Cisco IOS XE REST API Management Reference Guide

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Cisco IOS XE REST API Management Reference Guide

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Introducing the Cisco IOS XE REST API

Introduction

The Representation State Transfer APIs (REST APIs) provide an alternative method to the Cisco IOS XE CLI for provisioning selected functions.

Feature History and Supported Platforms

For each Cisco IOS XE release supporting the REST API, the following table describes:

- Select new features
- Added platform support

Table 1-1 Feature History and Platform Support

Release	New Features	New Platforms Supported
3.16S	Support on Cisco ASR 1000 Series for "dual IP bring-up," using either data plane interface or management plane interface. See the software configuration guide.	ASR 1000 Series Route Processor 2 (ASR 1000-RP2)
3.14S	Support for IPv6 addressing on an interface	ASR 1001-X ASR 1002-X

Table 1-1 Feature History and Platform Support

Release	New Features	New Platforms Supported
3.13S	Additional VRF Resources VRF-Aware DNS, OSPF routing, BGP routing, EIGRP routing, Routing Table VRF-Aware NAT Saving the REST API configuration file Configuring the VPN site-to-site tunnel state Support for Locator ID Separation Protocol (LISP) Support for QoS	
3.12S	Smart License Call-Home Reload VRF support for DHCP and VPN	
3.11S	Banner BGP Best path selection Logging SNMP server TACACS server IKE keep-alive VRF support for NTP, static route, TACACs, and logging EzVPN Fall-over option for BGP neighbor API Improved configuration of user account passwords Improved configuration of interfaces: ICMP redirects, proxy ARP, unicast source verification Improved configuration of ACL Subinterface	

Table 1-1 Feature History and Platform Support

Release	New Features	New Platforms Supported
3.10S	Global configuration DNS NTP IP interfaces **Note** IPv6 for REST API is not supported in Cisco IOS XE 3.10S. 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	CSR 1000V

Getting Started

You need to first configure the platform to support management using the REST API. For more information, see the configuration guide for your platform. Examples:

- Cisco CSR 1000V Series

  "Configuring Support for Management Using the REST API" section of the *Cisco CSR 1000V Series Cloud Services Router Software Configuration Guide*

- Cisco ASR 1000 Series

  "Configuring Support for Management Using the REST API" section of the *Cisco ASR 1000 Series Aggregation Services Routers Software Configuration Guide*

Important Notes

Cisco ASR1001-X and ASR1002-X Platforms—Management Port Limitation

On Cisco ASR1001-X and ASR1002-X platforms, the REST API is not supported on the management port (G0).

Known Issue with Self-Signed Certificates

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.

Requirements for Using Firewall and VPN REST APIs

Using Firewall and VPN REST APIs requires the necessary technology package licensing for the platform.

Conventions

Cisco IOS XE REST API Request Methods

The Cisco IOS XE REST API uses the HTTP request methods described in Table 1-2.

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 1-2 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 Codes and Error Representation

Properties Related to Error Codes

Property	Type	Description
error-code	number	-1

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

JSON Representation of Error Response

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

Example 1: JSON Error Response

```
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."
}
```

Example 2: JSON Error Response

```
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 IOS XE 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 3 describes the supported HTTP status codes and descriptions.

Table 3 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.
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 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 ~]$ 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 ~]$ 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 ~]$ 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 ~]$
```

Installing the Virtual Services Management Container

Perform the following steps to install the REST API virtual services management container.

Installing the Virtual Services Management Container

Prerequisites

Download the IOS XE REST API Support OVA file from the software download pages for the Cisco CSR 1000v: Download Software.

Step 1 Router# **copy** *filename.ova* **bootflash:**

Copies the .ova file into bootflash.

Example

```
Router# copy tftp: bootflash:
Address or name of remote host []? 192.168.1.254
Source filename []? /auto/myuser1/images/iosxe-remote-mgmt.2017-08-15_17.21.ova
Destination filename [iosxe-remote-mgmt.2017-08-15_17.21.ova]?
Accessing
tftp://192.168.1.254//auto/wsmyuser1/images/iosxe-remote-mgmt.2017-08-15_17.21.ova...
Loading
/auto/wsmyuser1/images/ios!O!!!O!!!!O!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!...
[OK - 125696000 bytes]
```

Step 2 Router# **virtual-service install name csr_mgmt package bootflash:** *filename.ova*

Installs the virtual services management container.

Example

```
Router# virtual-service install name csr_mgmt package bootflash:
iosxe-remote-mgmt.2017-08-15_17.21.ova
```

Step 3 Router# **show virtual-service list**

Verifies the virtual service has been installed.

Example

```
Router# show virtual-service list
```

```
Name                    Status             Package Name
------------------------------------------------------------------------------
csr_mgmt                Installed          iosxe-remote-mgmt.2017-08-15_17.21.ova
```

Step 4 Router# **configure terminal**

Enters configuration mode.

Step 5 Router(config)# **virtual-service csr_mgmt**

Enters configuration sub-mode for the named virtual service.

Step 6 Router(config-virt-serv)# **activate**

Activates the virtual service.

Example

```
Router(config-virt-serv)# activate

% Activating virtual-service 'csr_mgmt', this might take a few minutes. Use 'show
virtual-service list' for progress.
```

Step 7 Router(config-virt-serv)# **exit**

Step 8 Router(config)# **exit**

Step 9 Router# **show virtual-service detail**

Verifies the configuration of the virtual service.

Example

```
Router# show virtual-service detail

Virtual service csr_mgmt detail
  State                : Installed
  Owner                : IOSd
  Package information
    Name               : iosxe-remote-mgmt.2017-08-15_17.21.ova
    Path               : bootflash:/iosxe-remote-mgmt.2017-08-15_17.21.ova
    Application
      Name             : csr_mgmt
      Installed version : 2017.10
      Description      : CSR-MGMT
    Signing
      Key type         : Cisco release key
      Method           : SHA-1
    Licensing
      Name             : Not Available
      Version          : Not Available

  Detailed guest status
    None

  Activated profile name: None
  Resource reservation
    Disk               : 119 MB
    Memory             : 0 MB
    CPU                : 0% system CPU

  Attached devices
    Type              Name        Alias
    ---------------------------------------------
```

```
    NIC               net1        ieobc
    NIC               net2        net2
    Disk              _rootfs
    Disk              /opt/var
    Disk              /opt/var/c
    Serial/shell                  serial0
    Serial/aux                    serial1
    Serial/Syslog                 serial2
    Serial/Trace                  serial3

  Network interfaces
    MAC address             Attached to interface
    ------------------------------------------------------
    52:54:00:d2:04:fe
    52:54:00:d2:04:02
 ...
Resource admission (without profile) : passed
    Disk space    : 875MB
    Memory        : 512MB
    CPU           : 5% system CPU
    VCPUs         : Not specified
```

Step 10 Router# **show virtual-service list**

Verifies that the virtual service has been activated.

Example

The following example shows the virtual-service is still being activated.

```
Router# show virtual-service list

System busy activating virtual-service 'csr_mgmt'. The request may take several minutes...

Name                    Status             Package Name
------------------------------------------------------------------------------
csr_mgmt                Activating         iosxe-remote-mgmt.2017-08-15_17.21.ova
```

Example

The following example shows the virtual-service has now been activated.

```
Router# show virtual-service list

Name                    Status             Package Name
------------------------------------------------------------------------------
csr_mgmt                Activated          iosxe-remote-mgmt.2017-08-15_17.21.ova
```

Client Authentication

Overview

The REST API authentication works as follows:

- The authentication uses HTTPS as the transport for all the Cisco REST 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.
- The username/password for the HTTPS session should be configured with privilege 15.

Resource Summary for Client Authentication

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

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.

Resource URI

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

Example

JSON Request

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

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

Resource URI

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

Example

JSON Request

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

Accept: application/json
```

JSON Response

```
403 Access Denied
```

Token Resource

A token represents successful authentication of a client.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Properties	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be “object#auth-token”
token-id	string	Not applicable	Authentication token that must be included as a custom HTTP header X-auth-token value in all API requests
link	string	Not applicable	Token resource URL.
expiry-time	string	Not applicable	Idle period in hh:mm:ss format.

JSON Representation of a Token

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

Retrieve Token Details

Resource URI

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

Example

JSON Request

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

JSON Response

```
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.

Resource URI

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**	**PUT**	**DELETE**
Banner	/api/v1/global/banner	Y	N	Y	N
Host name	/api/v1/global/host-name	Y	N	Y	N
Domain name	/api/v1/global/domain-name	Y	N	Y	N
Local users	/api/v1/global/local-users	Y	Y	N	N
	/api/v1/global/local-users/{username}	Y	Y	Y	Y

		HTTP Method			
Logging	/api/v1/global/logging	Y	Y	N	N
	/api/v1/global/logging/{ip-address}	N	N	N	Y
	/api/v1/global/logging/{ip-address}_{transport}_{port}	Y	N	N	Y
Global running configuration	/api/v1/global/running-config	Y	N	Y	N
SNMP	/api/v1/global/snmp	Y	Y	N	N
	/api/v1/global/snmp/{ip-address}	Y	N	N	Y
TACACS	/api/v1/global/tacacs	Y	Y	N	N
	/api/v1/global/tacacs/{name}	Y	N	Y	Y
Syslog	/api/v1/global/syslog	Y	N	Y	N
Reload	/api/v1/global/reload	N	N	Y	N
Save configuration	/api/v1/global/save-config	N	N	Y	N
Save configuration autosave timer	/api/v1/global/autosave-timer	Y	N	Y	N
IPv6	/api/v1/global/ipv6/routing	Y	N	Y	N
CLI commands	/api/v1/global/cli	N	N	Y	N

Banner Resource

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: “object#banner”
exec	string	Optional	Exec mode message Providing an empty string cancels the property.

login	string	Optional	Login message Providing an empty string cancels the property.
motd	string	Optional	Message of the Day Providing an empty string cancels the property.

JSON Representation

```
{
    "kind"   : "object#banner",
    "exec"   : "{string}",
    "login"  : "{string}",
    "motd"   : "{string}"
}
```

Retrieve Banner

Resource URI

Verb	URI
GET	/api/v1/global/banner

Example

JSON Request

```
GET /api/v1/global/banner
Accept: application/json
```

JSON Response

```
200 OK
Content-Type: application/json
{
    "kind" : "object#banner"
    "exec" : "{string}",
    "login": "{string}",
    "motd" : "{string}"
}
```

Modify Banner

Resource URI

Verb	URI
PUT	/api/v1/global/banner

Example

JSON Request

```
PUT /api/v1/global/banner
Content-Type: application/json

{
    "exec" : "{string}",
    "login": "{string}",
    "motd" : "{string}"
}
```

JSON Response

```
204 No Content
```

Hostname Resource

The hostname resource represents the global configuration hostname property.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. Always “object#hostname”
host-name	string	Mandatory	router name

Retrieve Device Hostname

Resource URI

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

Example

JSON Request

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

JSON Response

```
200 Ok

Content-Type: application/json

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

Modify Device Hostname

Resource URI

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

Example

JSON Request

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

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

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

JSON Response

```
200 Ok

Content-Type: application/json

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

JSON Response with no Response Body

```
204 No Content
```

Domain Name Resource

Represents the domain name property of the global configuration.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

Retrieve Domain Name

Resource URI

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

Example

JSON Request

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

JSON Response

```
200 Ok

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

Modify Domain Name

Resource URI

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

Example

JSON Request

```
PUT  /api/v1/global/domain-name
Content-Type: application/json
Accept: application/json

{
  "domain-name": cisco.com
}
```

JSON Response

```
204 No Content
```

Users Resource

Users resource represents the collection of local users who are allowed to access the device.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.11	Added pw-type property
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. Has fixed value “object#local-user”
username	string	Mandatory	Name of the user. Once created, cannot be modified.
password	string	Optional	Password.
privilege	number	Optional	Privilege level 0-15.
pw-type	number	Optional	IOS password type. Only type 0 and 7 are supported. For a cleartext password, this argument is either 0 or optional. **Note**: Because only type 0 and 7 are supported, switching from other IOS password types may not be possible. Those credentials may need to be deleted first, and new credentials created.

JSON Representation

```
{
    "kind"      : "object#local-user"
    "username"  : "cisco",
    "password"  : "ladf3434d",
    "pw-type"   : 7,
    "privilege" : "15"
}
```

Create User Name

Resource URI

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

Example

JSON Request

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

Content-Type: application/json

{
   "username":  "jtod",
   "password" :  "re1st2",
   "pw-type"  :  7,
   "privilege":  15
}
```

JSON Response

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

Retrieve User Name or Password

Resource URI

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

Example

JSON Request

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

JSON Response

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

{
    "kind"     : "object#local-user"
    "username" : "cisco",
    "password" : "1adf3434d",
    "pw-type"  :  7,
    "privilege":  15
}
```

Retrieve All User Names

Resource URI

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

Properties for Retrieve All

Property	Type	Description
kind	string	Object type. Has fixed value “collection#local-user”
users	string	Array of user objects.

Example

JSON Request

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

JSON Response

```
200 OK

Content-Type: application/json

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

```
                {
                 "kind": "object#local-user",
                 "username" :  "marym",
                 "pw-type"  :  7,
                 "privilege":  7
                }
              ]
}
```

Modify User Attributes

Resource URI

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

Example

JSON Request

```
PUT /api/v1/global/local-users/cisco
Content-Type: application/json

{
    "username"    : "cisco",
    "password"    : "ladf3434d",
    "pw-type"     : 7,
    "privilege"   : 15
}
```

JSON Response

```
204 No Content
```

Delete a User Name

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Logging Resource

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. “object#logging”
ip-address	string	Mandatory	IP Address of the logging host
transport	string	Optional	Object type. “object#logging”
port	string	Optional	port of the logging host

JSON Representation

```
{
    "kind"       : "object#logging",
    "ip-address" : "1.1.1.1",
    "transport"  : "udp",
    "port"       : 514
}
```

Create a Logging Object

Example

JSON Request

```
POST /api/v1/global/logging
Content-Type: application/json

{
    "ip-address": "10.1.1.1",
    "transport": "tcp",
    "port": 1024
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/global/logging/10.1.1.1_tcp_1024
```

Retrieve a Logging Object

Example

JSON Request

```
GET /api/v1/global/logging/10.1.1.1
Accept: application/json
```

JSON Response

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

{
    "kind"       : "object#logging",
    "ip-address" : "10.1.1.1",
    "transport"  : "udp",
    "port"       : 514
}
```

Retrieve All Logging Objects

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. Always “collection#logging”
items	array	Mandatory	Array of object#logging

JSON Representation

```
{
    "kind"   : "collection#logging",
    "items"  : [ {object#logging} ]
}
```

Example

JSON Request

```
GET /api/v1/global/logging
Accept: application/json
```

JSON Response

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

{
    "kind"    : "collection#logging",
    "items"   : [
        {
        "kind"       : "object#logging",
        "ip-address" : "10.1.1.1",
        "transport"  : "udp",
        "port"       : 514
    },
    {
        "kind"       : "object#logging",
        "ip-address" : "10.1.1.2",
        "transport"  : "tcp",
        "port"       : 1024
    }
}
```

Deleting a Logging Object

Example

JSON Request

```
DELETE /api/v1/global/logging/10.1.1.1
```

JSON Response

```
204 No Content
```

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Retrieving or Exporting the Running Configuration

Resource URI

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

Example

JSON Request

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

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.

Resource URI

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

Example

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
!
```

JSON Response

```
204 No Content
```

SNMP Server Resource

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. “object#snmp”
ip-address	string	Mandatory	IP Address of the SNMP server
community-string	string	Mandatory	SNMPv1/v2 community-string or SNMPv3 user name

JSON Representation

```
{
    "kind"             : "object#snmp",
    "ip-address"       : {string},
    "community-string" : {string}
}
```

Create SNMP Object

Example

JSON Request

```
POST /api/v1/global/snmp
Content-Type: application/json

{
    "ip-address" : "10.1.1.1",
    "community-string" : "cisco123"
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/global/snmp/10.1.1.1_cisco123
```

Retrieve SNMP Object

Example

JSON Request

```
GET /api/v1/global/snmp/10.1.1.1_abc123
Accept: application/json
```

JSON Response

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

{
    "kind"             : "object#snmp",
    "ip-address"       : "10.1.1.1",
    "community-string" : "abc123"
}
```

Retrieve All SNMP Objects

Properties for Retrieve All

Property	Type	Description
kind	string	Object type. Always “collection#snmp”
items	array	Array of object#snmp

JSON Representation

```
{
    "kind"  : "collection#snmp",
    "items" : [ {object#snmp} ]
}
```

Example

JSON Request

```
GET /api/v1/global/snmp
Accept: application/json
```

JSON Response

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

{
    "kind"    : "collection#snmp",
    "items"   : [
        {
            "kind": "object#snmp",
            "ip-address": "10.1.1.1",
            "community-string": "abc123"
        },
        {
            "kind": "object#snmp",
            "ip-address": "10.1.1.2",
            "community-string": "abc123"
        }
}
```

Delete SNMP Object

Example

JSON Request

```
DELETE /api/v1/global/snmp/10.1.1.1_abc123
```

JSON Response

```
204 No Content
```

TACACS Server Resource

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. “object#tacacs”
name	string	Mandatory	Name of TACAS server
ip-address	string	Mandatory	IP Address of the TACACS server
key	String	Optional	key **Note**: This key will not be returned in the GET API for security reasons.

JSON Representation

```
{
    "kind"      : "object#tacacs",
    "name"      : {string},
    "ip-address": {string},
    "key": {string}
}
```

Create TACACS Server

Example

JSON Request

```
POST /api/v1/global/tacacs
Content-Type: application/json

{
    "name"       : "primary",
    "ip-address" : "10.1.1.1",
    "key"        : "cisco123"
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/global/tacacs/primary
```

Retrieve TACACS Server

Example

JSON Request

```
GET /api/v1/global/tacacs/primary
Accept: application/json
```

JSON Response

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

{
    "kind"      : "object#tacacs",
    "name"      : "primary",
    "ip-address": "10.1.1.1"
}
```

Retrieve All TACACS Servers

Properties for Retrieve All

Property	Type	Description
kind	string	Object type. Always “collection#tacacs”
items	array	Array of object#tacacs

JSON Representation for Retrieve All

```
{
    "kind"   : "collection#tacacs",
    "items"  : [ {object#tacacs} ]
}
```

Example

JSON Request

```
GET /api/v1/global/tacacs
Accept: application/json
```

JSON Response

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

{
    "kind"        : "collection#tacacs",
    "items"       :  [
          {
                "kind"      : "object#tacacs",
                "name"      : "primary",
                "ip-address": "10.1.1.1"
          },
          {
                "kind"      : "object#tacacs",
                "name"      : "secondary",
                "ip-address": "10.1.1.2"
          }
                     ]
}
```

Modify TACACS Server

Example

JSON Request

```
PUT /api/v1/global/tacacs/primary
Content-Type: application/json

{
    "ip-address"  : "10.1.1.1",
    "key"         : "cisco123"
}
```

JSON Response

```
204 No Content
```

Delete TACACS Server

Example

JSON Request

```
DELETE /api/v1/global/tacacs/primary
```

JSON Response

```
204 No Content
```

Syslog Resource

This resource is used to retrieve the CSR logs. The Properties table describes the fields in the show processes cpu output.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Field	Type	Description
kind	string	Must be “object#syslog-buffer”
messages	string	Syslog messages

JSON Representation

```
{
  "kind": "object#syslog-buffer",
  "messages": "{string}"
}
```

Retrieve the Syslog

Example

JSON Request

```
GET  /api/v1/global/syslog

Accept: application/json
```

JSON Response

```
200 OK

Content-Type: application/json

{
  "kind"    : "object#syslog-buffer",
  "messages": "{string}"
}
```

Reload Resource

Reloads/reboots the router after a specified interval, up to 60 minutes.

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
minutes	number	Mandatory	Reloads after the specified interval in minutes. Range: 0 to 60 A value of 0 indicates an immediate reload and will terminate the REST HTTP session.

JSON Representation

```
{
    "minutes": {number}
}
```

Reload Router

Resource URI

Verb	URI
PUT	/api/v1/global/reload

Example

JSON Request

```
PUT /api/v1/global/reload
Content-Type: application/json

{
   "minutes" : 5
}
```

JSON Response

```
204 No Content
```

Saving the REST API Configuration

This resource saves the REST API configuration file.

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms The following API is not supported: /api/v1/global/autosave-timer

Saving the REST API configuration file (IOS write memory CLI command) introduces a delay of a few seconds, depending on the size of the configuration file. To reduce the impact that the write memory command has on the REST API performance, the configuration is saved at a fixed time interval.

- save-config API

  Save the REST API configuration file. See Save REST API Configuration File, page 4-23.

- autosave-timer API

  Configure or retrieve the autosave interval. See Configure the Autosave Timer Interval, page 4-23.

The time interval is also configurable using a new CLI based on the restful-api CLI command.

Save REST API Configuration File

Resource URI

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

Example

JSON Request

```
PUT /api/v1/global/save-config
Content-Type: application/json
```

JSON Response

```
204 No Content
```

Configure the Autosave Timer Interval

Properties

Property	Type	Required for POST and PUT	Description
timeout	integer	Mandatory	Interval setting from 30 to 300 seconds

JSON Representation

```
{
    "timeout": {integer}
}
```

Resource URI

Verb	URI
PUT	/api/v1/global/autosave-timer
See Historyfor platform limitations.	

Example

JSON Request

```
PUT /api/v1/global/autosave-timer
Content-Type: application/json

{
   "timeout": 30
}
```

JSON Response

```
204 No Content
```

Retrieve the Autosave Timer Interval

Resource URI

Verb	URI
GET	/api/v1/global/autosave-timer
See Historyfor platform limitations.	

Example

JSON Request

```
GET /api/v1/global/autosave-timer
```

JSON Response

```
200 ok

Content-type: application/json

{ "timeout" : 30}
```

IPv6 Resource

History

Release	Modification
IOS XE 3.16	Introduced for the CSR1000V platform

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: "object#ipv6-routing"
unicast	boolean	Optional	Enables the forwarding of IPv6 unicast datagrams
multicast	boolean	Optional	Enables the forwarding of IPv6 multicast datagrams

JSON Representation

```
{
  "kind": "object#ipv6-routing",
  "unicast": {boolean},
  "multicast": {boolean}
}
```

Support for Any CLI

This resource can be used to configure any CLI through the REST API.

History

Release	Modification
IOS XE 3.16	Introduced for the CSR1000V platform

Properties

Property	Type	Required for POST and PUT	Description
config	string	Optional	CLI to be applied in the config mode
exec	string	Optional	CLI to be applied in the exec mode
show	string	Optional	CLI to be run to show the results

JSON Representation

```
{
  "config":"string",
  "exec":"string",
  "show":"string"
}
```

Configure a CLI in "config" Mode

Resource URI

Verb	URI
PUT	/api/v1/global/cli

Example

JSON Request

```
PUT /api/v1/global/cli
Content-Type: application/json

{
   "config": "interface lisp0"
}
```

JSON Response

```
204 No Content
```

Configure Multiple CLIs in "config" Mode

Separate multiple CLIs with **\n**.

Resource URI

Verb	URI
PUT	/api/v1/global/cli

Example

JSON Request

```
PUT /api/v1/global/cli
Content-Type: application/json

{
   "config": "crypto ssl proposal SSL_PROP \n protection rsa-aes128-sha1"
}
```

JSON Response

```
204 No Content
```

Configure a CLI to Show Output

Resource URI

Verb	URI
PUT	/api/v1/global/cli

Example

JSON Request

```
PUT /api/v1/global/cli
Content-Type: application/json

{
   "show": " privilege"
}
```

JSON Response

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

{
   "kind": "object# cli-results",
   "results": "Current privilege level is 15"
}
```

Configure Multiple CLIs in "exec" Mode

Separate multiple CLIs with **\n**.

Resource URI

Verb	URI
PUT	/api/v1/global/cli

Example

JSON Request

```
PUT /api/v1/global/cli
Content-Type: application/json

{
   "exec": " ping 1.1.1.1"
}
```

JSON Response

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

{
  "kind": "object# cli-results",
  "results":  "Type escape sequence to abort.\nSending 5, 100-byte ICMP Echos to 1.1.1.1,
timeout is 2 seconds:\n.....\nSuccess rate is 0 percent (0/5)"
}
```

Domain Name System (DNS) Server

Resource Summary for DNS Servers

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
DNS servers	/api/v1/global/dns-servers	Y	Y	N	N
	/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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	String	Not applicable	Object type. Always “collection#dns-server”
items	array	Mandatory	Array of DNS server objects

Property	Type	Required for POST and PUT	Description
ip-address	ipaddress	Mandatory	DNS server's IP address in x.x.x.x format
primary	Boolean	Mandatory	"true" if the primary DNS server's IP address is being configured, "false" otherwise.

Retrieve a DNS Server

Resource URI

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

Example

JSON Request

```
GET /api/v1/global/dns-server/172.25.25.25
Accept: application/json
```

JSON Response

```
200 Ok

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

Retrieve All DNS Servers

Resource URI

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

The first DNS server listed is the primary one.

