table lists and describes the fields in the **show processes cpu** output:

Field	Type	Description
kind	string	Must be "object#syslog-buffer"
messages	string	Syslog messages

Retrieve the Syslog

Sample JSON Request

```
GET  /api/v1/global/syslog

Accept: application/json
```

Sample JSON Response

```
200 OK

Content-Type: application/json

{
  "kind": "object#syslog-buffer",
  "messages": "{string}"
}
```