Properties for Retrieve All

Property	Type	Description
kind	String	Object type. Always "collection#dns-server"
items	array	Array of DNS server objects

Property	Type	Description
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.

Example

JSON Request

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

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
             },
           ]
}
```

Delete a DNS Server

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create a DNS Server

A POST on this resource is used to create individual DNS server resources.

Resource URI

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

Example

JSON Request

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

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

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

JSON Response

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

Network Time Protocol (NTP)

Resource Summary for NTP

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
NTP server	/api/v1/global/ntp/servers	Y	Y	NA	N
	/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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Object type. Always "collection#ntp-server"
ntp-servers	array	Mandatory	Array of ntp server objects
ntp-servers [ ].kind	string	Mandatory	Array object type. Always "object#ntp-server"
ntp-servers [ ].ip-address	string	Mandatory	CIDR format: x.x.x.x/nn or name

JSON Representation

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

Create NTP Server

Resource URI

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

Example

JSON Request

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

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

{
  "ip-address": "173.25.25.25"
}
```

Example

JSON Response

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

Retrieve All NTP Servers

Resource URI

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

Properties for Retrieve All

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.

Example

JSON Request

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

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"
             },
           ]
}
```

Retrieve a NTP Server

Resource URI

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

Example

JSON Request

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

JSON Response

```
200 Ok

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

Delete a NTP Server

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

NTP Status

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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.
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—for example, 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.

Property	Type	Description
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.

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}
}
```

Retrieve NTP Status

Resource URI

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

Example

JSON Request

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

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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	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”
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.

Property	Type	Description
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

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}
             }
           ]
}
```

Retrieve NTP Server Run-time Information

Resource URI

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

Example

JSON Request

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

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"
             }
           ]
}
```

Interface IP Configuration Requirements

Resource Summary for IP Interface

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
Interface	/api/v1/interfaces	Y	Y	N	N
	/api/v1/interfaces/{if-id}[1]	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

1. {if-id} = Interface ID returned from the REST API used to create the interface.

Interface Resources

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.11	Added the following properties: • icmp-redirects • icmp-unreachable • proxy-arp • verify-unicast-source • subinterface-vlan (includes sub-properties described below)
IOS XE 3.13	Enhanced interface API for BDI support: Added a new interface type: "bdi"
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. Has the fixed value "object#interface"
type	string	Mandatory	Interface type. Read-only
if-name	string	Mandatory	Interface name. Note that the name follows the usual IOS slot/port convention.
description	string	Optional	Interface Description
ip-address	ip-address	Mandatory	IP address in the format x.x.x.x
subnet-mask	ipsubnet	Mandatory	Subnet mask in the format x.x.x.x
nat-direction	string	Mandatory	Indicates if the interface is viewed as "inside" or "outside" from NAT point of view.
icmp-redirects	boolean	Optional	ICMP Redirects
icmp-unreachable	boolean	Optional	ICMP Unreachable
proxy-arp	boolean	Optional	Proxy Arp, enabled or disabled
verify-unicast-source	boolean	Optional	Unicast Source Address Verification enabled or disabled

Property	Type	Required for POST and PUT	Description
subinterface-vlan	object	Optional	This property is only used by a sub-interface; a full interface does not have this property. Includes three sub-properties: encap-type, vlan-id, encapsulated-vlan
encap-type	string	Optional	(sub-property of subinterface-vlan) Possible values: • DOT1Q • QINQ
vlan-id	number	Mandatory	(sub-property of subinterface-vlan) vlan-id. Possible values: 1 to 4094
encapsulated-vlan	string	Optional	(sub-property of subinterface-vlan) Used in QINQ subinterface configuration to specify the second vlan-id. Possible values: are 1 to 4094 as a numerical string.

JSON Representation

```
{
    "if-name": "string",
    "type": "string",
    "ip-address": "string",
    "subnet-mask": "string",
    "description": "string",
    "nat-direction": "string",
    "icmp-redirects":"boolean",
    "icmp-unreachable": "boolean",
    "proxy-arp": "boolean",
    "verify-unicast-source": "boolean",
    "subinterface-vlan":
    {
        "encap-type": "string",
        "vlan-id": "number",
        "encapsulated-vlan": "string",
    },
}
```

Examples Demonstrating Use of Interface ID

Examples Using Interface ID

Resource URI

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

Example 1: Creating a Loopback Interface

The following example is for a logical Ethernet network interface, and creates a loopback interface.

```
{
    "type": "{string}",
    "if-name": "{interface-name}",
    "description": "loopback ",
    "ip-address": "170.15.15.11",
    "subnet-mask": "255.255.255.0",
    "nat-direction": ""
}
```

Note POST /api/v1/ is available only for loopback. Cisco IOS XE 3.10 does not support POST /api/v1/ on a sub-interface.

Example 2: Retrieving an Interface

JSON Request

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

JSON Response

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

{
    "kind"                 : "object#",
    "type"                 : "ethernet",
    "if-name"              : "gigabitEthernet1",
    "description"          : "outside ",
    "ip-address"           : "172.15.15.15",
    "subnet-mask"          : "255.255.254.0",
    "nat-direction"        : "outside",
    "icmp-redirects"       : true,
    "icmp-unreachable"     : true,
    "proxy-arp"            : true,
    "verify-unicast-source": true
}
```

Example 3: Modifying an Interface

JSON Request

```
PUT /api/v1/gigabitEthernet1
Content-Type: application/json

{
    "type"                   : "ethernet",
    "if-name"                : "gigabitEthernet1",
    "description"            : "outside ",
    "ip-address"             : "172.15.15.16",
    "subnet-mask"            : "255.255.254.0",
    "nat-direction"          : "outside"
    "icmp-redirects"         : true,
    "icmp-unreachable"       : true,
    "proxy-arp"              : true,
    "verify-unicast-source"  : true
}
```

JSON Response

```
204 No Content
```

Examples Without Interface ID

Resource URI

Verb	URI
[GET POST]	/api/v1/interfaces

Example: GET

JSON Request

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

JSON Response

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

{
"kind" : "collection#interface",
"items": [
       {
        "kind"          : "object#",
        "type"          : "ethernet",
        "if-name"       : "gigabitEthernet1",
        "description"   : "outside ",
        "ip-address"    : "172.15.15.15",
        "subnet-mask"   : "255.255.254.0",
        "nat-direction" : "outside",
        "icmp-redirects"  : true,
        "icmp-unreachable": true,
```

```
            "proxy-arp"             : true,
            "verify-unicast-source" : true
        }
          ]
}
```

Example: POST

JSON Request

```
POST /api/v1/
Content-Type: application/json

{
    "type"                  : "loopback",
    "if-name"               : "loopback1",
    "description"           : "outside ",
    "ip-address"            : "172.15.15.16",
    "subnet-mask"           : "255.255.254.0",
    "nat-direction"         : "outside"
    "icmp-redirects"        : true,
    "icmp-unreachable"      : true,
    "proxy-arp"             : true,
    "verify-unicast-source" : true
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/interfaces/loopback1
```

Retrieve Interface Details

Resource URI

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

Example 1: Retrieve Interface Details

JSON Request

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

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"
}
```

Example 2: Retrieve Sub-interface Details

Note Available in Cisco IOS XE 3.11 and later

JSON Request

```
GET /api/v1/interfaces/GigabitEthernet2.23
Accept: application/json
```

JSON Response

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

{
    "kind": "object#interface",
    "description": "",
    "if-name": "GigabitEthernet2.23",
    "proxy-arp": true,
    "subnet-mask": "255.255.255.0",
    "icmp-unreachable": true,
    "nat-direction": "",
    "icmp-redirects": true,
    "ip-address": "22.10.10.23",
    "subinterface-vlan": {"vlan-id": 23, "encap-type": "DOT1Q"},
    "type": "ethernet",
    "verify-unicast-source": false
}
```

Retrieve All Interfaces and Details

Resource URI

Verb	URI
GET	/api/v1/interfaces

Properties for Retrieve All

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

Example

JSON Request

```
GET /api/v1/interfaces

Accept: application/json
```

JSON Response

```
200 OK

Content-Type: application/json
{
 "kind" : "collection#interface",
 "items": [
           {
             "kind"        : "object#interface",
             "type"        : "ethernet",
             "if-name"     : "gigabitEthernet1",
             "description" : "management interface",
             "ip-address"  : "129.10.10.10",
             "subnet-mask" : "255.255.254.0"
           },

           {
             "kind"          : "object#interface",
             "type"          : "ethernet",
             "if-name"       : "gigabitEthernet2",
             "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"       : "gigabitEthernet3",
             "description"   : "inside interface",
             "ip-address"    : "10.10.10.15",
             "subnet-mask"   : "255.255.254.0",
             "nat-direction" : "inside"
           }
        ]
}
```

Modify an Interface Configuration

Resource URI

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

Example 1: Changing the IP-address from 172.15.15.15 to 172.15.15.16

JSON Request

```
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"
}
```

JSON Response

```
204 No Content
```

Example 2: Modify VLAN IDs (Example Includes Sub-interface Property)

JSON Request

```
PUT /api/v1/interfaces/GigabitEthernet2.23
Content-Type: application/json

{  "subinterface-vlan":{"vlan-id":230},
    "if-name":"GigabitEthernet2.23",
    "subnet-mask":"255.255.255.0",
    "ip-address":"22.10.10.23",
    "type":"ethernet"
}
```

JSON Response

```
204 No content
```

Create an Interface

Enables:

- Creating a loopback or sub-interface and IP address
  - The loopback or sub-interface cannot be on the same network as a physical interface.
  - After a loopback interface is configured, a router-id can be generated from it.
- Changing properties of a physical interface

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

Resource URI

Verb	URI
POST	/api/v1/interfaces

Example 1: Create a Loopback Interface

JSON Request

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

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

JSON Response: Returning the Interface ID

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

Example 2: Create a Sub-interface

Note Available in Cisco IOS XE 3.11 and later

JSON Request

```
POST /api/v1/interfaces
Content-Type: application/json

{
  "subinterface-vlan": {"vlan-id":23},
  "if-name": "GigabitEthernet2.23",
  "subnet-mask": "255.255.255.0",
  "ip-address": "22.10.10.23",
  "type": "ethernet"
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/interfaces/GigabitEthernet2.23
```

Delete an Interface

Resource URI

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

Example 1: Delete an Interface

JSON Request

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

JSON Response

```
204 No Content
```

Example 2: Delete a Sub-interface

Note Available in Cisco IOS XE 3.11 and later

JSON Request

```
DELETE /api/v1/interfaces/GigabitEthernet2.23
```

JSON Response

```
204 No Content
```

Interface State

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. Has the fixed value "object#interface-state"
if-name	string	Mandatory	Interface Name. Read-only
enabled	boolean	Mandatory	Enables (up) or Disables (down) interface

Retrieve Interface State

Resource URI

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

Example

JSON Request

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

Accept: application/json
```

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

Resource URI

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

Example: "no shut" GigabitEthernet1

JSON Request

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

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

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

JSON Response

```
204 No Content
```

Interface Statistics

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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.
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

Resource URI

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

Example

JSON Request

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

Accept: application/json
```

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.

Example

JSON Request

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

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

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

JSON Response

```
204 No Content
```

L2 Interfaces

Resource Summary for L2 Interfaces

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
L2 Interfaces	/api/v1/l2interfaces	Y	Y	N	N
	/api/v1/ l2interfaces/{if-id}	Y	N	Y	Y
	/api/v1/l2interfaces/{if-id}/state	Y	N	Y	N

L2 Interfaces

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Added the **bridge-id** property
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties: Interface Schema

Applies to L3 interface APIs: /api/v1/interfaces/{if-id}/state

Property	Type	Required for POST and PUT	Description
kind	string	Not Applicable	Object type
if-name	string	Mandatory	Ethernet interface name Example: gigabitethenet3
description	string	Optional	Description for the interface. If this property is not present, the default behavior is to remove the description, if one exists.
svc-instance-list	array	Mandatory	List of service instances for VLANs

svc-instance	number	Mandatory	(sub-property of svc-instance-list)
			Service instance number.
			Do not use the same svc-instance number in two entries.
			Range: 1 to 8000
			Example 1: Correct use of unique svc-instance numbers for two entries in the svc-instance-list:
			`[`
			`{ 'svc-instance': 5001,`
			`….`
			`}`
			`{ 'svc-instance': 5002,`
			`…`
			`}`
			`]`
			Example 2: Incorrect use of same svc-instance number in two entries:
			`[`
			`{ 'svc-instance': 5001,`
			`….`
			`}`
			`{ 'svc-instance': 5001,`
			`…`
			`}`
			`]`

Property	Type	Required for POST and PUT	Description

encap-type	string	Mandatory	(sub-property of svc-instance-list)
			Encapsulation type
			Values: "dot1q" or "untag"
			In the svc-instance-list, only one entry can define encap-type as "untag".
			Example 1: Correct
			`instance-list: [ { 'svc-instance': 5001, 'encap-type': 'untag' } { 'svc-instance': 5002, 'encap-type': 'dot1q' …. } { 'svc-instance': 5003, 'encap-type': 'dot1q' …. } ]`
			Example 2: Incorrect—"untag" appears in more than one entry
			`instance-list: [ { 'svc-instance': 5001, 'encap-type': 'untag' } { 'svc-instance': 5002, 'encap-type': 'untag' } { 'svc-instance': 5003, 'encap-type': 'dot1q' …. } ]`

vlan-id	number	Mandatory if encap-type is "dot1q"	(sub-property of svc-instance-list) VLAN ID. The number must be unique under the interface. Range: 1 to 4094
bridge-id	integer	Optional	bridge-domain-ID Range: 1 to 4096
enabled	boolean	Optional	"true": Enable the interface If this property is not present, the default behavior is to enable.

JSON Representation: Interface Schema

```
{
  "kind": "object#l2interface",
  "if-name": "{string}",
  "description": "{string}",
  "svc-instance-list":
    [
      {
        "svc-instance": {number},
        "encap-type": "{string}",
        "vlan-id": {number},
        "bridge-id": {number}
      },
    ],
  "enabled": {boolan}
}
```

Properties: L2 Interface State Schema

Applies to L2 interface APIs: /api/v1/l2interfaces/{if-id}/state

Property	Type	Required for POST and PUT	Description
kind	string	Not Applicable	Object type
if-name	string	Mandatory	Ethernet interface name Example: gigabitethenet3
enabled	boolean	Mandatory	"true": Enable the interface "false": Disable the interface

JSON Representation: Interface State Schema

```
{
  "kind": "object#l2interface-state
  "if-name": "{string}",
  "enabled": {boolean}
}
```

Create an L2 Interface

Resource URI

Verb	URI
POST	/api/v1/l2interfaces

Example

JSON Request

```
POST /api/v1/l2interfaces
Content-Type: application/json
Accept: application/json

{
  "if-name": "gigabitethernet2",
  "svc-instance-list":
    [
       {
          "svc-instance": 1001,
          "encap-type": "dot1q",
          "vlan-id": 4001,
       },
       {
          "svc-instance": 1002,
          "encap-type": "dot1q",
          "vlan-id": 4002,
       }
    ],
  "enabled": true
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/l2interfaces/GigabitEthernet2
```

Retrieve All L2 Interfaces

Resource URI

Verb	URI
GET	/api/v1/l2interfaces

Example

JSON Request

```
GET /api/v1/l2interfaces
Accept: application/json
```

JSON Response

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

{
  "kind": "collection#l2interface"
  "items":
```

```
    [
       {
          "kind": "object#l2interface",
          "if-name": "gigabitethernet2",
          "svc-instance-list":
             [
               {
                  "svc-instance": 1001,
                  "encap-type": "dot1q",
                  "vlan-id": 4001,
               },
               {
                  "svc-instance": 1002,
                  "encap-type": "dot1q",
                  "vlan-id": 4002,
               }
            ],
          "enabled": true
        },
        {
           "kind": "object#l2interface",
           "if-name": "gigabitethernet4",
           "svc-instance-list":
              [
                {
                    "svc-instance": 2001,
                    "encap-type": "dot1q",
                    "vlan-id": 5001,
                },
              ],
           "enabled": false
         },
    ]
}
```


Modify an L2 Interface

Resource URI

Verb	URI
PUT	/api/v1/l2interfaces/{if-id}

Example

JSON Request

```
PUT /api/v1/l2interfaces/gigabitethernet2
Content-Type: application/json
Accept: application/json

{
  "if-name": "gigabitethernet2",
  "svc-instance-list":
    [
       {
          "svc-instance": 1001,
          "encap-type": "dot1q",
          "vlan-id": 4001,
       },
       {
          "svc-instance": 1002,
          "encap-type": "dot1q",
          "vlan-id": 4002,
       }
    ]
}
```

JSON Response

```
204 No Content
```

Retrieve an L2 Interface

Resource URI

Verb	URI
GET	/api/v1/l2interfaces/{if-id}

Example

JSON Request

```
GET /api/v1/l2interfaces/gigabitethernet2
Accept: application/json
```

JSON Response

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

{
   "kind": "object#l2interface",
   "if-name": "gigabitethernet2",
   "svc-instance-list":
      [
         {
            "svc-instance": 1001,
            "encap-type": "dot1q",
            "vlan-id": 4001,
          },
          {
             "svc-instance": 1002,
             "encap-type": "dot1q",
             "vlan-id": 4002,
          }
        ],
   "enabled": true
}
```

Delete an L2 Interface

Resource URI

Verb	URI
DELETE	/api/v1/l2interfaces/{if-id}

Example

JSON Request

```
DELETE /api/v1/l2interfaces/gigabitethernet2
```

JSON Response

```
204 No Content
```

Modify State of an L2 Interface

Resource URI

Verb	URI
PUT	/api/v1/l2interfaces/{if-id}/state

Example

JSON Request

```
PUT /api/v1/l2interfaces/gigabitethernet2/state
Content-Type: application/json
Accept: application/json

{
   "if-name": "gigabitethernet2",
   "enabled": true
}
```

JSON Response

```
204 No Content
```

Retrieve an L2 Interface State

Resource URI

Verb	URI
PUT	/api/v1/l2interfaces/{if-id}/state

Example

JSON Request

```
GET /api/v1/l2interfaces/gigabitethernet2/state
Accept: application/json
```

JSON Response

```
200 OK

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

{
  "kind": "object#l2interface-state"
  "if-name": "gigabitethernet2",
  "enabled": true
}
```

Bridge Domains

Resource Summary for Bridge Domain

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
Bridge Domain	/api/v1/ bridge-domain	Y	Y	N	N
	/api/v1/bridge-domain/{bd-id}	Y	N	Y	Y
	/api/v1/bridge-domain/{bd-id}/state	Y	N	Y	N

Bridge Domain Resource

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties: Bridge Domain Schema

Property	Type	Required for POST and PUT	Description
kind	string	Not Applicable	Object type
bd-id	number	Mandatory	Bridge domain ID Range: 1 to 4096

Property	Type	Required for POST and PUT	Description

vxlan-vni	number	Optional
		The field is optional if this bridge domain is not in VxLAN
			VXLAN VNI number
			Range: 4096 to 16777215
			The number must be uniquely assigned under one bridge domain. (The number cannot have been configured under another bridge domain.)
			Example: Incorrect repetition
			After using the bridge-domain API to create a bridge domain (10) with vxlan-vni 5010...
			`{'bd-id': 10, 'vxlan-vni': 5010, ….}.`
			... cannot then create another bridge domain (20) with the same vxlan-vni 5010.
			`('bd-id': 20, 'vxlan-vni': 5010, …}`
			Doing so returns an error.

member-list	array	Optional	List of members in this bridge domain. If the bridge domain is for a corresponding BDI: • The bd-id and bdi-id must match. • The member-list should not be configured.
l2if-name	string	Mandatory	(sub-property of member-list) L2 Ethernet interface name Example: gigabitethernet2
svc-instance	number	Mandatory	(sub-property of member-list) Service instance number Range: 1 to 8000
enabled	boolean	Optional	"true": Enable (up) the bridge domain. "false": Disable (down) the bridge-domain If this property is not present, the default behavior is to enable the bridge domain.

JSON Representation: Bridge Domain Schema

```
{
   "kind": "object#bridge-domain"
   "bd-id": {number},
   "vxlan-vni": {number},
   "member-list":
      [
         {
           "l2if-name": "{string}",
           "svc-instance": {number}
         },
      ],
   "enabled": {boolean}
}
```

Properties: Bridge Domain State Schema

Property	Type	Required for POST and PUT	Description
kind	string	Not Applicable	Object type
bd-id	number	Mandatory	Bridge domain ID Range: 1 to 4096
enabled	boolean	Mandatory	"true": Bring up the bridge domain "false": Bring down the bridge domain

JSON Representation: Bridge Domain State Schema

```
{
  "kind": "object#bridge-domain-state
  "bd-id": {number},
  "enabled": {boolean}
}
```

Create a Bridge Domain

Resource URI

Verb	URI
POST	/api/v1/bridge-domain

Example

JSON Request

```
POST /api/v1/bridge-domain
Content-Type: application/json
Accept: application/json

{
  "bd-id": 1001,
  "vxlan-vni": 5001
  "member-list":
    [
      {
        "l2if-name": "gigabitEthernet2",
        "svc-instance": 1001
      },
      {
        "l2if-name": "gigabitEthernet4",
        "svc-instance": 2001
      },
    ]
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/bridge-domain/1001
```

Retrieve All Bridge Domains

Resource URI

Verb	URI
GET	/api/v1/bridge-domain

Example

JSON Request

```
GET /api/v1/bridge-domain
Accept: application/json
```

JSON Response

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

{
  "kind": "collection#bridge-domain"
```

```
  "items":
    [
       {
          "kind": "object#bridge-domain",
          "bd-id": 1001,
          "vxlan-vni": 5001,
          "member-list":
            [
              {
                "l2if-name": "gigabitEthernet2",
                "svc-instance": 1001
              }
            ],
          "enabled": true
        },
        {
           "kind": "object#bridge-domain",
           "vxlan-vni": 5002
           "bd-id": 1002,
           "enabled": true
        },
     ],
}
```

Modify a Bridge Domain

Resource URI

Verb	URI
PUT	/api/v1/bridge-domain/{bd-id}

Example

JSON Request

```
PUT /api/v1/bridge-domain/1002
Content-Type: application/json
Accept: application/json

{
  "bd-id": 1002,
  "vxlan-vni": 5003
}
```

JSON Response

```
204 No Content
```

Retrieve a Bridge Domain

Resource URI

Verb	URI
GET	/api/v1/bridge-domain/{bd-id}

Example

JSON Request

```
GET /api/v1/bridge-domain/1001
Accept: application/json
```

JSON Response

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

{
   "kind": "object#bridge-domain",
   "bd-id": 1001,
   "member-list":
     [
        {
          "l2if-name": "gigabitethernet2",
          "svc-instance": 1001
        },
     ],
   "enabled": true
}
```

Delete a Bridge Domain

Resource URI

Verb	URI
DELETE	/api/v1/bridge-domain/{bd-id}

Example

JSON Request

```
DELETE /api/v1/brdige-domain/1001
```

JSON Response

```
204 No Content
```

Modify a Bridge Domain State

Resource URI

Verb	URI
PUT	/api/v1/bridge-domain/{bd-id}/state

Example

JSON Request

```
PUT /api/v1/bridge-domain/1001/state
Content-Type: application/json
Accept: application/json

{
   "bd-id": 1001,
   "enabled": true
}
```

JSON Response

```
204 No Content
```

Retrieve a Bridge Domain State

Resource URI

Verb	URI
GET	/api/v1/bridge-domain/{bd-id}/state

Example

JSON Request

```
GET /api/v1/bridge-domain/1001/state
Accept: application/json
```

JSON Response

```
200 OK

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

{
   "kind": "object#bridge-domain-state"
   "bd-id": 1001,
   "enabled": true
}
```

Multicast

Resource Summary for Multicast

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
Multicast Bi-dir PIM	/api/v1/mcast/pim	Y	N	Y	Y

Multicast Bi-Directional PIM

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type
rp-address	string	Optional	Multicast Rendezvous Point (RP) IP address Format: A.B.C.D (IPv4 only) Must configure either **rp-address** or **rp-auto**, but cannot include both at the same time.
rp-auto	boolean	Optional	Multicast Rendezvous Point (RP) auto listen
if-list	array	Mandatory	List of L3 interface names. These interfaces will have multi-cast PIM enabled.
if-name	string	Mandatory	(sub-property of if-list) Interface name Example: gigabitethernet3
pim-mode	string	Optional	(sub-property of if-list) Multicast PIM mode Possible values: In current release, only supports "sparse-dense" Default mode: "sparse-dense"

JSON Representation

```
{
   "kind" : "object#mcast-pim",
   "rp-address": "{string}",
   "if-list":
     [
       {
         "if-name": "{string}",
         "pim-mode": "{string}"
       },
     ]
}
```

Modify Multicast PIM

Resource URI

Verb	URI
PUT	/api/v1/mcast/pim

Example

JSON Request

```
PUT /api/v1/mcast/pim
Content-Type: application/json
Accept: application/json

{
   "rp-address": "10.1.1.1",
   "if-list":
     [
       {
         "if-name": "gigabitEthernet3"
       },
       {
         "if-name": "gigabitEthernet5"
       }
     ]
}
```

JSON Response

```
204 No Content
```

Retrieve Multicast PIM

Resource URI

Verb	URI
GET	/api/v1/mcast/pim

Example

JSON Request

```
GET /api/v1/mcast/pim
Accept: application/json
```

JSON Response

```
200 OK

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

{
   "kind": "object#mcast-pim"
   "rp-address": "10.1.1.1",
   "if-list":
     [
       {
         "if-name": "gigabitEthernet3",
            "pim-mode": "sparse-dense"
       }
     ]
}
```

Delete Multicast PIM

Resource URI

Verb	URI
DELETE	/api/v1/mcast/pim

Example

JSON Request

```
DELETE /api/v1/mcast/pim
```

JSON Response

```
204 No Content
```

VxLAN

Workflows

Workflow: Creating a VxLAN L2 Gateway

Prerequisites

- The CSR route is deployed and up.
- L3 interfaces facing the IP core are configured and up.

Workflow

1. Configure Multicast bi-directional PIM. The step must be done after the L3 interfaces facing the IP core have been created.

   Requirement: Multicast RP must already be configured somewhere in the network.

   Use the Multicast PIM API to enable multicast PIM globally and on the L3 interfaces facing the IP core.

   PUT /api/v1/mcast/pim

   See Multicast Bi-Directional PIM, page 10-1.

2. Create and enable the source interface for VxLAN. This step must be done before creating VxLAN .
   a. Use the Interface API to create Loopback interface with IP address/subnet mask. This is the source interface for VxLAN.

      POST /api/v1/interfaces

      See Create an Interface, page 7-9.

   b. Use the Interface State API to enable the interface.

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

      See Interface State, page 7-11.

3. Create and enable a VxLAN.

   Requirement: The source interface must have been created before this step (see following step).

   Use the VxLAN API to create VxLAN with list VNI members (and corresponding multicast-groups).

   POST /api/v1/vxlan

   See Create a VxLAN, page 11-5.

4. Configure routing for reaching peer VxLAN VTEPs.

   Use a Routing API (Static, OSPF, BGP, and so on) to create routing so that peer VxLAN VTEPs can be reached.

   See Routing Protocol (OSPF, BGP, EIGRP) Requirements, page 13-1.

5. For a VxLAN L2 GW, create and enable L2 interfaces.

   Use the L2 Interface API to create all L2 interfaces (with Service Instances, VLAN tags).

   POST /api/v1/l2interfaces

   See Create an L2 Interface, page 8-4.

6. Create and enable bridge domains.

   Use the Bridge Domain API to create all bridge domains with unique VNIs.

   POST /api/v1/ bridge-domain

   See Create a Bridge Domain, page 9-3.

Workflow: Creating a VxLAN L3 Gateway

Prerequisites

- The CSR route is deployed and up.
- L3 interfaces facing the IP core are configured and up.

Workflow

1. Configure Multicast bi-directional PIM. The step must be done after the L3 interfaces facing the IP core have been created.

   Use the Multicast PIM API to enable multicast PIM globally and on the L3 interfaces facing the IP core.

   PUT /api/v1/mcast/pim

   See Multicast Bi-Directional PIM, page 10-1.

2. Create and enable the source interface for VxLAN. This step must be done before creating VxLAN .

   a. Use the Interface API to create Loopback interface with IP address/subnet mask. This is the source interface for VxLAN.

      POST /api/v1/interfaces

      See Create an Interface, page 7-9.

b. Use the Interface State API to enable the interface.

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

   See Interface State, page 7-11.

3. Create and enable a VxLAN.

   Use the VxLAN API to create VxLAN with list VNI members (and corresponding multicast-groups).

   POST /api/v1/vxlan

   See Create a VxLAN, page 11-5.

4. Configure routing for reaching peer VxLAN VTEPs.

   Use a Routing API (Static, OSPF, BGP, and so on) to create routing so that peer VxLAN VTEPs can be reached.

   See Routing Protocol (OSPF, BGP, EIGRP) Requirements, page 13-1.

5. Create bridge domains corresponding to the BDI to be configured.

   Use Bridge Domain API to create all bridge domains with unique VNI

   POST /api/v1/bridge-domain

   See Create a Bridge Domain, page 9-3.

6. For a VxLAN L3 GW, create and enable BDI interfaces.

   a. Use the Interface API to create BDI interfaces with IP address/subnet mask.

      POST /api/v1/interfaces

      See Create an Interface, page 7-9.

   b. Use the Interface State API to enable BDI interfaces.

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

      See Interface State, page 7-11.

Resource Summary for VxLAN

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
VxLAN	/api/v1/vxlan	Y	Y	N	N
	/api/v1/vxlan/{if-id}	Y	N	Y	Y
	/api/v1/vxlan/{if-id}/state	Y	N	Y	N

VxLAN

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties: VxLAN Schema

Property	Type	Required for POST and PUT	Description
kind	string	Not Applicable	Object type
vxlan-if-id	number	Mandatory	Name of the source interface acting as VTEP. The source interface must be a loopback interface. Format: loopback<num> **Note**: The source interface must have been configured before configuring VxLAN on the device.
vxlan-udp-port	number	Optional	UDP port number for VxLAN tunneling. If this property is not present, the default port number (8472) will be used.
member-list	array	Optional	List of virtual network identifiers (VNIs)
vni-start	number	Mandatory	(sub-property of member-list) VNI number Range: 4096 to 16777215
vni-end	number	Optional	(sub-property of member-list) VNI number Range: 4096 to 16777215
mcast-grp-ip-start	string	Mandatory	(sub-property of member-list) Starting Multicast group IP address Format: A.B.C.D (IPv4 only)
mcast-grp-ip-end	string	Optional	(sub-property of member-list) Ending Multicast group IP address Format: A. B. C. D (IPv4 only)
enabled	boolean	Optional	"true": Bring up the interface If this property is not present, the default behavior is to enable.

JSON Representation: VxLAN Schema

```
{
  "kind": "object#vxlan-nve",
  "vxlan-if-id": 1,
  "src-if-name": "{string}",
  "vxlan-udp-port": {number},
  "member-list":
    [
      {
        "vni-start": {number},
        "vni-end": {number}
        "mcast-grp-ip-start": "{ipadress}",
        "mcast-grp-ip-end": "{ipaddress}",
       },
    ],
  "enabled", {boolean}
}
```

Properties: VxLAN State Schema

Property	Type	Required for POST and PUT	Description
kind	string	Not Applicable	Object type
vxlan-if-id	number	Mandatory	Value must be 1
enabled	boolean	Mandatory	"true": Bring up the VxLAN "false": Bring down the VxLAN

JSON Representation: VxLAN Schema

```
{
  "kind": "object#vxlan-state
  "vxlan-if-id": {number},
  "enabled": {boolean}
}
```

Create a VxLAN

Resource URI

Verb	URI
POST	/api/v1/vxlan

Example

JSON Request

```
POST /api/v1/vxlan
Content-Type: application/json
Accept: application/json

{
  "vxlan-if-id": 1,
  "src-if-name": "loopback10",
  "member-list":
    [
      {
        "vni-start": 5001,
        "mcast-grp-ip-start": "225.1.1.1",
        "mcast-grp-ip-end": "225.1.1.4"

      },
      {
        "vni-start": 5020,
        "vni-end": 5026
        "mcast-grp-ip-start": "225.1.2.1",
      },
    ]
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/vxlan/1
```

Retrieve All VxLANs

Note In the current release, one VxLAN is supported per platform.

Resource URI

Verb	URI
GET	/api/v1/vxlan

Example

JSON Request

```
GET /api/v1/vxlan
Accept: application/json
```

JSON Response

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

{
  "kind": "collection#vxlan"
     "items":
       [
         {
        "vxlan-if-id": 1,
        "src-if-name": "loopback10",
        "member-list":
          [
            {
              "vni-start": 5001,
             "mcast-grp-ip-start": "225.1.1.1",
           },
           {
             "vni-start": 5020,
             "vni-end": 5024,
             "mcast-grp-ip": "225.1.2.0",
             "mcast-grp-ip": "225.1.2.4"
           },
         ]
       }
     ],
  "enabled": true
}
```

Modify a VxLAN

Resource URI

Verb	URI
PUT	/api/v1/vxlan/{id}

Example

JSON Request

```
PUT /api/v1/vxlan/1
Content-Type: application/json
Accept: application/json

{
  "vxlan-if-id": 1,
  "src-if-name": "loopback10",
  "member-list":
    [
      {
        "vni-start": 5001,
        "mcast-grp-ip-start": "225.1.1.1",
      },
```

```
      {
        "vni-start": 5002,
        "mcast-grp-ip": "225.1.1.2",
      },
    ]
}
```

JSON Response

```
204 No Content
```

Retrieve a VxLAN

Resource URI

Verb	URI
GET	/api/v1/vxlan/{id}

Example

JSON Request

```
GET /api/v1/vxlan/1
Accept: application/json
```

JSON Response

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

{
  "kind": "object#vxlan"
  "vxlan-if-id": 1,
  "src-if-name": "loopback10",
  "member-list":
    [
      {
        "vni-start": 5001,
        "mcast-grp-ip-start": "225.1.1.1",
      },
      {
        "vni-start": 5002,
        "mcast-grp-ip-start": "225.1.1.2",
      },
   ],
 "enabled": true
}
```

Delete a VxLAN

Resource URI

Verb	URI
DELETE	/api/v1/vxlan/{id}

Example

JSON Request

```
DELETE /api/v1/vxlan/1
```

JSON Response

```
204 No Content
```

Modify a VxLAN State

Resource URI

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

Example

JSON Request

```
PUT /api/v1/vxlan/1/state
Content-Type: application/json
Accept: application/json

{
   "vxlan-if-id": 1,
   "enabled": true
}
```

JSON Response

```
204 No Content
```

Retrieve a VxLAN State

Resource URI

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

Example

JSON Request

```
GET /api/v1/vxlan/1/state
Accept: application/json
```

JSON Response

```
200 OK

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

{
   "kind": "object#vxlan-state"
   "vxlan-if-id": 1,
   "enabled": true
}
```

DHCP Server and Relay Agent

Resource Summary for DHCP Server and Relay Agent

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
DHCP servers	/api/v1/dhcp	Y	N	Y	N
DHCP pools	/api/v1/dhcp/pool	Y	Y	N	N
	/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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Object type. Has fixed value "object#dhcp-server"
enable	boolean	Mandatory	Enable/disable DHCP server and Relay agent features
excluded-addresses	array	Mandatory	Array of excluded addresses from this DHCP pool
excluded-addresses[ ].low-ip-address	ipaddress	Mandatory	Excluded low IP address in x.x.x.x format.
excluded-addresses[ ].high-ip-address	ipaddress	Optional	Excluded high IP address in x.x.x.x format.
relay-agent	array	Optional	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.
relay-agent interface-name	string	Mandatory	Interface name
relay-agent.address	string	Mandatory	List of DHCP server addresses or network addresses in x.x.x.x format.

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}" ]
                }
         ]
}
```

Retrieve DHCP Server

Resource URI

Verb	URI
GET	/api/v1/dhcp

Example

JSON Request

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

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.

Example: Modifying the High-IP Address Excluded Address

JSON Request

```
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" ]
                 }
        ]
}
```

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Object type. Has the fixed value “dhcp-server-pool”
pool-name	string	Mandatory	DHCP pool name
dynamic	object	Optional	Dynamic Address pool details. Only one of “dynamic: or “manual” objects must be present.
manual	object	Optional	Manual binding details. Only one of “dynamic” or “manual” objects must be present.
options	object	Mandatory	Pool options.
dynamic address-range	cidr-addr	Mandatory	The subnet network number and prefix length of the DHCP address pool in CIDR format: x.x.x.x/nn

Property	Type	Required for POST and PUT	Description
dynamic.lease-duration	object	Optional	Duration of the lease for address assignment to host. The default is one-day lease.
dynamic.lease-duration.infinite	boolean	Mandatory	Specifies if lease duration never expires.
dynamic.lease-duration.days	number	Optional	Days part of the duration. If not specified, default of 1 day is used.
dynamic.lease-duration.hours	number	Optional. Days part is mandatory if hours is specified.	Hours part of the duration.
dynamic.lease-duration.minutes	number	Optional. Hours part is mandatory if minutes is specified.	Minutes part of the duration.
manual.host-ip-address	ipaddress	Mandatory	IP address to be assigned to the host in x.x.x.x format.
manual.mac-address	string	Mandatory	Host Mac address xx:xx:xx:xx:xx:xx in hex format.
manual.client-name	string	Optional	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.
options.domain-name	string	Optional	Domain name for a DHCP client.
options.default-gateway	ipaddress	Optional	Default router for a DHCP client: IP address in x.x.x.x format. Up to 8 can be configured.
options.dns-servers	array	Mandatory	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	Mandatory	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	Mandatory	Netbios node type for windows hosts

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}"
      }
}
```

Retrieve Address Pool

Resource URI

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

Example

JSON Request

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

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"]
      }
}
```

Retrieve All DHCP Address Pools

Resource URI

Verb	URI
GET	/api/v1/dhcp/pool

Properties for Retrieve All

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

Example

JSON Request

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

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",
                              }
                    }
                ]
}
```

Modify a DHCP Address Pool

Resource URI

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

Example: Modifying the Lease Days to 60

JSON Request

```
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"]
      }
}
```

JSON Response

```
204 No Content
```

Delete Address Pool

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create a DHCP Address Pool

Resource URI

Verb	URI
POST	/api/v1/dhcp/pool

Example

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"]
      }
}
```

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.

History

Release	Modification

IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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
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"

JSON Representation

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

Retrieve a Host Binding

Resource URI

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

Example

JSON Request

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

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

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Retrieve All Active Bindings

Resource URI

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

Properties for Retrieve All

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"

JSON Representation

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

Example

JSON Request

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

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

This resource also supports clearing of all automatic bindings. Use POST on the resource with the following request message.

Note The **action** property is applicable only for this operation.

Properties for the POST Operation

Property	Type	Required for POST and PUT	Description
action	string	Mandatory	"clear" Clears all active bindings.

Resource URI

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

JSON Representation

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

Example

JSON Request

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

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

JSON Response

```
204 No Content
```

Routing Protocol (OSPF, BGP, EIGRP) Requirements

Resource Summary for Routing Protocols

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

		HTTP Method			
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
BGP Bestpath	/api/v1/routing-svc/bgp/{routing-protocol-id}/ best-path	Y	N	Y	N
Neighbor Fall-over	/api/v1/routing-svc/bgp/{routing-protocol-id}/ neighbors	Y	Y	N	N
	/api/v1/routing-svc/bgp/{routing-protocol-id}/ neighbors/{neighbor-id}	Y	N	Y	N
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
OSPF network	/api/v1/routing-svc/ospf/{routing-protocol-id}/ networks/{network-id}	Y	N	N	Y
EIGRP network	/api/v1/routing-svc/eigrp/{routing-protocol-id} /networks/{network-id} {network-id} is the ipaddress_prefixLen	Y	N	N	Y
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
BGP Neighbor Fall-over	/api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors /api/v1/routing-svc/bgp/{routing-protocol-id}/neighbors/{neighbor-id}	Y Y	Y N	N Y	N Y
Routing table	/api/v1/routing-svc/routing-table	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

Create a Routing Protocol Instance Identifier

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Resource URI

Verb	URI
POST	/api/v1/routing-svc/BGP /api/v1/routing-svc/EIGRP /api/v1/routing-svc/OSPF

Properties

Property	Type	Required for POST and PUT	Description
routing-protocol-type	string	Optional in request	“BGP”, “EIGRP”, or “OSPF”
routing-protocol-id	string	Mandatory	Unique routing protocol ID. Examples: EIGRP ASN, BGP ASN, OSPF process ID. **Note**: IOS supports only one BGP routing instance.
router-id	ipaddress	Optional	IP address in x.x.x.x format.

JSON Representation

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

Related Topics

BGP Network Resource, page 13-8
EIGRP Network Resource, page 13-14
OSPF Network Resource, page 13-18

Create a BGP Instance

Example

JSON Request

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

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

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

JSON Response

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

Create an OSPF Process ID

Example

JSON Request

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

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

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

JSON Response

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

Create an EIGRP ASN

Example

JSON Request

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

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

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

JSON Response

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

Delete a Routing Protocol Instance Identifier

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Resource URI

Verb	URI
DELETE	/api/v1/routing-svc/BGP/{routing-protocol-id}
	/api/v1/routing-svc/OSPF/{routing-protocol-id}
	/api/v1/routing-svc/EIGRP/{routing-protocol-id}
{routing-protocol-id} is one of: EIGRP ASN, BGP ASN, or OSPF process id.	

Delete a BGP ASN

Example

JSON Request

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

JSON Response

```
204 No Content
```

Delete an EIGRP ASN

Example

JSON Request

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

JSON Response

```
204 No Content
```

Delete an OSPF Process ID

Example

JSON Request

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

JSON Response

```
204 No Content
```

Retrieve All Routing Protocol IDs

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Resource URI

Verb	URI
GET	/api/v1/routing-svc/BGP /api/v1/routing-svc/OSPF /api/v1/routing-svc/EIGRP

Retrieve All BGP ASNs

Example

JSON Request

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

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

Example

JSON Request

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

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

Example

JSON Request

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

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 Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
network	string	Mandatory	Destination network CIDR format x.x.x.x/nn
kind	string	Not applicable	“object#bgp-network”
routing-protocol	string	Not applicable	bgp
routing-protocol-id	number	Not applicable	BGP ASN

JSON Representation

```
{
    "kind": "object#bgp-network"
    "routing-protocol-id": "{string}",
    "network": "{ipaddress}"
}
```

Related Topics

Create a BGP Instance, page 13-4

Configure a BGP Network

Resource URI

Verb	URI
POST	/api/v1/routing-svc/bgp/{routing-protocol-id}/networks
{routing-protocol-id} is the BGP ASN	

Example

JSON Request

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

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

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

JSON Response

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

Retrieve a BGP Network

Example

JSON Request

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

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"
}
```

Retrieve All BGP Networks

Resource URI

Verb	URI
GET	/api/v1/routing-svc/bgp/{routing-protocol-id}/networks
{routing-protocol-id} is the BGP ASN	

Properties for Retrieve All

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

JSON Representation

```
{
    "kind": "collection#bgp-network",
    "routing-protocol-type": "BGP",
    "routing-protocol-id": "{string}",
    "items": [ { json object with kind "object#bgp-network"} ]
}
```

Example

JSON Request

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

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"
            },
               …
          ]
}
```

Delete a BGP Network

Example

JSON Request

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

JSON Response

```
204 No Content
```

BGP Best Path Selection Resource

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
compare-routerid	boolean	Optional	Compare routerid for best path selection
ignore-cost-community	boolean	Optional	Ignore cost community for best path selection

ignore-igp-metrics	boolean	Optional	Ignore IGP metric
compare-confederation-path	boolean	Optional	Multi-Exit-Discriminator option
missing-as-least-preferred	boolean	Optional	Multi-Exit-Discriminator option
allow-invalid	boolean	Optional	Prefix validation option
disable	boolean	Optional	Prefix validation option

JSON Representation

```
{
    "kind"                    : "object#bgp-bestpath",
    "compare-routerid"         : true,
    "ignore-cost-community"    : true,
    "ignore-igp-metric"          : true,
    "multi-exit-discriminator"   :
                    {
                        "compare-confederation-path" : true,
                        "missing-as-worst"              : true
                    },
    "prefix-validation" :
                    {
                        "allow-invalid" : true,
                        "disable"      : true
                    }
}
```

Retrieve BGP Best Path

Resource URI

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

Example

JSON Request

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

JSON Response

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

{
"kind"                      : "object#bgp-bestpath",
"compare-routerid"          : true,
"ignore-cost-community"     : true,
"ignore-igp-metric"         : true,
"multi-exit-discriminator" :
     {
     "compare-confederation-path" : true,
     "missing-as-worst"           : true},
"prefix-validation" :
     {
     "allow-invalid" : true,
     "disable"  : true
     },
}
```

Modify BGP Best Path

Resource URI

Verb	URI
PUT	/api/v1/routing-svc/bgp/{routing-protocol-id}/best-path

Example

JSON Request

```
PUT  /api/v1/routing-svc/bgp/100/bestpath
Content-Type: application/json

{
     "compare-routerid" : true,
     "ignore-cost-community"   : true,
     "ignore-igp-metric"        : true,
     "multi-exit-discriminator" :
          {
          "compare-confederation-path"  : true,
          "missing-as-worst" : true
          },
     "prefix-validation" :
          {
               "allow-invalid" : true,
               "disable"  : true
          }
}
```

JSON Response

```
204 No Content
```

EIGRP Network Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.13	Added virtual-instance-name property.
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	“object#eigrp-network”. Read-only.
routing-protocol	string	Not applicable	“eigrp”
routing-protocol-id	number	Not applicable	EIGRP ASN
network	string	Mandatory	Destination network CIDR format x.x.x.x/nn.
virtual-instance-name	string	Optional	EIGRP virtual instance name

JSON Representation

```
{
    "kind": "object#bgp-network",
    "routing-protocol": "EIGRP",
    "routing-protocol-id": {number},
    "network": "{string}",
    "virtual-instance-name": "{string}"
}
```

Related Topics

Create an EIGRP ASN , page 13-5

Create an EIGRP Network

Resource URI

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

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

Example

JSON Request

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

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

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

JSON Response

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

Retrieve an EIGRP Network

Resource URI

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.

Example

JSON Request

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

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"
}
```

Retrieve All Configured EIGRP Networks

Resource URI

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

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

Properties for Retrieve All

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.

JSON Representation

```
{
    "kind": "collection#eigrp-network",
    "routing-protocol-type": "EIGRP",
    "routing-protocol-id": {number},
    "items": [ {json object with kind "object#eigrp-network"} ]
}
```

Example

JSON Request

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

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"
            },
               …
          ]
}
```

Delete an EIGRP Network

Resource URI

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.

Example

JSON Request

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

JSON Response

```
204 No Content
```

OSPF Network Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
area	string	Mandatory	OSPF area as a decimal value or IP address format x.x.x.x.
network	string	Mandatory	Destination network CIDR format x.x.x.x/nn.
kind	string	Not applicable	“object#ospf-network”. Read-only.
routing-protocol	string	Not applicable	“ospf”
routing-protocol-id	number	Not applicable	OSPF process ID.

JSON Representation

```
{
    "kind": "object#ospf-network",
    "routing-protocol": "{string}",
    "routing-protocol-id": "{string}",
    "network": "{string}",
    "area" : "{string}"
}
```

Related Topics

Create an OSPF Process ID, page 13-5

Configure an OSPF Network

Resource URI

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

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

Example

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
}
```

JSON Response

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

Retrieve an OSPF Network

Resource URI

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, prefix length, and OSPF area, joined by underscores.

Example

JSON Request

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

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
}
```

Retrieve All Configured OSPF Networks

Resource URI

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

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

Properties for Retrieve All

Property	Type	Description
kind	string	Must be "collection#ospf-network"
routing-protocol	string	"OSPF"
routing-protocol-id	string	OSPF process id
items	array	List of networks

JSON Representation

```
{
    "kind": "collection#ospf-network",
    "routing-protocol-type": "{string}",
    "routing-protocol-id": "{string}",
    "items": [ {json object with kind "object#ospf-network"} ]
}
```

Example

JSON Request

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

JSON Response

```
200 ok

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

Delete an OSPF Network

Resource URI

Verb	URI
DELETE	/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, prefix length, and OSPF area, joined by underscores.

Example

JSON Request

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

JSON Response

```
204 No Content
```

BGP Neighbor Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.11	Added **enable** and **detection** properties
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type		Description
kind	string	Mandatory	Can only be "object#bgp-neighbor"
routing-protocol-id	number	Mandatory	BGP AS
neighbor	ipaddress	Mandatory	IP address format x.x.x.x
remote-as	string	Mandatory	Neighbor's ASN
fall-over	object	Optional	Configures fall-over
enable	boolean	Mandatory	{sub-property of fall-over) Enable or disable fall-over
detection	string	Optional	{sub-property of fall-over) If fall-over is enabled, optionally use bfd

JSON Representation for BGP Neighbor Configuration

```
{
  "kind": "object#bgp-neighbor",
  "routing-protocol-id": {number},
  "address": "{ip-address}",
  "remote-as": "{string}",
  "fall-over":
    {
        "enable" : {boolean},
        "detection": "{string}"
    }
}
```

Create BGP Neighbor

Resource URI

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

Example

JSON Request

```
POST  /api/v1/routing-svc/bgp/100/neighbors
Content-Type: application/json

{
    "routing-protocol-id": "100",
    "address": "152.13.25.25",
    "remote-as": "222",
    "fall-over":
        {
            "enable" : true,
            "method" : "bfd"
        }
}
```

JSON Response

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

Retrieve a BGP Neighbor

Resource URI

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

Example

JSON Request

```
GET  /api/v1/routing-svc/bgp/100/neighbors/152.12.25.25
Accept: application/json
```

JSON Response

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

{
    "kind": "object#bgp-neighbor",
    "routing-protocol-id": "100",
    "address": "152.13.25.25",
    "remote-as": "222",
    "fall-over":
        {
            "enable": true,
            "method" : "bfd"
        }
}
```

Retrieve All Static BGP Neighbors

Resource URI

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

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

Properties for Retrieve All

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

JSON Representation

```
{
 "kind": "collection#bgp-neighbor",
  "routing-protocol-type": "{string}",
  "routing-protocol-id": "{string}",
  "items":[
            {json object with kind "object#bgp-neighbor"}
          ]
}
```

Example 1

JSON Request

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

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"
                }
               ]
}
```

Example 2

JSON Request

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

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",
    "fall-over":
        {
            "enable": true,
            "method" : "bfd"
        }
    }
  ]
}
```

Modify a BGP Neighbor

Resource URI

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

Example

JSON Request

```
PUT  /api/v1/routing-svc/bgp/100/neighbors/152.13.25.25
Content-Type: application/json

{
    "routing-protocol-id": "100",
    "address"            : "152.13.25.25",
    "remote-as"          : "222",
    "fall-over"          :
        {
            "enable" : true,
            "method" : "bfd"
        }
}
```

JSON Response

```
204 No Content
```

Delete a BGP neighbor

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.13	Added virtual-instance-name property for EIGRP passive interface.
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for OSPF

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: object#passive-interface
routing-protocol-type	string	Mandatory	ospf or eigrp (not case-sensitive)
routing-protocol-id	string	Mandatory	EIGRP ASN or OSPF process ID.
if-name	string	Mandatory	Name of an interface
passive	boolean	Mandatory	“true” to disable sending routing updates on the interface, or “false” to re-enable.

Properties for EIGRP

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: object#passive-interface
routing-protocol-type	string	Mandatory	ospf or eigrp (not case-sensitive)
routing-protocol-id	string	Mandatory	EIGRP ASN or OSPF process ID.
if-name	string	Mandatory	Name of an interface

Property	Type	Required for POST and PUT	Description
passive	boolean	Mandatory	“true” to disable sending routing updates on the , or “false” to re-enable.
virtual-instance-name	string	Optional	EIGRP virtual instance name

JSON Representation for OSPF

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

JSON Representation for EIGRP

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

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.

Resource URI

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

Example: Disabling sending routing updates on GigabitEthernet1

JSON Request

```
PUT  /api/v1/routing-svc/eigrp/100/passive/GigabitEthernet1
Content-type: application/json
Accept: application/json

{
   "passive": true
}
```

JSON Response

```
204 No Content
```

Retrieve a Passive Interface

Resource URI

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

URI Property	Description
{routing-protocol-id}	ospf or eigrp

Example for OSPF

JSON Request

```
GET  /api/v1/routing-svc/ospf/100/passive/GigabitEthernet1

Accept: application/json
```

JSON Response

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

{
   "kind": "object#passive-interface",
   "routing-protocol-id": "100",
   "routing-protocol-type": "ospf",
   "if-name": "GigabitEthernet1",
   "passive": true
}
```

Example for EIGRP

JSON Request

```
GET  /api/v1/routing-svc/eigrp/passive/GigabitEthernet1

Accept: application/json
```

JSON Response

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

{
   "kind": "object#passive-interface",
   "routing-protocol-id": "100",
   "routing-protocol-type": "eigrp",
   "if-name": "GigabitEthernet1",
   "passive": true,
   "virtual-instance-name": "Instance01"
}
```

Routing Table Display

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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

Property	Type	Description
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.
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.

Property	Type	Description
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 through which the specified network can be reached.

URI Parameters

Parameter	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

Resource URI

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

Example 1

JSON Request

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

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
}
```

Example 2

JSON Request

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

Accept: application/json
```

JSON 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
}
```

Static Route Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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-router	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.

JSON Representation for Static Route

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

Configure a Static Route

Resource URI

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.

Example

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
}
```

JSON Response

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

Retrieve a Static Route

Resource URI

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}

Example

JSON Request

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

JSON Response

```
200 ok

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

Retrieve All the Static Routes

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

Resource URI

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

Properties for Retrieve All

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

JSON Representation for Retrieve All

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

Example

JSON Request

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

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-router":"20.30.30.1",
              "admin-distance": 5
             }
           ]
}
```

Delete a Static Route

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Resource URI

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}

Example

JSON Request

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

JSON Response

```
204 No Content
```

ACL Requirements for Subnets or IP Ranges

Resource Summary for ACL

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

ACL Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.11	Added properties: • icmp-options • icmp-types • icmp-code • dscp • log
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

Property	Type	Required for POST and PUT	Description
– rules[ ].l4-options.src-port-start – rules[ ].l4-options.src-port-end	string	Mandatory	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	Required for POST and PUT	Description

• rules[ ].l4-options.dst-port-end	string	Optional	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`

Property	Type	Required for POST and PUT	Description
			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)
• rules[ ].l4-options.src-port-op • rules[ ].l4-optionsdest-port-op	string	Mandatory	Indicates how the port number should be matched. One of the keywords "eq", "gt", "lt". If omitted, defaults to "eq"
• rules[].icmp-options	object	Optional	Options applicable for ICMP protocol based rules
– icmp-type	string or number	Mandatory	ICMP message type (echo, echo-reply, fragment, etc) http://www.nthelp.com/icmp.html
– icmp-code	number	Mandatory	ICMP message code
– dscp	string or number	Optional	Differentiated Services Codepoint value.
– log	boolean	Optional	This is for debugging.

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}",
                    "log": {boolean},
                    "icmp-options" : {
                                        "icmp-type" : {string or number},
                                        "icmp-code" : {number}
                                      },
                    "dscp": "{string or number}"
            ],
```

ICMP Options

Option	ICMP Message Type	Type
{0-255}		
administratively-prohibited	Administratively prohibited	
alternate-address	Alternate address	6
conversion-error	Datagram conversion	31
dod-host-prohibited	Host prohibited	
dod-net-prohibited	Net prohibited	
dscp	Match packets with given dscp value	
echo	Echo (ping)	8
echo-reply	Echo reply	0
fragments	Check non-initial fragments	
general-parameter-problem	Parameter problem	
host-isolated	Host isolated	
host-precedence-unreachable	Host unreachable for precedence	
host-redirect	Host redirect	
host-tos-redirect	Host redirect for TOS	
host-tos-unreachable	Host unreachable for TOS	
host-unknown	Host unknown	

DSCP Values

DSCP Option	Differentiated Service	Codepoint Value	Decimal Value
{0-63}			
default	Match packets with default dscp	000000	0
af11	Match packets with AF11 dscp	001010	10
af12	Match packets with AF12 dscp	001100	12
af13	Match packets with AF13 dscp	001110	14
af21	Match packets with AF21 dscp	010010	18
af22	Match packets with AF22 dscp	010100	20
af23	Match packets with AF23 dscp	010110	22
af31	Match packets with AF31 dscp	011010	26
af32	Match packets with AF32 dscp	011100	28
af33	Match packets with AF33 dscp	011110	30
af41	Match packets with AF41 dscp	100010	34
af42	Match packets with AF42 dscp	100100	36
af43	Match packets with AF43 dscp	100110	38
cs1	Match packets with CS1(precedence 1) dscp	001000	8
cs2	Match packets with CS2(precedence 2) dscp	010000	16
cs3	Match packets with CS3(precedence 3) dscp	011000	24
cs4	Match packets with CS4(precedence 4) dscp	100000	32
cs5	Match packets with CS5(precedence 5) dscp	101000	40
cs6	Match packets with CS6(precedence 6) dscp	110000	48
cs7	Match packets with CS7(precedence 7) dscp	111000	56
ef	Match packets with EF dscp	101110	46

Modify an ACL

Resource URI

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

Example

JSON Request

```
PUT /api/v1/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",
                    "l4-options" : {
                            "src-port-start"   : "ftp",
                            "src-port-op" : "eq",
                            "dest-port-start"  : "ftp",
                            "dest-port-op": "eq"
                           }
               }
             ]
    }
```

JSON Response

```
200 OK
```

Retrieve an ACL

Resource URI

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

Example

JSON Request

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

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

Resource URI

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

Example

JSON Request

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

Accept: application/json
```

JSON Response

```
204 No Content
```

Configure an ACL

Resource URI

Verb	URI
POST	/api/v1/acl

Example

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"
                 }
              ],
```

```
    }
```

JSON Response

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

Retrieve All ACLs

Note When many ACLs are configured on the router, the Retrieve All ACLs operation produces a very long list. To retrieve a smaller set of ACLs, use ACL Batching, page 14-11.

Resource URI

Verb	URI
GET	/api/v1/acl

Example

JSON Request

```
GET /api/v1/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"
                            }
                           ]
                 }

               ]
    }
```

ACL Batching

When many ACLs are configured on the router, the Retrieve All ACLs operation produces a very long list. To retrieve a smaller set of ACLs, use ACL batching. ACL batching retrieves a limited number of ACLs, as defined by **count** in the operation.

Resource URI

Verb	URI
GET	/api/v1/acl?start-index=0&count=2

Example

JSON Request

```
GET  /api/v1/acl?start-index=0&count=2
```

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).

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

JSON Representation

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

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

Resource URI

Verb	URI
GET	/api/v1/acl/statistics

Example

JSON Request

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

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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

Property	Type	Required for POST and PUT	Description
rules[ ].l4-options.src-port-start rules[ ].l4-options.src-port-end	string	Optional	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

Property	Type	Required for POST and PUT	Description

			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	Required for POST and PUT	Description
rules[ ].l4-options.dst-port-start rules[ ].l4-options.dst-port-end		Optional	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

Property	Type	Required for POST and PUT	Description

			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)

rules[ ].l4-options.src-port-op rules[ ].l4-optionsdest-port-op	string	Mandatory	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	Mandatory	Rule match counters.

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}
     }
   ]
}
```

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 and examples.

JSON Representation for Clearning ACL Statistics

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

Retrieve Statistics for a Single ACL

Resource URI

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

Example

JSON Request

```
GET /api/v1/acl/abc/interfaces/gigabitEthernet1_inside

Accept: application/json
```

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 an Interface Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Description
kind	string	Object type. Has fixed value "collection#acl-"
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.

JSON Representation

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

Retrieve ACL Associated with an Interface

Resource URI

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

Example

JSON Request

```
GET /api/v1/acl/abc/interfaces/gigabitEthernet1_inside

Accept: application/json
```

JSON Response

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

{
    "kind"      : "object#acl-interface",
    "acl-id"    : "abc",
    "if-id"     : "gigabitEthernet1",
    "direction" : "inside"
}
```

Retrieve All ACL Interfaces

Resource URI

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

Properties for Retrieve All

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"

JSON Representation

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

Example

JSON Request

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

Accept: application/json
```

JSON Response

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

{
  "kind": "collection#acl-interface",
  "items": [
             {
               "kind": "object#acl-interface",
               "acl-id": "abc",
               "if-id": "gigabitEthernet1",
               "direction": "inside"
             },
             {
               "kind": "object#acl-interface",
               "acl-id": "abc",
               "if-id": "gigabitEthernet2",
               "direction": "inside"
             }
           ]
}
```

Delete ACL Associated with an Interface

Resource URI

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

Example

JSON Request

```
DELETE /api/v1/acl/abc/interfaces/gigabitEthernet1_inside
Accept: application/json
```

JSON Response

```
204 No Content
```

Apply an ACL to Interfaces

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

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

Resource URI

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

Example

JSON Request

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

Accept: application/json
{
  "if-id":     "gigabitEthernet1",
  "direction": "inside"
}
```

JSON Response

```
201 Created
Location: http://host/api/v1/acl/abc/interfaces/gigabitEthernet1_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**	**PUT**	**DELETE**
NAT pool	/api/v1/nat-svc/pool	Y	Y	N	N
	/api/v1/nat-svc/pool/{nat-pool-id}	Y	N	Y	Y
Static NAT	/api/v1/nat-svc/static	Y	Y	N	N
	/api/v1/nat-svc/static/{nat-rule-id}	Y	N	Y	Y
Dynamic NAT Dynamic NAT	/api/v1/nat-svc/dynamic	Y	Y	N	N
	/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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

Retrieve a NAT Pool

Resource URI

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

Properties for Retrieve

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

Example

JSON Request

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

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
}
```

Retrieve All NAT Pools

Resource URI

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

Properties for Retrieve All

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

Example

JSON Request

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

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
   }
]
```

Modify a NAT Pool

When updating the NAT pool, the old pool is deleted and a new NAT pool is created with the same pool-id, using new parameters.

Resource URI

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

Example

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
}
```

JSON Response

```
204 No Content
```

Delete a NAT Pool

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create a NAT Pool

Resource URI

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

Example

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
}
```

JSON Response

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

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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
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.

Property	Type	Description
ip-network-mapping-global-network	string	Specifies the global subnet translations.
ip-network-mapping-mask	string	Specifies the IP network mask to be used with subnet translations.

Retrieve a Static NAT Rule

Resource URI

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

Example

JSON Request

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

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"
    }
}
```

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
    }
}
```

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"
    }
}
```

Retrieve All Static NAT Rules

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. Always “collection#nat-static-rule”
items	array	Mandatory	Collection of static NAT rules with objects of type “object#nat-static-rule”
nat-rule-id	string	Mandatory	Unique NAT rule id
mode	string	Mandatory	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 . “outside-source” refers to translating source address for packets that enter router through outside.
ip-mapping	object	Mandatory	Specifies IP address based static NAT mapping. Mutually exclusive with ip-port-mapping and network-nat-mapping.
ip-mapping-local-ip	ipaddress	Mandatory	Local IP address assigned to host on the inside network. Specified in the format x.x.x.x.

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

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}"
    }

}
```

Example

JSON Request

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

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"
                                }
            }
        ]
}
```

Modify a Static NAT Rule

Resource URI

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

Example Request of a Static NAT Rule

JSON Request

```
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"
    }
}
```

Example Request of a Port Static NAT Rule

JSON Request

```
{
  "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
    }
}
```

Example Request of a Network Static NAT

JSON Request

```
{
  "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"
    }
}
```

JSON Response

```
204 No Content
```

Delete a Static NAT Rule

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create a Static NAT Rule

Resource URI

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

Example Request of a Static NAT Rule

JSON Request

```
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"
    }
}
```

Example Request of a Port Static NAT Rule

JSON Request

```
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
    }
}
```

Example Request of a Network Static NAT

JSON Request

```
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"
    }
}
```

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Object type. Always "object#nat-dynamic-rule"
nat-rule-id	string	Mandatory	Unique NAT rule id
mode	string	Mandatory	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 . "outside-source" refers to translating source address for packets that enter router through outside . "inside-destination" refers to translating destination address for packets that enter router through inside
acl-id	name	Mandatory	ACL resource id that defines the ACL for this dynamic NAT
nat-pool-id	string	Mandatory	NAT pool to use. Refers to the NAT pool resource id.
pat-enabled	boolean	Optional	Specifies if Port Address translation to be enabled.

JSON Representation

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

}
```

Retrieve a Dynamic NAT Rule

Resource URI

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

Example

JSON Request

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

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
}
```

Retrieve All Dynamic NAT Rules

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Object type. Always “collection#nat-dynamic-rule”
items	array	Mandatory	Collection of nat-dynamic-rule objects
nat-rule-id	string	Mandatory	Unique NAT rule id

Property	Type	Required for POST and PUT	Description
mode	string	Mandatory	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 . “outside-source” refers to translating source address for packets that enter router through outside . “inside-destination” refers to translating destination address for packets that enter router through inside
acl-id	name	Mandatory	ACL resource id that defines the ACL for this dynamic NAT
nat-pool-id	string	Mandatory	NAT pool to use. Refers to the NAT pool resource id.
pat-enabled	boolean	Optional	Specifies if Port Address translation to be enabled.

JSON Representation

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

Example

JSON Request

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

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
   }
  ]
}
```

JSON Response

```
204 No Content
```

Modify a Dynamic NAT Rule

Resource URI

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

Example

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
}
```

JSON Response

```
204 No Content
```

Delete a Dynamic NAT Rule

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create a Dynamic NAT Rule

Resource URI

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

Example

JSON Request

```
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
}
```

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.

This resource supports only:

- Retrieve all NAT translations: All relevant properties are shown in the tables below.
- Clear all NAT translations: Uses the POST operation and an **action** property described in Clear All NAT Translations , page 15-21.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

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.
outside-local-port	number	The port identifying the outside local address.
outside-global-port	number	The port identifying the outside global address.

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}
        },
  ]
}
```

Retrieve All NAT Translations

Resource URI

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

Example

JSON Request

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

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 on the router. Use POST as shown below.

Note The **action** property is applicable only for this operation.

Properties for the POST Operation

Property	Type	Required for POST and PUT	Description
action	string	Mandatory	"clear" Clears active translations and automatic bindings on the router.

Example

JSON Request

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

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

JSON Response

```
204 No Content
```

Firewall Inspection Requirements

Workflows

Workflow: Setting Up Firewall Inspection

Configure the firewall inspection in the following order:

1. Create a source zone.

   POST /api/v1/zbfw-svc/zones

   See Create a ZBFW Zone, page 16-3.
2. Create a destination zone.

   POST /api/v1/zbfw-svc/zones

   See Create a ZBFW Zone, page 16-3.
3. If an ACL is required, configure an ACL.

   POST /api/v1/acl

   See Configure an ACL, page 14-9 and ACL Requirements for Subnets or IP Ranges, page 14-1.
4. Create the firewall filter rules.

   POST /api/v1/zbfw-svc/filters

   See Create a ZBFW Filter, page 16-6.

5. Create the firewall policy.

   POST /api/v1/zbfw-svc/policies

   See Create a Firewall Policy, page 16-12.

Note The REST API internally generates the zone-based firewall policy-map.

Resource Summary for Firewall Inspection

Resource Summary

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
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
	/api/v1/zbfw-svc/zones/{zone-name}	Y	N	Y	Y
Filters	/api/v1/zbfw-svc/filters	Y	Y	N	N
	/api/v1/zbfw-svc/filters/{filter-id}	Y	N	Y	Y
Policies	/api/v1/zbfw-svc/policies	Y	Y	N	N
	/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

Create a ZBFW Zone

Resource URI

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

Example

JSON Request

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

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

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

JSON Response

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

ZBFW Zone Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

JSON Representation

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

Modify a ZBFW Zone

Resource URI

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

Example

JSON Request

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

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

JSON Response

```
204 No Content
```

Retrieve a ZBFW Zone

Resource URI

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

Example

JSON Request

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

JSON Response

```
200 OK

Content-type: application/json

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

Retrieve All ZBFW Zones

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be collection#zbfw-zone
items	array	Mandatory	Collection of zbfw zones.

JSON Representation

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

Example

JSON Request

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

JSON Response

```
200 OK

Content-type: application/json

{
  "kind": "collection#zbfw-zone",
  "items":[
           {
             "kind": "object#zbfw-zone",
             "zone-name": "inside",
             "-list": { "tunnel0", "gig0" }
```

```
            },
            {
              "kind": "object#zbfw-zone",
              "zone-name": "outside",
              "-list": { "gig1" }
            }
           ]
}
```

Delete a ZBFW Zone

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create a ZBFW Filter

Resource URI

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

Example

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"}
                ]
  }
```

JSON Response

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

ZBFW Filter Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

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}"]
}
```

Modify a ZBFW Filter

Example

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"}
                 ]
}
```

JSON Response

```
204 No Content
```

Retrieve a ZBFW Filter

Resource URI

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

Example

JSON Request

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

JSON Response

```
200 OK

Content-type: application/json

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

Retrieve All ZBFW Filters

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Must be collection#zbfw-filter
items	array	Mandatory	Collection of zone-base-firewall filters.

JSON Representation

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

Example

JSON Request

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

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"}]
           }
          ]
}
```

Delete a ZBFW Filter

Resource URI

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

JSON Request

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

JSON Response

```
204 No Content
```

ZBFW Policy Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

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}"
                    }
                ]
}
```

Modify a Firewall Policy

Resource URI

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

Example

JSON Request

```
PUT /api/v1/zbfw-svc/policies/zone_pair_in_to_out

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"
                    }

                 ]
}
```

JSON Response

```
204 No Content
```

Create a Firewall Policy

Resource URI

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

Example

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"
                   }
               ]
}
```

JSON Response

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

Retrieve a Firewall Policy

Resource URI

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

Example

JSON Request

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

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"
                  }

                ]
}
```

Retrieve All Firewall Policies

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Must be collection#zbfw-policy
items	array	Mandatory	Collection of zone base firewall policies.

JSON Representation

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

Example

JSON Request

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

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"
                      },

                     ]
               }
             ]
}
```

Delete a Firewall Policy

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Firewall Session Collection Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	object#firewall-session
policy-id	string	Not applicable	Name of the policy
source-ip	ipaddress	Not applicable	Source IP address
destination-ip	ipaddress	Not applicable	Destination IP address
traffic-protocol	string	Not applicable	IP protocol
source-protocol-port	number	Not applicable	Source port of the protocol
destination-protocol -port	number	Not applicable	Destination port of the protocol

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"

Resource URI

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

Example

JSON Request

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

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 Resource

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

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object#firewall-log
enable	boolean	Mandatory	“true” to enable the logging, or “false” to disable it.
dest-address	ipaddress	Mandatory	IP address in x.x.x.x format of where the log should be redirected to.
dest-udp-port	number	Mandatory	Destination UDP port

JSON Representation

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

Retrieve Firewall Log Server Parameters

Resource URI

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

Example

JSON Request

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

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

Resource URI

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

Example

JSON Request

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

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

{
  "enable": false,
  "dest-ip-address": 25.25.25.25,
  "dest-udp-port": 26
}
```

JSON Response

```
204 No Content
```

Firewall Statistics (Global Count) Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	object	Not applicable	collection#firewall-statistics
drop-count	string	Not applicable	
firewall-back-pressure packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall back pressure packet and byte counts.
firewall-invalid-zone packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall invalid zone packet and byte counts.
firewall-l4-insp packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall layer 4 inspection packet and byte counts.
firewall-no-forwarding-zone packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall no forwarding zone packet and byte counts.
firewall-non-session packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall non-session packet and byte counts.
firewall-policy packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall policy packet and byte counts.
firewall-L4 packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall layer 4 packet and byte counts.
firewall-L7 packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall layer 7 packet and byte counts.
firewall-not-initiator packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall not-initiator packet and byte counts.
firewall-no-new-session packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall no new session packet and byte counts.

Property	Type	Required for POST and PUT	Description
firewall-syn-cookie-max-dst packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall TCP SYN cookie maximum destination packet and byte counts.
firewall-syn-cookie packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall TCP SYN cookie packet and byte counts.
firewall-AR-standby packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall asymmetric routing standby packet and byte counts.
firewall-not-from-init packet count byte count	number	Not applicable	(sub-property of drop-count) Firewall not from initiator packet and byte counts.
items	array	Not applicable	Array of objects that define zone-based firewall session statistics. Each object includes: • kind • policy-id • byte-stats • packet-stats
kind	string	Not applicable	object#zbfw-session-stats
policy-id	string	Not applicable	Name of the policy
byte-stats	object	Not applicable	Statistics in bytes
source-ip	ipaddress	Not applicable	(sub-property of byte-stats) Source IP address
destination-ip	ipaddress	Not applicable	(sub-property of byte-stats) Destination IP address
traffic-protocol	string	Not applicable	(sub-property of byte-stats) Traffic protocol
source-protocol-port	number	Not applicable	(sub-property of byte-stats) Source protocol port
destination-protocol-port	number	Not applicable	(sub-property of byte-stats) Destination protocol port
tx-byte-count	number	Not applicable	(sub-property of byte-stats) Transmit byte count
rx-byte-count	number	Not applicable	(sub-property of byte-stats) Receive byte count

Property	Type	Required for POST and PUT	Description
packet-stats	object	Not applicable	Statistics in packets
traffic-protocol	string	Not applicable	(sub-property of packet-stats) Traffic protocol
packet-count	string	Not applicable	(sub-property of packet-stats) Packet count

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}
                            }
                          ]
             }
           ]
}
```

Retrieve Firewall Statistics

Resource URI

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

Example

JSON Request

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

JSON Response

```
200 OK

Content-type: application/json
```

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

License Requirements

Workflows

Workflow: Configure a CSR License Using a Downloaded License File

1. Verify that there is a license on the CSR.
2. If using a cloned VM, obtain a new UDI.

   POST /api/v1/license/udi

   See Requesting a New license UDI, page 17-8.
3. Accept the EULA.

   POST /api/v1/license/eula

   See Accepting the EULA, page 17-10.

4. Install the license.

   POST /api/v1/license/install

   See Installing a License Obtained Out-of-Band, page 17-4.

5. (Optional) Change the technology package.

   PUT /api/v1/license/boot

   See Technology License Package, page 17-11.

Workflow: Configure a CSR License Using Call-Home

1. Verify that there is a license on the CSR.
2. If using a cloned VM, obtain a new UDI.

   POST /api/v1/license/udi

   See Requesting a New license UDI, page 17-8.

3. Accept the EULA.

   POST /api/v1/license/eula

   See Accepting the EULA, page 17-10.

4. Install the license.

   POST /api/v1/license/call-home

   See Installing a License Through the Call-home Feature, page 17-3.

5. (Optional) Change the technology package.

   PUT /api/v1/license/boot

   See Technology License Package, page 17-11.

Resource Summary for Licenses

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**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
Technology License Package	/api/v1/license/boot	Y	N	Y	N
Smart License	/api/v1/smart-license	Y	N	Y	N

		HTTP Method			
Smart License renew	/api/v1/smart-license/renew	N	N	Y	N
Smart License register	/api/v1/smart-license/register	N	N	Y	N
Smart License deregister	/api/v1/smart-license/deregister	N	N	Y	N
Call-home	/api/v1/call-home	Y	N	Y	N
Call-home profile	/api/v1/call-home/profile	Y	Y	N	N
	/api/v1/call-home/profile/{name}	Y	N	Y	Y

Installing a License Through the Call-home Feature

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Value Rules
username	string	Mandatory	N/A
password	string	Mandatory	N/A
license-server-url	string	Mandatory	N/A
pak-id	string	Mandatory	N/A
send-to-email-id	string	Mandatory	N/A

Resource URI

Verb	URI
POST	/api/v1/license/call-home

Example

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}"
}
```

JSON Response

```
204 No Content
```

Installing a License Obtained Out-of-Band

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required?	Value Rules

license-location	string	Y	The location where the license is stored outside of the device.
			Example (for Cisco CSR 1000V): 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`

Resource URI

Verb	URI
POST	/api/v1/license/install

Example

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"
}
```

JSON Response

```
204 No Content
```

Retrieving License Information

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms The following API is not supported: /api/v1/license/udi

Properties

Property	Type	Required for POST and PUT	Value Rules
detail	boolean	Mandatory	“true” to show the details “false” to show a summary

Resource URI

Verb	URI
GET	/api/v1/license?detail={Boolean}

Example

JSON Request

```
GET  /api/v1/license?detail=TRUE
```

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"
                }
        ]
}
```

Properties

Property	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
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

A GET request on the license UDI returns the UDI in the desired format.

Resource URI

Verb	URI
GET	/api/v1/license/udi
See History for platform limitations.	

Example

JSON Request

```
GET  /api/v1/license/udi

Accept: application/json
```

JSON Response

```
200 Ok

Content-Type: application/json

{
    "kind": "object#license-udi",
    "udi": "AS54XM-AC-RPS:JAE948QT6R"
}
```

Requesting a New license UDI

A POST request on a new license UDI returns a new UDI in the desired format.

Resource URI

Verb	URI
POST	/api/v1/license/udi
See History for platform limitations.	

Example

JSON Request

```
POST  /api/v1/license/udi

Accept: application/json

{
  "request": "udi"
}
```

JSON Response

```
200 ok

Content-Type: application/json

{
    "kind": "object#license-udi",
    "udi": "CSRXM-AC-RPS:JAE948QX12"
}
```

Accepting the End-user Agreement

Use GET to view the end-user agreement license (EULA). Use POST to accept the EULA.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Value Rules
eula-uri	string	Mandatory	Link to the EULA object. It is the GET EULA request URI. For example “/api/v1/license/eula”
eula-accept	boolean	Mandatory	“true” or “false” to indicate whether the user accepts the EULA terms.

Retrieving the License EULA

Resource URI

Verb	URI
GET	/api/v1/license/eula

Example

JSON Request

```
GET  /api/v1/license/eula

Accept: application/json
```

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."
```

Accepting 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 acknowledgment of the content of the EULA and acceptance of the EULA (if true is entered for the EULA-accept attribute).

Resource URI

Verb	URI
POST	/api/v1/license/eula

Example

JSON Request

```
POST  /api/v1/license/eula

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

{
    "eula-uri": "/api/v1/license/eula",
    "eula-accept": true
}
```

JSON Response

```
204 No Content
```

Technology License Package

The technology license package feature allows changing between license types:

- Standard
- Advanced
- Premium

For example, after beginning with a one type of license, it is possible to upgrade to a more advanced license type.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Value Rules
kind	string	Mandatory	Object type: "object#license-boot"
level	string	Mandatory	Standard, Advanced, or Premium

Retrieving the License Type

Resource URI

Verb	URI
GET	/api/v1/license/boot

Example

JSON Request

```
GET /api/v1/license/boot
Accept: application/json
```

JSON Response

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

{
"kind":  "object#license-boot"
"level": "premium"
}
```

Setting the License Type

Resource URI

Verb	URI
PUT	/api/v1/license/boot

Example

JSON Request

```
PUT /api/v1/license/boot
Content-Type: application/json

{
   "level": "premium",
}
```

JSON Response

```
204 No Content
```

Smart License Resource

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: "object#smart-license".
enable	boolean	Mandatory	Enable or disable Smart License feature.
profile	string	Optional	Call Home profile to use with Smart Licensing.
state	string	Not applicable	State of the smart call home registration.

JSON Representation

```
{
    "kind"   : "object#smart-license",
    "enable" : {boolean},
    "profile": {string},
    "state"  : {string}
}
```

Retrieve Smart License

Resource URI

Verb	URI
GET	/api/v1/smart-license

Example

JSON Request

```
GET /api/v1/smart-license
Accept: application/json
```

JSON Response

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

{
"kind"        : "object#smart-license",
    "enable"  : true,
    "state"   : "Unidentified"
    "profile" : "CiscoTAC-1"
}
```

Modify Smart License

Resource URI

Verb	URI
PUT	/api/v1/smart-license

Example

JSON Request

```
PUT /api/v1/smart-license
Content-Type: application/json

{
    "enable" : true,
    "profile": "CiscoTAC-1"
}
```

JSON Response

```
204 No Content
```

Smart License Registration Resource

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
idtoken	string	Mandatory	Token used to register with Cisco Smart Licensing.

JSON Representation

```
{
    "idtoken" : {string}
}
```

Smart License Registration

Resource URI

Verb	URI
PUT	/api/v1/smart-license/register

Example

JSON Request

```
PUT /api/v1/smart-license/register
Content-Type: application/json

{
    "idtoken" : "QXN123"
}
```

JSON Response

```
204 No Content
```

Smart License Deregister

Resource URI

Verb	URI
PUT	/api/v1/smart-license/deregister

Example

JSON Request

```
PUT /api/v1/smart-license/deregister
Content-Type: application/json
{
}
```

JSON Response

```
204 No Content
```

Smart License Renew Resource

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
id	boolean	Optional	Renew id
authorization	boolean	Optional	Renew Authorization

JSON Representation

```
{
    "id" : {boolean},
    "authorization" : {boolean}
}
```

Smart License Renew

Resource URI

Verb	URI
PUT	/api/v1/smart-license/renew

Example

JSON Request

```
PUT /api/v1/smart-license/renew
Content-Type: application/json

{
    "id" : true,
    "authorization" : true
}
```

JSON Response

```
204 No Content
```

Call-Home Resource

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: "object#call-home"
aaa-authorization	boolean	Optional	AAA authorization
aaa-authorization-username	string	Optional	AAA authorization username
contact-email	string	Optional	Email address
data-privacy	object	Optional	Data privacy
level	enum-erated list	Mandatory	(sub-property of data-privacy) Options: normal, high
hostname	boolean	Mandatory	Enables/disables hostname privacy
http-proxy	object	Optional	HTTP Proxy
server-address	string	Mandatory	(sub-property of http-proxy) http proxy server address
server-port	number	Mandatory	(sub-property of http-proxy) 16-bit port number Range: 1 to 65535
rate-limit	number	Optional	Rate limit messages. Range: 1 to 60

JSON Representation

```
{
    kind                        : object#call-home,
    aaa-authorization           : {boolean},
    aaa-authorization-username  : {string},
    contact-email               : {string},
    data-privacy                : {
                                    level: [normal, high],
                                    hostname: {boolean
                                  },
    http-proxy                  : {
                                     server-address: {string},
                                     server-port   : {number}
                                   },
    rate-limit                  : {number}
}
```

Retrieve Call-Home Resource

Resource URI

Verb	URI
GET	/api/v1/call-home

Example

JSON Request

```
GET /api/v1/call-home
Accept: application/json
```

JSON Response

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

{
"kind"                       : "object#call-home",
"aaa-authorization"          : true
"aaa-authorization-username" : "cisco",
"contact-email"              : "test@cisco.com",
"data-privacy" : {
                   "level"    : "high",
                   "hostname" : false
                 },
"http-proxy" : {
                 server-address : "cisco-proxy",
                 server-port    : 8080
               },
"rate-limit" : 30
}
```

Modify Call-Home Resource

Resource URI

Verb	URI
PUT	/api/v1/call-home

Example

JSON Request

```
PUT /api/v1/call-home
Content-Type: application/json

{
"aaa-authorization"         : true
"aaa-authorization-username": "cisco",
"contact-email"             : "test@cisco.com",
"data-privacy"              : {
                                "level"    : "high",
                                "hostname" : false
                              },
"http-proxy" : {
                 server-address : "cisco-proxy",
                 server-port    : 8080
               },
"rate-limit" : 30
}
```

JSON Response

```
204 No Content
```

Call-Home Profile Resource

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: "object#call-home-profile"
name	string	Mandatory	Name of the call-home profile

active	boolean	Optional	Enable or disable the profile. Default: Active
anonymous-reporting-only	boolean	Optional	Call home anonymous reporting
destination-transport-email	boolean	Optional	Use email for transport
destination-transport-http	boolean	Optional	Use HTTP for transport
destination-address	object	Optional	Object to hold URL and email addresses
urls	array	Optional	(sub-property of destination-address) Array or url strings
emails	array	Optional	(sub-property of destination-address) Array of email address strings
subscribe-group-all	object	Optional	Subscribe to group "all"
severity	enum-erated list	Mandatory	(sub-property of subscribe-group-all) [catastrophic, critical, debugging, disaster, fatal, major, minor, normal, notification, event]
subscribe-group-syslog	object	Optional	Subscribe to group "syslog"
severity	enum-erated list	Mandatory	(sub-property of subscribe-group-syslog) [catastrophic, critical, debugging, disaster, fatal, major, minor, normal, notification, event]
subscribe-group-configuration	object	Optional	One of the following objects: [daily, weekly, monthly]
subscribe-group-inventory	object	Optional	One of the following objects: [daily, weekly, monthly]
subscribe-group-snapshot	object	Optional	One of the following objects: [daily, weekly, monthly, interval, hourly]
daily	object		Period is daily. Applicable to: • subscribe-group-configuration • subscribe-group-inventory • subscribe-group-snapshot
time	string	Mandatory	(sub-property of daily) Time Format: hh:mm

weekly	object		Period is weekly. Applicable to: • subscribe-group-configuration • subscribe-group-inventory • subscribe-group-snapshot
day	enum-erated list	Mandatory	(sub-property of weekly) Day of the week: [sun, mon, tues, wed, thurs, fri, sat]
time	string	Mandatory	(sub-property of weekly) Time Format: hh:mm
monthly	object		Period is monthly. Applicable to: • subscribe-group-configuration • subscribe-group-inventory • subscribe-group-snapshot
day	number	Mandatory	(sub-property of monthly) Day of the month: 1 to 31
time	string	Mandatory	(sub-property of monthly) Time Format: hh:mm
interval	object		Period is at an interval. Applicable to: • subscribe-group-snapshot
minute	number	Mandatory	(sub-property of interval) Minutes: 1 to 60
hourly	object		Period is hourly. Applicable to: • subscribe-group-snapshot
minute	number	Mandatory	(sub-property of hourly) Minutes: 0 to 59

JSON Representation

```
{
    "kind"                        : "object#call-home-profile",
    "name"                        : {string},
    "active"                      : {boolean},
    "anonymous-reporting-only"    : {boolean},
    "destination-transport-email" : {boolean},
    "destination-transport-http"  : {boolean},
```

```
    "destination-address"         : {
                                        "urls"    : [{string}],
                                        "emails"  : [{string}]
                                      },
    "subscribe-group-all"         : { "severity" : {string} },
    "subscribe-group-configuration" : { "daily"  : {
                                           "time" : {string}
                                                  }
                                      },
    "subscribe-group-inventory" : { "weekly"    : {
                                            "day"  : {string},
                                            "time" : {string}
                                                  }
                                    },
    "subscribe-group-snapshot"        : { "interval" : {
                                             "minute"   : {string}
                                                        }
                                        },
    "subscribe-group-syslog"    : { "severity" : {string} }
}
```

Create a Call-Home Profile

Resource URI

Verb	URI
POST	/api/v1/call-home/profile

Example

JSON Request

```
POST /api/v1/call-home/profile
Content-Type: application/json

{
"name"                        : "test"
"active"                      : false,
"anonymous-reporting-only"    : false,
"destination-transport-email" : true,
"destination-transport-http"  : true,
"destination-address"         : {
                                   url      : []
                                   email    : [ "test@cisco.com" ]
                                 },
"subscribe-group-all"       : { "severity" : "minor"},
"subscribe-group-inventory" : { "daily"    : {
                                               "time" : "23:00"
                                             }
                              }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/call-home/profile/test
```

Retrieve Call-Home Profile

Resource URI

Verb	URI
GET	/api/v1/call-home/profile/{profile-name}

Example

JSON Request

```
GET /api/v1/call-home/profile/CiscoTest
Accept: application/json
```

JSON Response

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

{
"kind"                      : "object#call-home-profile",
"name"                      : "CiscoTest"
"active"                    : true,
"anonymous-reporting-only"  : true,
"destination-transpor-email": true,
"destination-transpor-http" : false,
"destination-address"       : {
                                urls  : [ "http://cisco.com" ]
                                emails: [ "test@cisco.com" ]
                              },
"subscribe-group-all" : {},
"subscribe-group-configuration" : {},
"subscribe-group-inventory" : {},
"subscribe-group-snapshot" : {},
"subscribe-group-syslog" : {},
}
```

Modify Call-Home Profile

Resource URI

Verb	URI
PUT	/api/v1/call-home/profile/{profile-name}

Example

JSON Request

```
PUT /api/v1/call-home/profile/CiscoTest
Content-Type: application/json

{
    "active"                      : true,
    "anonymous-reporting-only"    : true,
    "destination-transport-email" : false,
    "destination-transport-http"  : true,
    "destination-address"         : {
                                      url   : [ "http://cisco.com" ]
                                      email: [ "test@cisco.com" ]
                                    }
}
```

JSON Response

```
204 No Content
```

Delete Call-Home Profile

Resource URI

Verb	URI
DELETE	/api/v1/call-home/profile/{profile-name}

Example

JSON Request

```
DELETE /api/v1/call-home/profile/CiscoTest
```

JSON Response

```
204 No Content
```

Retrieve All Call-Home Profiles

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: "collection#call-home-profile"
items	array	Not applicable	Array of object#call-home-profile

JSON Representation for Retrieve All

```
{
  "kind"  : "collection#call-home-profile",
  "items" : [ {object#call-home-profile} ]
}
```

Example

JSON Request

```
GET /api/v1/call-home/profile
Accept: application/json
```

JSON Response

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

{
"kind"  : "collection#call-home-profile",
"items" : [
            {
              "kind"                        : "object#call-home-profile",
              "name"                        : "CiscoTest"
              "active"                      : true,
              "anonymous-reporting-only"    : true,
              "destination-transport-email" : true,
              "destination-transport-http"  : false,
              "destination-address"         : {
                                                url   : [ "http://cisco.com" ]
                                                email : [ "test@cisco.com" ]
                                              },
              "subscribe-group-all"           : {},
              "subscribe-group-configuration" : {},
              "subscribe-group-inventory"     : {},
              "subscribe-group-snapshot"      : {},
              "subscribe-group-syslog"        : {}
             },
             {
              "kind"                        : "object#call-home-profile",
              "name"                        : "test"
              "active"                      : false,
              "anonymous-reporting-only"    : false,
              "destination-transport-email" : true,
              "destination-transport-http"  : true,
              "destination-address"         : {
                                                url : []
                                                email : [ "test@cisco.com" ]
                                              },
              "subscribe-group-all"           : {},
              "subscribe-group-configuration" : {},
              "subscribe-group-inventory"     : {},
              "subscribe-group-snapshot"      : {},
              "subscribe-group-syslog"        : {}
             }
          ]
}
```

Throughput Resource

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. "object#license-throughput"
level	number	Mandatory	Throughput Values: 10, 100, 1000, 25 250, 50, 500

JSON Representation

```
{
    "kind" : "object#smart-license",
    "level" : {number}
}
```

Retrieve Throughput

Resource URI

Verb	URI
GET	/api/v1/license/throughput

Example

JSON Request

```
GET /api/v1/license/throughput
Accept: application/json
```

JSON Response

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

{
    "kind"  : "object#license-throughput",
    "level" : 10
}
```

Modify Throughput

Resource URI

Verb	URI
PUT	/api/v1/license/throughput

Example

JSON Request

```
PUT /api/v1/license/throughput
Content-Type: application/json

{
   "level" : 10
}
```

JSON Response

```
204 No Content
```

Memory and CPU Usage Report

Resource Summary for Memory and CPU

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
Memory	/api/v1/global/memory/processes	Y	N	N	N
CPU	/api/v1/global/cpu	Y	N	N	N

Memory Usage

The table below lists the fields and descriptions in the **show processes memory** command output.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Description
total-used	number	Total amount of used memory
total-free	number	Total amount of free memory

Property	Type	Description
processes	array	List of processes
process-id	number	(sub-property of processes) Process ID
process-name	string	(sub-property of processes) Process name
memory-used	number	(sub-property of processes) Bytes of memory allocated by the process

JSON Representation of Memory

```
{
    "kind": "object#memory-processes",
    "total-used": {number},
    "total-free": {number},
    "processes": [
                   {
                     "process-id" : {number},
                     "process-name" : "{string}",
                     "memory-used" : {number}
                    }
                  ]
}
```

Retrieve the Memory Usage

Resource URI

Verb	URI
GET	/api/v1/global/memory/processes

Example

JSON Request

```
GET  /api/v1/global/memory/processes

Accept: application/json
```

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Mandatory	Must be “object#cpu”
last-five-secs-utilization	string	Mandatory	The percent of CPU utilization for the last five seconds
last-one-mn-utilization	string	Mandatory	The percent of CPU utilization for the last minute
last-five-mns-utilization	string	Mandatory	The percent of CPU utilization for the last five minutes

JSON Representation

```
{
  "kind": "object#cpu",
  "last-5-secs-utilization": "{string}",
  "last-1-mn-utilization": "{string}",
  "last-5-mns-utilization": "{string}"
}
```

Retrieve the CPU Utilization

Resource URI

Verb	URI
GET	/api/v1/global/memory/cpu

Example

JSON Request

```
GET  /api/v1/global/cpu

Accept: application/json
```

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%"
}
```

VRF

Resource Summary for VRF

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
VRF	/api/v1/vrf	Y	Y	N	N
	/api/v1/vrf/{name}	Y	N	Y	Y
Logging	/api/v1/vrf/{name}/logging	Y	Y	N	N
	/api/v1/vrf/{name}/logging/{id}	Y	N	N	Y
SNMP	/api/v1/vrf/{name}/snmp	Y	Y	N	N
	/api/v1/vrf/{name}/snmp/{ip-address}	Y	N	N	Y

		HTTP Method			
Static Route	/api/v1/vrf/{name}/routing-svc/static-routes	Y	Y	N	N
	/api/v1/vrf/{name}/routing-svc/static-routes/{destination-network_next-hop}	N	N	N	N
	/api/v1/vrf/{name}/routing-svc/static-routes/{destination-network_next-hop_intf-name}	Y	N	N	Y
NTP	/api/v1/vrf/{name}/ntp/servers	Y	Y	N	N
	/api/v1/vrf/{name}/ntp/servers/{ntp-servers}	Y	N	N	Y
VPN Site-to-Site: Tunnel	/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/{vpn-interface-id}	Y	N	Y	Y
VPN Site-to-Site: Keyring	/api/v1/vrf/{vrf-name}/vpn-svc/ike/keyrings	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/vpn-svc/ike/keyrings/{keyring-id}	Y	N	Y	Y
VPN Site-to-Site: Statistics	/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/active/sessions	Y	N	N	N
	/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/statistics	Y	N	N	N
VPN Site-to-Site: IKE Profile	/api/v1/vrf/{vrf-name}/vpn-svc/ike/profiles	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/vpn-svc/ike/profiles/{profile-name}	Y	N	Y	Y
DHCP Pool	/api/v1/vrf/{vrf-name}/dhcp/pool	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/dhcp/pool/{pool-name}	Y	N	Y	Y
DHCP Bindings	/api/v1/vrf/{vrf-name}/dhcp/active/bindings	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/dhcp/active/bindings/{host-ip}	Y	N	N	Y
VRF-Aware DNS	/api/v1/vrf/{vrf-name}/dns-servers	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/dns-servers/{dns-servers}	Y	N	N	Y
OSPF	/api/v1/vrf/{vrf-name}/routing-svc/ospf	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}	N	N	N	Y
OSPF networks	/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/networks	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/networks/{network-id}	Y	N	N	Y
OSPF passive interfaces	/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/passive	Y	N	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/passive/{if-id}	Y	N	Y	Y

		HTTP Method			
BGP	/api/v1/vrf/{vrf-name}/routing-svc/bgp	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/ routing-svc/bgp/{routing-protocol-id}	N	N	N	Y
BGP networks	/api/v1/vrf/{vrf-name}/routing-svc/bgp/{routing-protocol-id}/networks	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/bgp/{routing-protocol-id}/networks/{network-id}	Y	N	N	Y
BGP neighbors	/api/v1/vrf/{vrf-name}/routing-svc/bgp/{asn-id}/neighbors	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/bgp/{asn-id}/neighbors/{neighbor-ip-address}	Y	N	Y	Y
EIGRP	/api/v1/vrf/{vrf-name}/routing-svc/eigrp	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/ routing-svc/eigrp/{routing-protocol-id}	N	N	N	Y
EIGRP networks	/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/networks	Y	Y	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/networks/{network-id}	Y	N	N	Y
EIGRP passive interfaces	/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/passive	Y	N	N	N
	/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/passive/{if-id}	Y	N	Y	Y
VRF routing table	/api/v1/vrf/{vrf-name}/routing-svc/routing-table	Y	N	N	N
Static NAT	/api/v1/vrf/{vrf-name}/nat-svc/static	Y	Y	N	N
Static NAT rule	/api/v1/vrf/{vrf-name}/nat-svc/static/{nat-rule-id}	Y	N	Y	Y
Dynamic NAT	/api/v1/vrf/{vrf-name}/nat-svc/dynamic	Y	Y	N	N
Dynamic NAT rule	/api/v1/ vrf/{vrf-name}/nat-svc/dynamic/{nat-rule-id}	Y	N	Y	Y
NAT translations	/api/v1/ vrf/{vrf-name}/nat-svc/translations	Y	Y	N	N

VRF Object Resource

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.13	Added the following properties: • rd • route-target • action • community
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type. “object#vrf”
name	string	Mandatory	Name of the VRF
forwarding	array	Mandatory	Array of name ex [“gi0”, “gi1”]
rd	string	Optional Mandatory if route target	Route Distinguisher (ASN:nn or IP-address:nn)
route-target	array	Optional	route-target array
action	enumerated	Mandatory if route target	(sub-property of route-target) route-target option , routing information action ("import" | "export" | "both")
community	string	Mandatory if route target	(sub-property of route-target) route-target option, community from which to get routes (ASN:nn or IP-address:nn)

JSON Representation

```
{
    "kind"         : "object#vrf",
    "name"         : {string},
    "forwarding"   : [ {string} ]
    "rd"           : "1:1",
    "route-target": [
                       {
                         "action"    : "import",
                         "community" : "1:2"
                       }
                     ]
}
```

Create VRF Object

Resource URI

Verb	URI
POST	/api/v1/vrf

Example

JSON Request

```
POST /api/v1/vrf
Content-Type: application/json

{
    "name"          : "pepsi",
    "forwarding"    : [ "GigabitEthernet1" ]
    "rd"            : "1:1",
    "route-target" : [
                        {
                          "action"    : "import",
                          "community" : "1:2"
                        }
                      ]
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/vrf/pepsi
```

Modify a VRF Object

Resource URI

Verb	URI
PUT	/api/v1/vrf/{vrf-name}

Example

JSON Request

```
PUT /api/v1/vrf/coke
Content-Type: application/json

{
   "forwarding": [ "GigabitEthernet1" ]
}
```

JSON Response

```
204 No Content
```

Retrieve a VRF Object

Resource URI

Verb	URI
GET	/api/v1/vrf/{vrf-name}

Example

JSON Request

```
GET /api/v1/vrf/coke
Accept: application/json
```

JSON Response

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

{
    "kind" : "object#vrf",
    "name" : "coke",
    "forwarding": [ "GigabitEthernet1" ]
    "rd" : "1:1",
    "route-target" : [ {
                         "action" : "import",
                         "community" : "1:2"
                       }
                     ]
}
```

Retrieve All VRF Objects

Properties for Retrieve All

Property	Type	Description

kind	string	Object type: “collection#vrf”
items	array	Array of object#vrf

JSON Representation

```
{
    "kind"  : "collection#vrf",
    "items" : [ {object#vrf} ]
}
```

Resource URI

Verb	URI
GET	/api/v1/vrf

Example

JSON Request

```
GET /api/v1/vrf
Accept: application/json
```

JSON Response

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

{
"kind": "collection#vrf",
"items": [
          {
               "kind"          : "object#vrf",
               "name"          : "coke",
               "forwarding"    : [ "GigabitEthernet1" ]
               "rd"            : "1:1",
               "route-target" : [{
                                   "action"   : "import",
                                   "community": "1:2"}
                                 ]
          },
          {
               "kind"          : "object#vrf",
               "name"          : "pepsi",
               "forwarding"    : [ "GigabitEthernet2" ]
               "rd"            : "1:1",
               "route-target"  : [ {
                                       "action"   : "import",
                                       "community": "1:2"
                                   }
                                  ]
          }
         ]
}
```

Delete a VRF Object

Resource URI

Verb	URI
DELETE	/api/v1/vrf/{vrf-name}

Example

JSON Request

```
DELETE /api/v1/vrf/coke
```

JSON Response

```
204 No Content
```

VRF Logging

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF logging leverages the same schema as defined for the Logging resource used in global configuration, with the exception that the VRF logging resource URLs are as shown below. See Logging Resource, page 4-11 for details.

```
/api/v1/vrf/{name}/logging
/api/v1/vrf/{name}/logging/{id}
```

VRF SNMP

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF SNMP leverages the same schema as defined for the SNMP resource used in global configuration, with the exception that the VRF SNMP resource URLs are as shown below. See SNMP Server Resource, page 4-15 for details.

```
/api/v1/vrf/{name}/snmp
/api/v1/vrf/{name}/snmp/{ip-address}
```

VRF Static Route

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF Static Routes leverage the same schema as defined in the Static Route Collection resource used in routing configuration, with the exception that the VRF Static Route resource URLs are as shown below. See Static Route Resource, page 13-33 for details.

```
/api/v1/vrf/{name}/routing-svc/static-routes
/api/v1/vrf/{name}/routing-svc/static-routes/{destination-network_next-hop}
/api/v1/vrf/{name}/routing-svc/static-routes/{destination-network_next-hop_intf-name}
```

VRF NTP

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF NTP leverages the same schema as defined in the Network Time Protocol chapter, with the exception that the VRF NTP resource URLs are:

```
/api/v1/vrf/{name}/ntp/servers
/api/v1/vrf/{name}/ntp/servers/{ntp-servers}
```

In the URLs above, {name} refers to a VRF name created using /api/v1/vrf.

VRF VPN Site-to-Site

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.13	Change tunnel state API added: /api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/{vpn-interface-id}/state See Change State of a Tunnel Interface, page 20-26.
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF VPN Site-to-Site leverages the same schema as defined for VPN Site-to-Site, with the exception that the VRF VPN Site-to-Site resource URLs are as shown below. See Virtual Private Networks (SVTI and EzVPN), page 20-1 for details.

- Tunnel

```
/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site
/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/{vpn-interface-id}
/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/{vpn-interface-id}/state
```

- Keyring

```
/api/v1/vrf/{vrf-name}/vpn-svc/ike/keyrings
/api/v1/vrf/{vrf-name}/vpn-svc/ike/keyrings/{keyring-id}
```

- Statistics

```
/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/active/sessions
/api/v1/vrf/{vrf-name}/vpn-svc/site-to-site/statistics
```

- IKE Profile

```
/api/v1/vrf/{vrf-name}/vpn-svc/ike/profiles
/api/v1/vrf/{vrf-name}/vpn-svc/ike/profiles/{profile-name}
```

In the URLs above, {vrf-name} refers to a VRF name created using /api/v1/vrf.

VRF DHCP

History

Release	Modification
IOS XE 3.12	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF DHCP leverages the same schema as defined for the DHCP Server, with the exception that the VRF DHCP resource URLs are as shown below. See DHCP Server and Relay Agent, page 12-1 for details.

- DHCP pool

```
/api/v1/vrf/{vrf-name}/dhcp/pool
/api/v1/vrf/{vrf-name}/dhcp/pool/{pool-name}
```

- DHCP bindings

```
/api/v1/vrf/{name}/dhcp/active/bindings
/api/v1/vrf/{name}/dhcp/active/bindings/{host-ip}
```

VRF-Aware DNS

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF-Aware DNS leverages the same schema as defined for the DNS Server resource, with the exception that the VRF-Aware DNS resource URLs are as shown below. The URL for VRF-aware DNS includes the VRF name. See Domain Name System (DNS) Server, page 5-1 for details.

```
/api/v1/vrf/{vrf-name}/dns-servers
/api/v1/vrf/{vrf-name}/dns-servers/{dns-servers}
```

VRF-Aware OSPF Routing

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF-Aware OSPF Routing leverages the same schema as defined for OSPF routing without VRF, with the exception that the VRF-Aware OSPF Routing resource URLs are as shown below. The URL for VRF-Aware OSPF Routing includes the VRF name. See Routing Protocol (OSPF, BGP, EIGRP) Requirements, page 13-1 for details.

- OSPF creation

```
/api/v1/vrf/{vrf-name}/routing-svc/ospf
```

- OSPF deletion

  `/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}`

- OSPF networks

  `/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/networks`

- OSPF network (single)

  `/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/networks/{network-id}`

- OSPF passive interfaces

  `/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/passive`

- OSPF passive interface (single)

  `/api/v1/vrf/{vrf-name}/routing-svc/ospf/{routing-protocol-id}/passive/{if-id}`

VRF-Aware BGP Routing

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF-Aware BGP Routing leverages the same schema as defined for BGP routing without VRF, with the exception that the VRF-Aware BGP Routing resource URLs are as shown below. The URL for VRF-Aware BGP Routing includes the VRF name. See Routing Protocol (OSPF, BGP, EIGRP) Requirements, page 13-1 for details.

- BGP creation

  `/api/v1/vrf/{vrf-name}/routing-svc/bgp`

- BGP deletion

  `/api/v1/vrf/{vrf-name}/ routing-svc/bgp/{routing-protocol-id}`

- BGP networks

  `/api/v1/vrf/{vrf-name}/routing-svc/bgp/{routing-protocol-id}/networks`

- BGP network (single)

  `/api/v1/vrf/{vrf-name}/routing-svc/bgp/{routing-protocol-id}/networks/{network-id}`

- BGP neighbors

  `/api/v1/vrf/{vrf-name}/routing-svc/bgp/{asn-id}/neighbors`

- BGP neighbor (single)

  `/api/v1/routing-svc/bgp/{asn-id}/neighbors/{neighbor-ip-address}`

VRF-Aware EIGRP Routing

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF-Aware EIGRP Routing leverages the same schema as defined for EIGRP routing without VRF, with the exception that the VRF-Aware EIGRP Routing resource URLs are as shown below, and includes the following additional optional property:

Property	Type	Required for POST and PUT	Description
virtual-instance-name	string	Optional	EIGRP virtual instance name

The URL for VRF-Aware EIGRP Routing includes the VRF name. See Routing Protocol (OSPF, BGP, EIGRP) Requirements, page 13-1 for details.

- EIGRP creation

  `/api/v1/vrf/{vrf-name}/routing-svc/eigrp`

- EIGRP deletion

  `/api/v1/vrf/{vrf-name}/ routing-svc/eigrp/{routing-protocol-id}`

- EIGRP networks

  `/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/networks`

- EIGRP network (single)

  `/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/networks/{network-id}`

- EIGRP passive interfaces

  `/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/passive`

- EIGRP passive interface (single)

  `/api/v1/vrf/{vrf-name}/routing-svc/eigrp/{routing-protocol-id}/passive/{if-id}`

VRF-Aware Routing Table

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF-Aware Routing Table leverages the same schema as defined for Routing Table without VRF, with the exception that the VRF-Aware Routing Table resource URLs are as shown below. The URL for VRF-Aware Routing Table includes the VRF name. See Routing Table Display, page 13-30 for details.

```
/api/v1/vrf/{vrf-name}/routing-svc/routing-table
```

VRF-Aware NAT

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

VRF-Aware NAT leverages the same schema as defined for static NAT, dynamic NAT, and NAT translation without VRF, with the exception that the VRF-Aware NAT resource URLs are as shown below, and includes the following additional optional property:

Property	Type	Required for POST and PUT	Description
match-in-vrf	Boolean	optional	The match-in-vrf option is required when two overlapping VRFs use the same public address, and will help route packets correctly within the VRF.

The URL for VRF-Aware NAT includes the VRF name. See Network Address Translation (NAT), page 15-1 for details.

- Static NAT

  ```
  /api/v1/vrf/{vrf-name}/nat-svc/static
  ```

- Static NAT rule

  ```
  /api/v1/vrf/{vrf-name}/nat-svc/static/{nat-rule-id}
  ```

- Dynamic NAT

  ```
  /api/v1/vrf/{vrf-name}/nat-svc/dynamic
  ```

- Dynamic NAT rule

  ```
  /api/v1/ vrf/{vrf-name}/nat-svc/dynamic/{nat-rule-id}
  ```

- NAT translations

  ```
  /api/v1/ vrf/{vrf-name}/nat-svc/translations
  ```

Virtual Private Networks (SVTI and EzVPN)

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.

Workflows

Create an IPSEC VPN Tunnel

1. Create a keyring. The keyring can be shared by more than one tunnels.

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

   Create an IKE Keyring, page 20-6

2. (Optional) Create the IKE policy (can use one of the default policies). The IKE policy can be shared by more than one tunnel.

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

   Create an IKE Policy, page 20-12

3. Create IPSEC policy (it include transform set and ipsec profile, they can be shared by many tunnels).

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

   Create an IPSec Policy, page 20-20

4. Create IPSEC VPN tunnel endpoint (it will reference ike/ipsec policy or profile, this will create a tunnel interface).

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

   Create a Site-to-Site VPN Tunnel, page 20-24

Resource Summary for IPSec VPN

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**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-site/{vpn-interface-id}	Y	N	Y	Y
VPN site-to-site interface state	/api/v1/vpn-svc/site-to-site/{vpn-interface-id}/state	Y	N	Y	N
DMVPN Hub	/api/v1/vpn-svc/dmvpn/hub	Y	Y	N	N
	/api/v1/vpn-svc/dmvpn/hub/{vpn-id}	Y	N	Y	Y
Keyrings	/api/v1/vpn-svc/ike/keyrings	Y	Y	N	N
Keyring ID	/api/v1/vpn-svc/ike/keyrings/{keyring-id}	Y	N	Y	Y
IKE policies	/api/v1/vpn-svc/ike/policies	N	N	N	N
	/api/v1/vpn-svc/ike/policies/{policy-id}	N	N	N	N
IKE Keep Alive	/api/v1/vpn-svc/ike/keepalive	Y	N	Y	Y
IKEv2 Policy	/api/v1/vpn-svc/ikev2/policy	Y	Y	N	N
	/api/v1/vpn-svc/ikev2/policy/{resource-id}	Y	N	Y	Y
IKEv2 Keyring	/api/v1/vpn-svc/ikev2/keyring	Y	N	N	N
	/api/v1/vpn-svc/ikev2/keyring/(resource-id}	Y	N	N	Y
IKEv2 Keyring Peer	/api/v1/vpn-svc/ikev2/keyring/(resource-id}/add-peer	N	Y	N	N
	/api/v1/vpn-svc/ikev2/keyring/(resource-id}/add-peer/{peer-name}	N	N	Y	Y
IKEv2 Profile	/api/v1/vpn-svc/ikev2/profile	Y	Y	N	N
	/api/v1/vpn-svc/ikev2/profile/{resource-id}	Y	N	Y	Y

		HTTP Method			
IPSec policies	/api/v1/vpn-svc/ipsec/policies	Y	Y	N	N
	/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

IKE Crypto Key Ring Resource

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

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

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}"
      }
    ]
}
```

Retrieve an IKE Keyring

Resource URI

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

Example

JSON Request

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

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"
      }
    ]
}
```

Retrieve All IKE Keyrings

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object#ike-keying
items	array	Mandatory	List of IKE keyring objects.

JSON Representation

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

Example

JSON Request

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

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"
                       }
                     ]
              }
}
```

Update an IKE Keyring

Resource URI

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

Example: Request to Add Another Key and Peer-address

JSON Request

```
PUT /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"}
         ]
}
```

JSON Response

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

Delete an IKE Keyring

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create an IKE Keyring

Resource URI

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

Example

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"
      }
    ]
}
```

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be object#ike-policy.
priority-id	string	Mandatory	This is the ISAKMP policy priority number, so it must be a number in IKEv1 (it is different for ikev2).
version	string	Optional	IKE version. Only “v1” is supported.
local-auth-method	string	Optional	“pre-share” for pre-shared key (default). “rsa-sig” and “rsa-encr” are not supported.
encryption	string	Optional	Values are • “3des”- triple DES • “aes”: AES - Advanced Encryption Standard. • “des”: DES - Data Encryption Standard (56 bit keys)
hash	string	Optional	• md5: Message Digest 5 • sha: Secure Hash Standard There is a default.
dhGroup	number	Optional	• 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.
lifetime	number	Optional	<60-86400> lifetime in seconds. There is a default.

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}
}
```

Retrieve an IKE Policy

Resource URI

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

Example

JSON Request

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

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
}
```

Retrieve All IKE Policies

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be “collection#ike-policy”
items	array		List of IKE policy objects.

JSON Representation

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

Example

JSON Request

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

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
              }
}
```

Update an IKE Policy

Resource URI

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

Example: Modifying the Protection-suite Encryption from 3DES to AES128

JSON Request

```
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
}
```

JSON Response

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

Delete an IKE Policy

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create an IKE Policy

Resource URI

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

Example

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
}
```

JSON Response

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

IKE Keepalive Resource

The IKE Keepalive is a single global Resource. DELETE on this resource removes the IKE Keepalive configuration on the router. GET on this resource will return 404 Not Found when IKE Keepalive is not configured.

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object type: “object#ike-keepalive”
interval	number	Mandatory	Keepalive interval time (10 - 3600)
retry	number	Mandatory	Retry time (2 - 60), default 2 seconds
periodic	boolean	Mandatory	Keepalive mode, TRUE is periodic, FALSE is on-demand which is the default

JSON Representation for IKE Keepalive

```
{
"kind": "object#ike-keepalive",
"interval": {number},
"retry": {number},
"periodic": {boolean}
}
```

Retrieve IKE Keepalive

Resource URI

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

Example

JSON Request

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

JSON Response

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

{
"kind": "object#ike-keepalive",
"interval": 30,
"retry": 2,
"periodic": false
}
```

Modify IKE Keepalive

Resource URI

Verb	URI
PUT	/api/v1/vpn-svc/ike/keepalive

Example

JSON Request

```
PUT /api/v1/vpn-svc/ike/keepalive
Content-Type: application/json

{
   "interval": 30,
"retry": 10,
"periodic": true
}
```

JSON Response

```
204 No Content
```

Delete IKE Keepalive

Resource URI

Verb	URI
DELETE	/api/v1/vpn-svc/ike/keepalive

Example

JSON Request

```
DELETE /api/v1/vpn-svc/ike/keepalive
```

JSON Response

```
204 No Content
```

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.

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object#ipsec-policy
policy-id	string	Mandatory	IPSec policy name
protection-suite		Mandatory	Optional as there is a default protection suite (IOS transform-set).
esp-encryption	string	Mandatory	(sub-property of protection-suite) 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	Optional	(sub-property of protection-suite) ESP authentication transform. • esp-md5-hmac: ESP transform using HMAC-MD5 auth • esp-sha-hmac: ESP transform using HMAC-SHA auth. Default.
ah	string	Optional	(sub-property of protection-suite) AH transform: • ah-md5-hmac: AH-HMAC-MD5 transform • ah-sha-hmac: AH-HMAC-SHA transform

Property	Type	Required for POST and PUT	Description
anti-replay-window-size	string	Optional	"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).
lifetime-sec	number	Optional	Default of 3600 seconds.
lifetime-kb	number	Optional	Default is 4608000.
idle-time	number	Optional	IPSec idle timer in seconds.
pfs	string	Optional	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)

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}"
}
```

Retrieve an IPSec Policy

Resource URI

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

Example

JSON Request

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

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"
}
```

Retrieve All IPSec Policies

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be “collection#ipsec-policy”
Items	array	Mandatory	List of IPSec policy objects.

JSON Representation

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

Example

JSON Request

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

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: 4608000,
               "idle-time: 10000,
               "pfs": "group1"
             },
        ]
}
```

Modify an IPSec Policy

Resource URI

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

Example

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"
}
```

JSON Response

```
204 No Content
```

Delete an IPSec Policy

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Create an IPSec Policy

Resource URI

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

Example

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"
}
```

JSON Response

```
201 Created

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

Site-to-Site Tunnel

History

Release	Modification
IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.11	For the local-device property, added the option of entering an interface name instead of an IP address.
IOS XE 3.12	Added **ike-profile** and **mtu** properties.
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
vpn-interface-name	string	Mandatory	A unique name of the form “tunnel<number>”. For example, “tunnel1”.
ike-profile	string	Optional	IKE profile name
mtu	number	Optional	MTU of the VPN tunnel Range: 68 to 9192
vpn-type	string	Mandatory	Must be “site-to-site”.
ip-version	string	Mandatory	“ipv4” or “ipv6”. The default is IPv4. Optional.
ipsec-policy-id	string	Optional	IPSec policy name.
local-device • ip-address • tunnel-ip-address	string	Mandatory	The local device • Tunnel interface's IP address. It can be in CIDR format x.x.x.x/nn or an interface name. When it is an interface name, it is an **IP unnumbered** *interface name*. • Required for svti and dvti. name or IP address in x.x.x.x format.
remote-device • tunnel-ip-address	string	Mandatory	Remote peer IP address in x.x.x.x format.

JSON Representation

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

Retrieve a Site-to-Site VPN Tunnel

Resource URI

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

Example

JSON Request

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

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"
    }
}
```

Retrieve All Site-to-Site VPN Tunnels

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be “collection#vpn-site-to-site”.
items	array	Not applicable	List of VPN objects.

JSON Representation

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

Example

JSON Request

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

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--name": "tunnel100",
               "ike-profile": "ike-profile-1",
               "mtu": 1400,
               "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--name": "tunnel33",
               "ike-profile": "ike-profile-1",
               "mtu": 1400,
               "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"
                    }
                }
        ]
}
```

Create a Site-to-Site VPN Tunnel

Resource URI

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

Example

This POST example relates to the VPN tunnel example given in Retrieve All Site-to-Site VPN Tunnels, page 20-22.

JSON Request

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

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

{
  "vpn-type": "site-to-site",
  "vpn-interface-name": "tunnel100",
  "ike-profile": "ike-profile-1",
  "mtu": 1400,
  "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"
                   }
}
```

JSON Response

```
204 No Content

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

Modify a Site-to-Site VPN

Resource URI

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

Example: Modifying the Remote Tunnel IP Address

JSON Request

```
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"
                    }
}
```

JSON Response

```
204 No Content
```

HTTP DELETE a VPN Site-to-Site Tunnel

Resource URI

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

Example

JSON Request

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

JSON Response

```
204 No Content
```

Change State of a Tunnel Interface

Use this resource to configure or retrieve the state of a tunnel interface.

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Optional	object#vpn-site-to-site-state
vpn-interface-name	string	Optional	VPN interface name Example: Tunnel100
enabled	Boolean	Mandatory	False = shut the tunnel interface True = no shut the tunnel interface
line-protocol-state	string	Optional	Used only in GET API, not in PUT. Possible values: "up" or "down"

JSON Representation

```
{
  "kind" : "object#vpn-site-to-site-state",
  "vpn-interface-name" : "{string}",
  "line-protocol-state": "{string}",
  "enabled" : {Boolean}
}
```

Configure Tunnel Interface State

Resource URI

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

Example

JSON Request

```
PUT /api/v1/vpn-svc/site-to-site/tunnel100/state
Content-Type: application/json

{
   "vpn-interface-name"    : "tunnel100",
   "enabled" : false
}
```

JSON Response

```
204 No Content
```

Retrieve Tunnel Interface State

Resource URI

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

Example

JSON Request

```
GET /api/v1/vpn-svc/site-to-site/tunnel100/state
```

JSON Response

```
200 ok

Content-type: application/json

{
  "kind" : "object#vpn-site-to-site-state",
  "vpn-interface-name" : "tunnel100",
  "line-protocol-state": "down",
  "enabled" : false
}
```

VPN Active Sessions Collection Resource

History

Release	Modification

IOS XE 3.10	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be collection#vpn-active-session
items	array	Not applicable	List of vpn-active-session JSON object
vpn-type	string	Not applicable	Must be “site-to-site”.
vpn-interface-name	string	Not applicable	Unique number identifying the VPN tunnel.
status	string	Not applicable	See the next table for a description of the possible tunnel states.
local-address	ipaddress	Not applicable	Tunnel source IP address in x.x.x.x format.
remote-address	string	Not applicable	Tunnel destination IP address in x.x.x.x format.
ike-remaining-lifetime	number	Not applicable	IKE SA remaining lifetime in HH:MM:SS format.
ipsec-tx-remaining-lifetime-kb	number	Not applicable	IPSec outbound SA remaining lifetime in KB.
ipsec-rx-remaining-lifetime-kb	number	Not applicable	IPSec inbound SA remaining lifetime in KB.
ipsec-tx-remaining-lifetime-sec	number	Not applicable	IPSec outbound SA remaining lifetime in seconds.
ipsec-rx-remaining-lifetime-sec	number	Not applicable	IPSec inbound SA remaining lifetime in seconds.

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}
            }
           ]
}
```

Tunnel States

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

Resource URI

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

Example

JSON Request

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

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
    }
  ]
}
```

Retrieve All VPN Active Session Statistics

Resource URI

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

Properties for Retrieve All

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Must be “collection#vpn-statistics”.
items	array	Not applicable	List of object#vpn-statistics
vpn-type	string	Not applicable	Must be “site-to-site” in IOS-XE 3.10
vpn-interface-name	string	Not applicable	The IOS tunnel number in “tunnel<number>” format, such as “tunnel2”.
local-address	ipaddress	Not applicable	Tunnel source IP address in x.x.x.x format.
remote-address	ipaddress	Not applicable	Tunnel destination IP address in x.x.x.x format.
encapsulated	number	Not applicable	Number of encapsulated packets.
decapsulated	number	Not applicable	Number of decapsulated packets.
encrypted	number	Not applicable	Number of encrypted packets.
decrypted	number	Not applicable	Number of decrypted packets.
send-errors	number	Not applicable	Number of transmit error packets.
receive-errors	number	Not applicable	Number of receive error packets.

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}
    }
  ]
}
```

Example

JSON Request

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

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
    }
  ]
}
```

Remote Access VPN Server

To create the EzVPN server, the following objects need to be defined (other than the ike-policy, keyring and ipsec-profile that is already defined for P2P tunneling).

- IP local address pool
- Client-config-profile (this configuration is pushed to remote client once it connects)
- Vtemplate (a dynamic tunnel is cloned once a remote client connects)
- IKE profile (classifies who belongs to the group, and what policy to apply)

EzVPN Server

The CSR1000v supports the Easy VPN (EzVPN) server only. To create the EzVPN server, the following objects need to be defined (other than the ike-policy, keyring and ipsec-profile that is already defined for:

- P2P tunneling).
- IP local address pool
- Client-config-profile (this configuration is pushed to remote client once it connects)
- Vtemplate (a dynamic tunnel is cloned once a remote client connects)
- IKE profile (classifies who belongs to the group, and what policy to apply)

Workflows

Create an EzVPN Server

1. Create a keyring.

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

   See Create an IKE Keyring, page 20-6.
2. (Optional) Create an IKE policy.

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

   See Create an IKE Policy, page 20-12.
3. Create an IPSEC profile.

   Include transform-set and ipsec profile.

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

   See Create an IPSec Policy, page 20-20.
4. Create a local-pool. The local-pool is used to assign an address to the remote user.

   POST /api/v1/vpn-svc/ezvpn/pools

   See Create an IP Local Pool, page 20-34.
5. (Required) Create a client-config-profile.

   See EzVPN Client Config Profile, page 20-36.
6. (Required) Create an IKE profile (cannot be a shared profile).

   See IKE Profile, page 20-35.

7. Configure the EzVPN server. This is the remote access endpoint. The server will refer to the IKE/IPSEC policy or profile. The server will create a virtual-template interface, which will be cloned by the DVTI interface during remote login.

   See EzVPN Server Interface, page 20-36.

Resource Summary for EzVPN

Resource	URL	HTTP Methods			
		GET	POST	PUT	DELETE
Local pool	/api/v1/globle/local-pool/	Y	Y	Y	Y
Ike-profile	/api/v1/vpn-svc/ike/ike-profile/{ike-profile-id}	Y	N	Y	Y
all ike-profile	/api/v1/vpn-svc/ike/ike-profiles	Y	Y	N	N
Client-config profile	/api/v1/vpn-svc/ezvpn/client-config-profiles	Y	Y	Y	Y
EzVPN server	/api/v1/vpn-svc/ezvpn/ezvpn-servers	Y	Y	N	N
EzVPN server	/api/v1/vpn-svc/ezvpn/ezvpn-servers/{ezvpn-id}	Y	N	Y	Y

IP Local Pool

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
pool-name	string	Mandatory	Pool name
ip-version	string	Optional	IPv4 format
start_address	string	Mandatory	Starting address
end_address	string	Mandatory	Ending address

JSON Representation for the IP Local Pool Command

```
{
  "description" : "IP local pool",
  "type":"object",
  "properties":
    {
      "pool-name":{"type": "string"},
      "ip-version":{"type":"string"},
      "start-address":{"type":"string"},
      "end-address":{"type":"string"},
    }
}
```

Create an IP Local Pool

Example

JSON Request

```
POST /api/v1/vpn-svc/ezvpn/pools
Content-Type: application/json

{
   "name":"pool1",
   "start-address": "10.1.1.1",
   "end-address":"10.1.1.255"
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/vpn-svc/ezvpn/pools/pool1
```

Retrieve an IP Local Pool

Example

JSON Request

```
GET /api/v1/vpn-svc/ezvpn/pools/pool1
Accept: application/json
```

JSON Response

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

{
"kind"          : "object#local-pool",
"name"          : "pool1",
"version"       : "ipv4",
"start-address" : "10.1.1.1"
"end-address"   : "10.1.1.255"
}
```

Delete an IP Local Pool

Example

JSON Request

```
DELETE /api/v1/ezvpn/pools/pool1
```

JSON Response

```
204 No Content
```

IKE Profile

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

JSON Representation for the ike-profile Resource

```
{
  "description": "IKE profile",
  "type": "object",
  "properties":
  {
    "ike-profile-name": {"type": "string"},
    "keyring": {"type": "string", "optional": true},
    "identity":
    {
      "type": "object",
      "category": {"type": "string",
      "enum": ["group", "address", "host", "host domain",
      "user",  "user domain"]}
       "value": {"type": "string"}
    }
    "authentication-list": {"type": "string", "optinal": true},
    "authorization-list": {"type": "string", "optional": true},
    "accounting": {"type": "string", "optional": true},
    "client-group": {"type": "string", "optional": true},
    "client-address":
    {
      "type": "string", "optional": true,
      "enum": ["push", "on-demand", "both"]
    },
    "initiate-mode-aggressive": { "type": "boolean", "optional": true},
    "keep-alive":
    {
      "type": "object", "optional": true,
      "interval": {"type": "number", "min": 10, "max": 3600},
      "retry": {"type": "number", "min": 2, "max": 60}
    }
    "vtemplate-if-name": {"type": "string", "optional": true},
  }
}
```

EzVPN Client Config Profile

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

JSON Representation for ezvpn-client-config-profile Resource

```
{
  "description": "client-config-profile",
  "type": "object",
  "properties":
  {
       "profile-name": {"type": "string"},
       "pre-shared-key": {"type": "string"},
       "dns-server":
       {
         "type": "object", "optional": true,
         "primary": {
         "type": "string", "format": "ip-address"},
         "secondary": {
         "type": "string", "format": "ip-address", "optional": true}
       }
       "nbms-wins-server":
       {
         "type": "object", "optional": true,
         "primary": {
         "type": "string", "format": "ip-address"},
         "secondary": {
         "type": "string", "format": "ip-address", "optional": true}
       }
       "split-tunnel-acl": {"type": "string", "optional": true},
       "domain": {"type": "string", "optional": true},
       "address-pool":
       {
         "type": "object",
         "pool-name": {"type": "string"},
         "prefix-len": {"type": "number"},
       }
       "client-banner": {"type": "string", "optional": true, "maxlength": 500},
  }
}
```

EzVPN Server Interface

The virtual-template interface requirement allows a dynamic VTI interface to be cloned and provides the user with the ability to configure additional IOS features, such as a firewall, to EzVPN tunnels.

History

Release	Modification
IOS XE 3.11	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
description	string	Mandatory	Descriptive string for the EzVPN server.
vpn-type	string	Mandatory	"ezvpn"
vpn-interface-name	string	Mandatory	vtemplate name. If it does not exist, the system will create one.
ip-version	sting	Mandatory	IPv4
ike-profile-id	string	Mandatory	The ike-profile the server is going to use to negotiate with remote, it should include client-config file to push to remote.
ipsec-policy-id	string	Optional	IPSEC policy name
local-device	object	Mandatory	IP address of the vtemplate and IP address of the tunnel source.
ip-address	string	Mandatory	(sub-property of local-device) Interface name or IP address of the vtemplate.
tunnel-ip-address	string	Mandatory	(sub-property of local-device) Interface name (preferable) or IP address of the tunnel source.

JSON Representation for EzVPN-server Resource

```
{
    "description":"string",
    "vpn-type":"ezvpn",
    "vpn-interface-name":"string",
    "ip-version":"string",
    "ike-profile-id":"string",
    "ipsec-policy-id":"string",
    "local-device":
    {
      "ip-address": "string",
      "tunnel-ip-address":"string",
    }
}
```

Create EzVPN Server Interface

Example

JSON Request

```
POST /api/v1/vpn-svc/ezvpn/servers
Content-Type: application/json

{  "vpn-type": "ezvpn",
   "vpn-interface-name": "Virtual-Template11",
   "ipsec-policy-id": "profile101",
   "ike-profile-id": "ezvpn",
   "local-device":
    {
      "ip-address": "loopback0",
      "tunnel-ip-address": "gigabitethernet1"
    }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/vpn-svc/ezvpn/servers/Virtual-Template11
```

Retrieve EzVPN Server Interface

Example

JSON Request

```
GET /api/v1/vpn-svc/ezvpn/servers/virtual-Template1

Accept: application/json
```

JSON Response

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

{       "kind": "object#ezvpn-server",
        "ip-version":"ipv4",
        "vpn-type": "ezvpn",
        "vpn-interface-name": "Virtual-Template11",
        "ipsec-policy-id": "profile101",
        "ike-profile-id": "ezvpn",
        "local-device":
        {
          "ip-address" : "loopback0",
          "tunnel-ip-address": "gigabitethernet1"
        }
}
```

Delete EzVPN Server Interface

Example

JSON Request

```
DELETE /api/v1/vpn-svc/ezvpn/servers/Virtual-Template1
```

JSON Response

```
204 No Content
```

LISP

Introduction to LISP

Locator ID Separation Protocol (LISP) is a network architecture and protocol that implements the use of two namespaces instead of a single IP address:

- Endpoint identifiers (EIDs)—Assigned to end hosts
- Routing locators (RLOCs)—Assigned to devices (primarily routers) that make up the global routing system

Splitting EID and RLOC functions provides several advantages, including improved routing system scalability, and improved multi-homing efficiency and ingress traffic engineering.

Required Configuration of LISP Devices

LISP functionality requires LISP-specific configuration of one or more LISP-related devices, such as the LISP egress tunnel router (ETR), ingress tunnel router (ITR), proxy ETR (PETR), proxy ITR (PITR), map resolver (MR), map server (MS), and LISP alternative logical topology (ALT) device.

Modes

There are different modes in which the device can be configured to support the LISP feature. Different modes support different configurations.

LISP modes:

- xTr mode
  - LISP Egress Tunnel Router (ETR)
  - LISP Ingress Tunnel Router (ITR)
- Proxy xTR mode
  - LISP Egress Tunnel Router (ETR)
  - LISP Ingress Tunnel Router (ITR)
- LISP Map Server/Map Resolver
  - Shared Model
  - Parallel Model
- VPN mode
- Mobility mode
  - First Hop Router mode
  - Site Gateway mode
  - xTr mobile

For additional information about the various modes above, and LISP in general, please refer to: http://www.cisco.com/c/en/us/td/docs/ios-xml/ios/iproute_lisp/configuration/xe-3s/asr1000/irl-xe-3s-asr1000-book/irl-overview.html#GUID-CD1B3F3E-99E2-4383-A558-714700A6427F

Resource Summary for LISP

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
LISP	/api/v1/routing-svc/lisp/	Y	Y	N	N
	/api/v1/routing-svc/lisp/<lisp-id>	Y	N	Y	Y
	/api/v1/vrf/<vrf-name>/routing-svc/lisp/	Y	Y	N	N
	/api/v1/vrf/<vrf-name>/routing-svc/lisp/<lisp-id>	Y	N	Y	Y
	/api/v1/routing-svc/lisp/<lisp-id>/site	Y	Y	N	N
	/api/v1/routing-svc/lisp/<lisp-id>/site/<site-name>	Y	N	Y	Y

LISP Resource: xTr Mode

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for xTr Mode

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object Type:" object#lisp"
lisp-id	number	Optional	Unique identifier for the LISP configuration. Range: 0 to 65520
database-mapping	array	Mandatory	Array of mapping between EIDs and RLOCs with priority and weight for each
instance-id	number	Optional	Specifies the instance ID to be associated with this EID table. Range: 0 to 16777215
eid-prefix	string	Mandatory	IP address (IPv4 or IPv6) for EID Format: "IP/subnet-length"
rloc-interface-name	string	Optional	RLOC identifier Valid ETR interface name (IPv4 or IPv6)
rloc-interface-address	string	Optional	RLOC identifier Valid ETR interface address (IPv4 or IPv6)
priority	number	Mandatory	Specifies the priority assigned to the RLOC Range: 0 to 255
weight	number	Mandatory	Specifies the weight assigned to the locator Range: 0 to 100
At least one of the following properties must be configured: ipv4-itr, ipv4-etr, ipv4-itr-map-resolver, ipv4-itr-map-server, ipv6-itr, ipv6-etr, ipv6-itr-map-resolver, ipv6-itr-map-server			
ipv4-itr	boolean	Optional	Specifies whether the router will operate in ITR mode for IPv4

Property	Type	Required for POST and PUT	Description
ipv4-etr	boolean	Optional	Specifies whether the router will operate in ETR mode for IPv4
ipv4-itr-map-resolver	array	Optional	Comma-separated list of IP addresses to be used as map-resolvers for ITR mode. Can include up to 2 map resolvers per type of IP address.
ipv4-etr-map-server-address	array	Optional	Comma-separated list of IP addresses to be used as map-servers for ETR mode. Can include up to 2 map servers per type of IP address.
ipv4-etr-map-server-key	array	Optional	Comma-separated list of keys to be used with map-resolvers. One key allowed per map-resolver configuration.
ipv6-itr	boolean	Optional	Specifies whether the router will operate in ITR mode for IPv6
ipv6-etr	boolean	Optional	Specifies whether the router will operate in ETR mode for IPv6
ipv6-itr-map-resolver	array	Optional	Comma-separated list of IP addresses to be used as map-resolvers for ITR mode. Can include up to 2 map resolvers per type of IP address.
ipv6-etr-map-server-address	array	Optional	Comma-separated list of IP addresses to be used as map-servers for ETR mode. Can include up to 2 map-servers per type of IP address.
ipv6-etr-map-server-key	array	Optional	Comma separated list of keys to be used with map-resolvers. One key allowed per map-resolver configuration.

JSON Representation: xTr Mode

```
{
  "kind": "object#lisp",
  "lisp-id": {number},
  "xtr":
  {
    "database-mapping": [
       {
            "eid-prefix": {string},
            "rloc-interface-address": {string},
            "rloc-interface-name": {string},
            "priority": {number},
            "weight": {number}
       }
    ],
    "instance-id": {number}
    "ipv4-itr": {boolean},
    "ipv4-etr": {boolean},
    "ipv4-itr-map-resolver": [{string}],
    "ipv4-etr-map-server": [
                 {
                 "address":{string}
                 "key": {String}
                 }
    ],
    "ipv6-itr": {boolean},
    "ipv6-etr": {boolean},
    "ipv6-itr-map-resolver": [{string}],
    "ipv6-etr-map-server": [
              {
              "address":{string}
              "key": {String}
              }
    ]
  }
}
```

Retrieve All the LISP Configurations

Resource URI

Verb	URI
GET	/api/v1/routing-svc/lisp

Example

JSON Request

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

JSON Response

```
200 OK
Content-Type: application/json
{
"kind": "collection#lisp",
"items": [

"lisp-id": 0,
"xtr":
    {

      "database-mapping":
      [
        {
          "eid-prefix": "10.0.0.1/32",
          "rloc-interface-name": "GigabitEthernet1",
          "priority": 1,
          "weight": 1
        }
      ],
      "ipv4-itr": true,
      "ipv4-etr": true,
      "ipv4-itr-map-resolver" : [{"20.0.0.1"}, {"30.0.0.1"}],
      "ipv4-etr-map-server:
        [
          {
            "address" : {"1.2.3.4"},
            "key-type" : 0,
            "key"    : "cisco"
          }
        ]
    }
}
```

Create a LISP Configuration: xTr Mode

Resource URI

Verb	URI
POST	/api/v1/routing-svc/lisp

Example

JSON Request

```
POST /api/v1/routing-svc/lisp/
Content-Type: application/json

{
  "lisp-id": 0,
  "xtr":
  {
  "database-mapping": [
       {
         "eid-prefix": "10.0.0.1/32",
         "rloc-interface-address": "10.0.0.10",
         "priority": 1,
         "weight": 1
       }
   ],
   "ipv4-itr": true,
   "ipv4-etr": true,
   "ipv4-itr-map-resolver": [{"20.0.0.1"}, {"30.0.0.1"}],
   "ipv4-etr-map-server:[
        {
          "address": {"1.2.3.4"},
          "key-type": 0,
          "key": "cisco"
        }
    ]
    "ipv6-itr": false,
    "ipv6-etr": true,
    "ipv6-itr-map-resolver": [{"20.0.0.1"}],
    "ipv6-etr-map-server:[
        {
          "address": {"1.2.3.4"},
          "key-type": 0,
          "key": "cisco"
        }
    ]
  }
}
```

JSON Response

```
201 Created
Location: https://host//api/v1/routing-svc/lisp/0
```

Retrieve a LISP Configuration: xTr Mode

Resource URI

Verb	URI
GET	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
GET /api/v1/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "database-mapping": [
    {
      "eid-prefix": "10.0.0.1/32",
      "rloc-interface-address": "10.0.0.10",
      "priority": 1,
      "weight": 1
    }
  ],
  "ipv4-itr": true,
  "ipv4-etr": true,
  "ipv4-itr-map-resolver": [{"20.0.0.1"}, {"30.0.0.1"}],
  "ipv4-etr-map-server:[
      {
        "address": {"1.2.3.4"},
        "key-type": 0,
        "key": "cisco"
      }
    ],
  "ipv6-itr": false,
  "ipv6-etr": true,
  "ipv6-itr-map-resolver": [{"20.0.0.1"}],
  "ipv6-etr-map-server:[
      {
        "address": {"1.2.3.4"},
        "key-type": 0,
        "key": "cisco"
      }
    ]
}
```

Modify a LISP Configuration: xTr Mode

Resource URI

Verb	URI
PUT	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
PUT /api/v1/routing-svc/lisp/0
Content-Type: application/json

{
  "xtr":
  {
    "database-mapping": [
       {
         "eid-prefix": "10.0.0.1/32",
         "rloc-interface-address": "10.0.0.10",
         "priority": 1,
         "weight": 1
       }
      ],
    "ipv4-itr": true,
    "ipv4-etr": true,
    "ipv4-itr-map-resolver": [{"20.0.0.1"}, {"30.0.0.1"}],
    "ipv4-etr-map-server:[
        {
          "address": {"1.2.3.4"},
          "key-type": 0,
          "key": "cisco"
        }
      ]
  }
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: xTr Mode

Resource URI

Verb	URI
DELETE	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
DELETE /api/v1/routing-svc/lisp/lisp/0
```

JSON Response

```
204 No Content
```

LISP Resource: MS/MR Mode

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for MS/MR Mode

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object Type:" object#lisp"
lisp-id	number	Optional	Unique identifier for the LISP configuration. Range: 0 to 65520
model	string	Mandatory	Specifies "shared" or "parallel" model
site	array	Mandatory	Array that specifies the site configuration
site-name	string	Mandatory	Specifies the site-name
eid-prefix-ipv4	array of objects	Mandatory	Array specifying the IPv4 EID information
eid-prefix-ipv6	array of objects	Mandatory	Array specifying the IPv6 EID information
address	string	Optional	(sub-property of eid-prefix-ipv4 or eid-prefix-ipv6) IPv4/IPv6 address for the EID, with subnet length. Format: "ip/subnet-length"
instance-id	number	Optional	(sub-property of eid-prefix-ipv4 or eid-prefix-ipv6) Instance ID to be used with the IPv4/IPv6 EID
accept-more-specifics	boolean	Optional	(sub-property of eid-prefix-ipv4 or eid-prefix-ipv6) Specifies that any EID prefix that is more specific than the EID prefix configured is accepted and tracked
authentication-key-type	number	Optional	Authentication key type Default: 0
authentication-key	string	Optional	Authentication key

Property	Type	Required for POST and PUT	Description
ipv4-map-resolver	boolean	Optional	Specifies whether it is necessary to enable IPv4 map-resolver (MR) on the router
ipv4-map-server	boolean	Optional	Specifies whether it is necessary to enable IPv4 map-server (MS) on the router
ipv6-map-resolver	boolean	Optional	Specifies whether it is necessary to enable IPv6 map-resolver (MR) on the router
ipv6-map-server	boolean	Optional	Specifies whether it is necessary to enable IPv6 map-server (MS) on the router

JSON Representation: MS/MR Mode

```
{
  "kind": "object#lisp",
  "name": lisp-id": {number},
  "ms-mr":
  {
  "model": {string},
  "msmr":
   {
     "site":
       [
         {
           "site-name": {string},
           "eid-prefix-ipv4": [
             {
               "address": {string},
               "instance-id": {number},
               "accept-more-specifics": {boolean}
             }
           ]
           "eid-prefix-ipv6": [
              {
                "address": {string},
                "ipv4-subnet-length": {number},
                "ipv6-subnet-length": "instance-id": {number},
                "accept-more-specifics": {boolean}
              }
           ]
             "authentication-key-type": {number}
             "authentication-key": {string}
         }
       ],
    "ipv4-map-resolver": {boolean},
    "ipv4-map-server": {boolean},
    "ipv6-map-resolver": {boolean},
    "ipv6-map-server": {boolean},
   }
}
```

Create a LISP Configuration: MS/MR Mode

Resource URI

Verb	URI
POST	/api/v1/routing-svc/lisp

Example

JSON Request

```
POST /api/v1/routing-svc/lisp/
Content-Type: application/json

{
  "lisp-id": 0,
  "msmr":
  {
    "model": "shared",
    "site": [
     {
         "site-name": "abc",
       "eid-prefix-ipv4": [
          {
            "address": "172.16.1.0/24",
          }
       ],
       "eid-prefix-ipv6": [
         {
           "address": "2001:db8:a::/48",
         }
       ],
       "authentication-key": "cisco"
     }
       ],
       "ipv4-map-resolver": true,
       "ipv4-map-server": true,
       "ipv6-map-resolver": true,
       "ipv6-map-server": true,
  }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/routing-svc/lisp/lisp0
```

Retrieve a LISP Configuration: MS/MR Mode

Resource URI

Verb	URI
GET	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
GET /api/v1/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "ms-mr":
    {
      "model": "shared",
      "site": [
        {
          "site-name": "abc",
          "eid-prefix-ipv4": [
            {
              "address": "172.16.1.0/24
            }
          ],
          "eid-prefix-ipv6": [
            {
              "address": "2001:db8:a::/48
            }
          ],
          "authentication-key": "cisco"
        }
      ],
    "ipv4-map-resolver": true,
    "ipv4-map-server": true,
    "ipv6-map-resolver": true,
    "ipv6-map-server": true,
  }
}
```

Modify a LISP Configuration: MS/MR Mode

Resource URI

Verb	URI
PUT	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
PUT /api/v1/routing-svc/lisp/0
Content-Type: application/json
{
  "msmr":
  {
    "model": "parallel",
    "site": [
       {
         "site-name": "abc",
         "eid-prefix-ipv4": [
            {
              "address": "172.16.1.0/24",
              "instance-id": 101
            }
            "eid-prefix-ipv6": [
              {
                "address": "2001:db8:a::/48",
                "instance-id": 102
              }
           "authentication-key": "cisco123"
       }
         ],
       "ipv4-map-resolver": true,
       "ipv4-map-server": true,
       "ipv6-map-resolver": true,
       "ipv6-map-server": true,
  }
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: MS/MR Mode

Resource URI

Verb	URI
DELETE	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
DELETE /api/v1/routing-svc/lisp/0
```

JSON Response

```
204 No Content
```

Create a LISP Configuration: MS/MR Mode, VRF-Aware

Resource URI

Verb	URI
POST	/api/v1/vrf/<VRF-name>/routing-svc/lisp

Example

JSON Request

```
POST /api/v1/vrf/BLUE/routing-svc/lisp
Content-Type: application/json

{
  "lisp-id": 0,
  "msmr":
  {
    "model": "shared",
    "site": [
      {
        "site-name": "abc",
        "eid-prefix-ipv4": [
           {
             "address": "172.16.1.0/24",
           }
         ],
          "eid-prefix-ipv6": [
              {
                "address": "2001:db8:a::/48",
              }
          ],
          "authentication-key": "cisco"
      }
    ],
    "ipv4-map-resolver": true,
    "ipv4-map-server": true,
    "ipv6-map-resolver": true,
    "ipv6-map-server": true,
  }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/routing-svc/lisp/0
```

Retrieve a LISP Configuration: MS/MR Mode, VRF-Aware

Resource URI

Verb	URI
GET	/api/v1/vrf/<VRF-name>/routing-svc/lisp

Example

JSON Request

```
GET /api/v1/vrf/BLUE/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "ms-mr":
  {
    "model": "shared",
    "site": [
       {
         "site-name": "abc",
         "eid-prefix-ipv4": [
           {
             "address": "172.16.1.0/24",
           }
         ],
         "eid-prefix-ipv6": [
           {
             "address": "2001:db8:a::/48",
           }
         ],
         "authentication-key": "cisco"
       }
    ],
    "ipv4-map-resolver": true,
    "ipv4-map-server": true,
    "ipv6-map-resolver": true,
    "ipv6-map-server": true,
  }
}
```

Modify a LISP Configuration: MS/MR Mode, VRF-Aware

Resource URI

Verb	URI
PUT	/api/v1/vrf/<VRF-name>/routing-svc/lisp/<name>

Example

JSON Request

```
PUT /api/v1/vrf/BLUE/routing-svc/lisp/0
Content-Type: application/json

{
  "msmr":
  {
    "model": "shared",
    "site": [
        {
          "site-name": "abc",
          "eid-prefix-ipv4": [
           {
             "address": "172.16.1.0/24",
           }
          ],
          "eid-prefix-ipv6": [
           {
             "address": "2001:db8:a::/48",
           }
           ],
           "authentication-key": "cisco"
        }
     ],
    "ipv4-map-resolver": true,
    "ipv4-map-server": true,
    "ipv6-map-resolver": true,
    "ipv6-map-server": true,
  }
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: MS/MR Mode, VRF-Aware

Resource URI

Verb	URI
DELETE	/api/v1/vrf/<VRF-name>/lisp/<name>

Example

JSON Request

```
DELETE /api/v1/vrf/BLUE/routing-svc/lisp/0
```

JSON Response

```
204 No Content
```

LISP Resource—Mobility Mode: First Hop Router/Site Gateway/ xTr-Mobile Mode

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for FHR/Site Gateway/ xTr - Mobile Mode

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object Type:" object#lisp"
lisp-id	number	Optional	Unique identifier for the LISP configuration. Range: 0 to 65520
locator-set-name	array	Mandatory	Array that specifies the locator set information
ip-address	string	Mandatory	Address that the FHR uses to communicate with the site gateway xTr
priority	number	Mandatory	Specifies the priority assigned to the RLOC Range: 0 to 255
weight	number	Mandatory	Specifies the weight assigned to the locator Range: 0 to 255
eid-table-instance-id	number	Mandatory	Specifies the instance ID to be associated with this EID table Range: 0 to 16777215
eid-table-database-mapping	array	Optional	Configures an IPv4 EID-to-RLOC mapping relationship and an associated traffic policy for LISP
eid-prefix	string	Optional	(subproperty of eid-table-database-mapping) IPv4 or IPv6 EID prefix and length to be advertised by the router
locator-set	string	Optional	(subproperty of eid-table-database-mapping) Specifies the IPv4 routing locator (RLOC) associated with the EID prefix

Property	Type	Required for POST and PUT	Description
dynamic-eid-name	string	Optional	Name of a LISP dynamic-EID
dynamic-eid-notify-auth-key	string	Optional	Enables sending of dynamic endpoint identifier (EID) presence notifications to a gateway xTR with the specified IPv4 address along with the authentication key used with the gateway xTR
dynamic-eid-notify-group	string	Optional	Specifies the IPv4 multicast group address used for sending and receiving site-based map-notify multicast messages
dynamic-eid-database-mapping	array	Optional	Configures an IPv4 mapping relationship and an associated traffic policy for LISP VM-mobility dynamic EID policy
ipv4-itr	boolean	Optional	Specifies whether the router needs to operate in ITR mode for IPv4
ipv4-etr	boolean	Optional	Specifies whether the router needs to operate in ETR mode for IPv4
ipv4-itr-map-resolver	array	Optional	Comma-separated list of IP addresses to be used as map-resolvers. Can include up to 2 map resolvers per type of IP address.
ipv4-etr-map-server-address	array	Optional	Comma-separated list of IP addresses to be used as map-servers. Can include up to 2 map-servers per type of IP address.
ipv4-etr-map-server-key	array	Optional	Comma-separated list of keys to be used with map-resolvers. One key allowed per MS configuration.
ipv4-use-petr	string	Optional	PETR address to use
ipv6-itr	boolean	Optional	Specifies whether the router needs to operate in ITR mode for IPv6
ipv6-etr	boolean	Optional	Specifies whether the router needs to operate in ETR mode for IPv6
ipv6-itr-map-resolver	array	Optional	Comma-separated list of IP addresses to be used as map-resolvers. Can include up to 2 MRs per type of IP address.
ipv6-etr-map-server-address	array	Optional	Comma-separated list of IP addresses to be used as map-servers. Can include up to 2 map-servers per type of IP address.

Property	Type	Required for POST and PUT	Description
ipv6-etr-map-server-key	array	Optional	Comma-separated list of keys to be used with map-resolvers. One key allowed per MS configuration.
ipv4-use-petr	string	Optional	PETR address to use

JSON Representation

```
{
  "kind": "object#lisp",
  "lisp-id": {number},
  "mobility":
  {
    "locator-set": [
      {
        "name": {string},
        "address": [
          {
            "ip-address": {string},
            "priority": {number},
            "weight": {number}
          }
        ]
      }
    ],
    "eid-table-instance-id": {number},
    "eid-table-database-mapping": [
       {
         "eid-prefix": {string},
         "locator-set": {string}
       }
    ],
    "dynamic-eid-name": {string},
    "dynamic-eid-notify-auth-key": {string},
    "dynamic-eid-database-mapping": [
      {
        "eid-prefix": {string},
        "locator-set": {string}
      }
     ],
    "ipv4-itr": {boolean},
    "ipv4-etr": {boolean},
    "ipv4-itr-map-resolver": [{string}],
    "ipv4-etr-map-server": [
      {
        "address":{string}
        "key": {String}
      }
    ],
    "ipv6-itr": {boolean},
    "ipv6-etr": {boolean},
    "ipv6-itr-map-resolver": [{string}],
    "ipv6-etr-map-server": [
      {
        "address":{string}
        "key": {String}
      }
    ]
    "ipv4-use-petr": {string},
    "ipv6-use-petr": {string}
  }
}
```

Create a LISP Configuration: FHR/Site Gateway/ xTr-Mobile Mode

Resource URI

Verb	URI
POST	/api/v1/routing-svc/lisp

Example

JSON Request

```
POST /api/v1/routing-svc/lisp/
Content-Type: application/json

{
  "lisp-id": 0,
  "mobility":
  {
    "locator-set": [
    {
      "ABC": [
        "ip-address": "192.168.6.6",
        "priority": 1,
        "weight": 100
      ]
    },
    {
      "DC1": [
        "ip-address: "172.25.210.1"
        "priority": 1
        "weight": 100
      ]
    }
    ],
    "eid-table-instance-id": 101,
    "dynamic-eid-name": "LISP1",
    "dynamic-eid-notify-authentication-key":    "cisco",
    "dynamic-eid-map-notify-group":    "239.0.0.1",
    "dynamic-eid-database-mapping": [
    {
      "eid-prefix": "10.0.0.5/32",
      "locator-set": "DC1"
    }
    ],
    "ipv4-itr": True,
    "ipv4-etr": True,
    "ipv4-itr-map-resolver": [{"10.0.0.1"}]
  }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/routing-svc/lisp/0
```

Retrieve a LISP Configuration: FHR/Site Gateway/ xTr-Mobile Mode

Resource URI

Verb	URI
GET	/api/v1/routing-svc/lisp/{name}

Example

JSON Request

```
GET /api/v1/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "mobility":
  {
    "locator-set": [
      {
        "ABC": [
        "ip-address": "192.168.6.6",
        "priority": 1,
        "weight": 100
        ]
      },
    {
      "DC1": [
        "ip-address: "172.25.210.1"
        "priority": 1
        "weight": 100
      ]
    }
    ],
    "eid-table-instance-id": 101,
    "dynamic-eid-name": "VMs"
    "dynamic-eid-notify-auth-key":    "cisco",
    "dynamic-eid-database-mapping": [
      {
        "eid-prefix": "10.0.0.5/32",
        "locator-set": "DC1"
      }
    ]
    "ipv4-itr": True,
    "ipv4-etr": True,
    "ipv4-itr-map-resolver": [{"10.0.0.1"}]
  }
}
```

Modify a LISP Configuration: FHR/Site Gateway/ xTr-Mobile Mode

Resource URI

Verb	URI
PUT	/api/v1/routing-svc/lisp/{name}

Example

JSON Request

```
PUT /api/v1/routing-svc/lisp/0
Content-Type: application/json
{
  "mobility":
    {
      "locator-set": [
        {
          "ABC": [
          "ip-address": "192.168.6.6",
          "priority": 1,
          "weight": 100
      ]
        },
      {
        "DC1": [
          "ip-address: "172.25.210.1"
          "priority": 1
          "weight": 100
        ]
      }
      ],
      "eid-table-instance-id": 101,
      "dynamic-eid-name": "VMs"
      "dynamic-eid-notify-auth-key":    "cisco",
      "dynamic-eid-database-mapping": [
      {
        "eid-prefix": "10.0.0.5/32",
        "locator-set": "DC1"
      }
      ]
  }
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: FHR/Site Gateway/ xTr-Mobile Mode

Resource URI

Verb	URI
DELETE	/api/v1/routing-svc/lisp/{name}

Example

JSON Request

```
DELETE /api/v1/routing-svc/lisp/0
```

JSON Response

```
204 No Content
```

LISP Resource: PxTr Mode

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for PxTr Mode

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object Type:" object#lisp"
lisp-id	number	Optional	Unique identifier for the LISP configuration. Range: 0 to 65520
At least one of the following properties must be configured for PxTr mode: ipv4 proxy-itr, ipv4-proxy-etr, ipv4-alt-vrf, ipv4-map-cache-limit, ipv6 proxy-itr, ipv6-proxy-etr, ipv6-alt-vrf, ipv6-map-cache-limit			
ipv4-proxy-etr	boolean	Optional	Specifies whether it is necessary to configure the router as IPv4 PETR
ipv6-proxy-etr	boolean	Optional	Specifies whether it is necessary to configure it as IPv6 PETR

Property	Type	Required for POST and PUT	Description
ipv4-proxy-itr	boolean	Optional	Specifies whether it is necessary to configure the router as IPv4 PITR
ipv6-proxy-itr	boolean	Optional	Specifies whether it is necessary to configure the router as ipv6 PITR
ipv4-proxy-itr-address-ipv4	string	Optional	IPv4 address to configure the router as IPv4 PITR
ipv4-proxy-itr-address-ipv6	string	Optional	IPv6 address to configure the router as IPv4 PITR
ipv4-alt-vrf	string	Optional	Specifies the VRF for the IPv4 LISP ALT To configure which VRF instance supporting the IPv4 address-family LISP should use when sending map requests for an IPv4 endpoint identifier-to-routing locator mapping directly over the ALT
ipv4-map-cache-limit	number	Optional	Specifies the number of entries Default: 1000
ipv6-proxy-itr-address	array	Optional	Comma-separated list of IP addresses to configure the router as IPv6 PITR
ipv6-proxy-itr-address-ipv6	string	Optional	IPv6 address to configure the router as IPv6 PITR
ipv6-alt-vrf	string	Optional	Specifies the VRF for the IPv6 LISP ALT
ipv6-map-cache-limit	number	Optional	Specifies the number of entries Default: 10000

JSON Representation: PxTr Mode

```
{
  "kind": "object#lisp",
  "lisp-id": {number},
  "pxtr":
  {
    "ipv4-proxy-etr": {boolean},
    "ipv6-proxy-etr": {boolean},
    "ipv4-proxy-itr": {boolean},
    "ipv6-proxy-itr": {boolean},
    "ipv4-proxy-itr-address-ipv4": [{string}],
    "ipv4-proxy-itr-address-ipv6": [{string}],
    "ipv4-alt-vrf": {string},
    "ipv4-map-cache-limit": {number},
    "ipv6-proxy-itr-address": [{string}],
    "ipv4-proxy-itr-address-ipv6": [{string}],
    "ipv6-alt-vrf": {string},
    "ipv6-map-cache-limit": {number},
  }
}
```

Create a LISP Configuration: PxTr Mode

Resource URI

Verb	URI
POST	/api/v1/routing-svc/lisp/

Example

JSON Request

```
POST /api/v1/routing-svc/lisp
Content-Type: application/json
{
  "lisp-id": 0,
  "pxtr":
  {
    "ipv4-proxy-etr": true,
    "ipv6-proxy-etr": true,
    "ipv4-proxy-itr": true,
    "ipv6-proxy-itr": true,
    "ipv4-proxy-itr-address-ipv4": {"10.0.0.2"},
    "ipv4-map-cache-limit": 10000,
    "ipv6-proxy-itr-address-ipv4": {"10.0.0.2"},
    "ipv6-map-cache-limit": 20000
  }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/routing-svc/lisp/0
```

Retrieve a LISP Configuration: PxTr Mode

Resource URI

Verb	URI
GET	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
GET /api/v1/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "pxtr":
  {
    "ipv4-proxy-itr": true,
    "ipv6-proxy-itr": true,
    "ipv4-proxy-itr-address-ipv4": {"10.0.0.1"},
    "ipv4-map-cache-limit": 10000,
    "ipv6-proxy-itr-address-ipv4": {"10.0.0.1"},
    "ipv6-map-cache-limit": 20000
  }
}
```

Modify a LISP Configuration: PxTr Mode

Resource URI

Verb	URI
PUT	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
PUT /api/v1/routing-svc/lisp/0
Content-Type: application/json

pxtr:
{
  "ipv4-proxy-itr": true,
  "ipv6-proxy-itr": true,
  "ipv4-proxy-itr-address": {"10.0.0.1"},
  "ipv4-map-cache-limit": 2000,
  "ipv6-proxy-itr-address": {"10.0.0.1"},
  "ipv6-map-cache-limit": 1000
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: PxTr Mode

Resource URI

Verb	URI
DELETE	/api/v1/routing-svc/lisp/<name>

Example

JSON Request

```
DELETE /api/v1/routing-svc/lisp/0
```

JSON Response

```
204 No Content
```

Create a LISP Configuration: PxTr Mode, VRF-Aware

Resource URI

Verb	URI
POST	/api/v1/routing-svc/lisp/

Example

JSON Request

```
POST /api/v1/vrf/BLUE/routing-svc/lisp
Content-Type: application/json
{
  "name": "0",
  "pxtr":
  {
    "name": 0,
    "ipv4-proxy-etr": true,
    "ipv6-proxy-etr": true,
    "ipv4-proxy-itr": true,
    "ipv6-proxy-itr": true,
    "ipv4-alt-vrf": "BLUE"
    "ipv4-proxy-itr-address-ipv4": {"10.0.0.2"},
    "ipv4-map-cache-limit": 10000,
    "ipv6-proxy-itr-address-ipv4": {"10.0.0.2"},
    "ipv6-map-cache-limit": 20000
  }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/routing-svc/lisp/0
```

Retrieve All LISP Configurations: PxTr Mode, VRF-Aware

Resource URI

Verb	URI
GET	/api/v1/vrf/<vrf-name>/routing-svc/lisp

Example

JSON Request

```
GET /api/v1/vrf/BLUE/routing-svc/lisp
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "name": "0",
  "pxtr":
  {
    "ipv4-proxy-itr": true,
    "ipv6-proxy-itr": true,
    "ipv4-proxy-itr-address-ipv4": {"10.0.0.1"},
    "ipv4-alt-vrf": "BLUE"
    "ipv4-map-cache-limit": 10000,
    "ipv6-proxy-itr-address-ipv4": {"10.0.0.1"},
    "ipv6-map-cache-limit": 20000
  }
}
```

Retrieve LISP Configuration: PxTr Mode, VRF-Aware

Resource URI

Verb	URI
GET	/api/v1/vrf/<vrf-name>/routing-svc/lisp/{name}

Example

JSON Request

```
GET /api/v1/vrf/BLUE/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "pxtr":
  {
    "ipv4-proxy-itr": true,
    "ipv6-proxy-itr": true,
    "ipv4-proxy-itr-address-ipv4": {"10.0.0.1"},
    "ipv4-alt-vrf": "BLUE"
    "ipv4-map-cache-limit": 10000,
    "ipv6-proxy-itr-address-ipv4": {"10.0.0.1"},
    "ipv6-map-cache-limit": 20000
  }
}
```

Modify a LISP Configuration: PxTr Mode, VRF-Aware

Resource URI

Verb	URI
PUT	/api/v1/vrf/<vrf-name>/routing-svc/lisp/{name}

Example

JSON Request

```
PUT /api/v1/vrf/BLUE/routing-svc/lisp/0
Content-Type: application/json

pxtr:
{
  "ipv4-proxy-itr": true,
  "ipv6-proxy-itr": true,
  "ipv4-proxy-itr-address": {"10.0.0.1"},
  "ipv4-map-cache-limit": 2000,
  "ipv4-alt-vrf": "BLUE"
  "ipv6-proxy-itr-address": {"10.0.0.1"},
  "ipv6-map-cache-limit": 1000
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: PxTr Mode, VRF-Aware

Resource URI

Verb	URI
DELETE	/api/v1/vrf/<vrf-name>/routing-svc/lisp/{name}

Example

JSON Request

```
DELETE /api/v1/vrf/BLUE/routing-svc/lisp/0
```

JSON Response

```
204 No Content
```

LISP Resource: VPN Parallel Mode

VPN parallel mode shares the same properties and JSON representation as in xTr mode. When creating or retrieving the LISP resource, the VRF instance is included in the URL.

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for VPN Parallel Mode

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object Type:" object#lisp"
lisp-id	number	Optional	Unique identifier for the LISP configuration. Range: 0 to 65520
database-mapping	array	Mandatory	Array of mapping between EIDs and RLOCs with priority and weight for each
instance-id	number	Optional	Specifies the instance ID to be associated with this EID table. Range: 0 to 16777215

Property	Type	Required for POST and PUT	Description
eid-prefix	string	Mandatory	IP address (IPv4 or IPv6) for EID Format: "IP/subnet-length"
rloc-interface-name	string	Optional	RLOC identifier Valid ETR interface name (IPv4 or IPv6)
rloc-interface-address	string	Optional	RLOC identifier Valid ETR interface address (IPv4 or IPv6)
priority	number	Mandatory	Specifies the priority assigned to the RLOC Range: 0 to 255
weight	number	Mandatory	Specifies the weight assigned to the locator Range: 0 to 100
At least one of the following properties must be configured: ipv4-itr, ipv4-etr, ipv4-itr-map-resolver, ipv4-itr-map-server, ipv6-itr, ipv6-etr, ipv6-itr-map-resolver, ipv6-itr-map-server			
ipv4-itr	boolean	Optional	Specifies whether the router will operate in ITR mode for IPv4
ipv4-etr	boolean	Optional	Specifies whether the router will operate in ETR mode for IPv4
ipv4-itr-map-resolver	array	Optional	Comma-separated list of IP addresses to be used as map-resolvers for ITR mode. Can include up to 2 map resolvers per type of IP address.
ipv4-etr-map-server-address	array	Optional	Comma-separated list of IP addresses to be used as map-servers for ETR mode. Can include up to 2 map servers per type of IP address.
ipv4-etr-map-server-key	array	Optional	Comma-separated list of keys to be used with map-resolvers. One key allowed per map-resolver configuration.
ipv6-itr	boolean	Optional	Specifies whether the router will operate in ITR mode for IPv6
ipv6-etr	boolean	Optional	Specifies whether the router will operate in ETR mode for IPv6
ipv6-itr-map-resolver	array	Optional	Comma-separated list of IP addresses to be used as map-resolvers for ITR mode. Can include up to 2 map resolvers per type of IP address.

Property	Type	Required for POST and PUT	Description
ipv6-etr-map-server-address	array	Optional	Comma-separated list of IP addresses to be used as map-servers for ETR mode. Can include up to 2 map-servers per type of IP address.
ipv6-etr-map-server-key	array	Optional	Comma separated list of keys to be used with map-resolvers. One key allowed per map-resolver configuration.

JSON Representation: VPN Parallel Mode

```
{
  "kind": "object#lisp",
  "lisp-id": {number},
  "xtr":
  {
    "database-mapping": [
       {
            "eid-prefix": {string},
            "rloc-interface-address": {string},
            "rloc-interface-name": {string},
            "priority": {number},
            "weight": {number}
       }
    ],
    "instance-id": {number}
    "ipv4-itr": {boolean},
    "ipv4-etr": {boolean},
    "ipv4-itr-map-resolver": [{string}],
    "ipv4-etr-map-server": [
                  {
                  "address":{string}
                  "key": {String}
                  }
    ],
    "ipv6-itr": {boolean},
    "ipv6-etr": {boolean},
    "ipv6-itr-map-resolver": [{string}],
    "ipv6-etr-map-server": [
              {
              "address":{string}
              "key": {String}
              }
    ]
  }
}
```

Create a LISP Configuration: VPN Parallel Mode

Resource URI

Verb	URI
POST	/api/v1/vrf/{vrf-name}/routing-svc/lisp

Example

JSON Request

```
POST /api/v1/vrf/BLUE/routing-svc/lisp
Content-Type: application/json
{
  "lisp-id": 0,
  "xtr":
  {
    "database-mapping": [
      {
        "eid-prefix": "10.0.0.1/30",
        "rloc-interface-address": "10.0.0.10",
        "priority": 1,
        "weight": 1
      }
    ],
    "instance-id": 101,
    "ipv4-itr": true,
    "ipv4-etr": true,
    "ipv4-itr-map-resolver": [{"20.0.0.1"}, {"30.0.0.1"}],
    "ipv4-etr-map-server:[
      {
        "address": {"1.2.3.4"},
        "key-type": 0,
        "key": "cisco"
      }
    ]
    "ipv6-itr": false,
    "ipv6-etr": true,
    "ipv6-itr-map-resolver": [{"20.0.0.1"}],
    "ipv6-etr-map-server:[
      {
        "address": {"1.2.3.4"},
        "key-type": 0,
        "key": "cisco"
      }
    ]
  }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/routing-svc/lisp/0
```

Retrieve a LISP Configuration: VPN Parallel Mode

Resource URI

Verb	URI
GET	/api/v1/vrf/{vrf-name}/routing-svc/lisp/{name}

Example

JSON Request

```
GET /api/v1/vrf/BLUE/routing-svc/lisp/0
Accept-Type: application/json
```

JSON Response

```
200 OK
{
  "kind": "object#lisp",
  "xtr":
  {
    "database-mapping": [
      {
        "eid-prefix": "10.0.0.1/30",
        "rloc-interface-address": "10.0.0.10",
        "priority": 1,
        "weight": 1
      }
    ],
    "instance-id": 101,
    "ipv4-itr": true,
    "ipv4-etr": true,
    "ipv4-itr-map-resolver": [{"20.0.0.1"}, {"30.0.0.1"}],
    "ipv4-etr-map-server:[
      {
        "address": {"1.2.3.4"},
        "key-type": 0,
        "key": "cisco"
      }
    ]
    "ipv6-itr": false,
    "ipv6-etr": true,
    "ipv6-itr-map-resolver": [{"20.0.0.1"}],
    "ipv6-etr-map-server:[
      {
        "address": {"1.2.3.4"},
        "key-type": 0,
        "key": "cisco"
      }
    ]
  }
}
```

Modify a LISP Configuration: VPN Parallel Mode

Resource URI

Verb	URI
PUT	/api/v1/vrf/{vrf-name}/routing-svc/lisp/{name}

Example

JSON Request

```
PUT /api/v1/vrf/BLUE/lisp/0
Content-Type: application/json
{
  "xtr":
    {
      "database-mapping": [
        {
          "eid-prefix": "10.0.0.1/30",
          "rloc-interface-address": "10.0.0.10",
          "priority": 1,
          "weight": 1
        }
      ],
      "instance-id": 100,
      "ipv4-itr": true,
      "ipv4-etr": true,
      "ipv4-itr-map-resolver": [{"20.0.0.1"}, {"30.0.0.1"}],
      "ipv4-etr-map-server:[
        {
          "address": {"1.2.3.4"},
          "key-type": 0,
          "key": "cisco"
        }
      ]
    }
}
```

JSON Response

```
204 No Content
```

Delete a LISP Configuration: VPN Parallel Mode

Resource URI

Verb	URI
DELETE	/api/v1/vrf/{vrf-name}/routing-svc/lisp/{name}

Example

JSON Request

```
DELETE /api/v1/vrf/BLUE/lisp/0
```

JSON Response

```
204 No Content
```

QoS

Introduction to QoS

Quality of Service (QoS) network tools improve service to selected network traffic by the following methods:

- Supporting dedicated bandwidth
- Improving loss characteristics
- Avoiding and managing network congestion
- Shaping network traffic
- Setting traffic priorities across the network

QOS configuration comprises defining a traffic class, creating a traffic policy, and attaching the traffic policy to an interface.

Policing and Shaping

QoS offers two kinds of traffic regulation mechanisms—policing and shaping. Packet classification tools enable partitioning network traffic into multiple priority levels or classes of service.

- Policing features limit the input or output transmission rate of a class of traffic based on user-defined criteria.
- Shaping features manage traffic and congestion on the network.

Hierarchical Policies

A hierarchical policy is a QoS model that enables specifying QoS behavior at multiple levels of hierarchy. Multiple policy maps can be configured to shape multiple queues together. For hierarchical policies, the service-policy command is used to attach:

- Child policies to child policies
- Child policies to parent policies
- Parent policies to interfaces, subinterfaces, and virtual circuits

A parent policy contains only the class-default class. It cannot contain any other classes.

There are numerous restrictions on parent and child policies. For more information, see: http://www.cisco.com/c/en/us/td/docs/routers/10000/10008/configuration/guides/qos/qoscf.pdf

Resource Summary for QoS

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
QoS: Traffic classes (class-maps)	/api/v1/qos/class-map	Y	Y	N	N
	/api/v1/qos/class-map/{class-map-name}	Y	N	Y	Y
QoS: Traffic policies (policy-maps)	/api/v1/qos/policy-map	Y	Y	N	N
	/api/v1/qos/policy-map/{policy-map-name}	Y	N	Y	Y

QoS Class Maps

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties for class-map

Property	Type	Required for POST and PUT	Description
kind	string	Not applicable	Object Type:" object#class-map"
cmap-name	string	mandatory	Name for the class
description	string	optional	Description of the class
match-type	string	optional	match-any/match-all (default is match-all)
match-criteria	object	mandatory	Object of protocol, dscp, or acl
protocol	List of strings	optional	(sub-property of match-criteria) Can specify multiple protocols together: ftp, http, ipv6, netbios, rtp, sftp, sip, skinny, snmp, telnet, sftp, udp

Property	Type	Required for POST and PUT	Description
dscp	List of objects	optional	(sub-property of match-criteria) Matching dscp field Possible values: af11, af12, af13, af21,af22, af23,af31, af32, af33, cs1, cs2, cs3, cs4, cs5, cs6, cs7, ef The "ip" sub-property is boolean.
acl	List of strings	optional	(sub-property of match-criteria) String defining access list

JSON Representation for Class Map

```
{
"kind":"object#class-map",
"match-type":{string},
"cmap-name":{string},
"description":{string},
"match-criteria":{
                    "protocol":[{string}] ,
                    "dscp":[{
                                "value":{string},
                                "ip":{boolean}
                             }
                            ],
                    "acl":[{string}]
                  }
}
```

Create a Class Map

Resource URI

Verb	URI
POST	/api/v1/qos/class-map

Example

JSON Request

```
POST /api/v1/qos/class-map
Content-Type: application/json

{
  "match-type":"match-any",
  "cmap-name":"qos-voice",
  "match-criteria":{
    "protocol":["rtp"],
    "dscp":[{"value":"af11"},{"value":"af21"}],
    "acl":["ac121"]
  }
}
```

JSON Response

```
201 Created
Location: https://host//api/v1/qos/class-map/qos-voice
```

Retrieve All Class Maps

Resource URI

Verb	URI
GET	/api/v1/qos/class-map

Example

JSON Request

```
GET /api/v1/qos/class-map
Accept: application/json
```

JSON Response

```
200 OK
Content-Type: application/json
[
  "kind":"collection# class-map",
  "items":[
            {
              "kind":"object#class-map",
              "match-type":"match-any",
              "cmap-name":"qos-voice",
              "description":"Voice",
              "match-criteria":{
                                  "protocol":["rtp"],
                                  "dscp":[{"value":"af11"},
                                  "acl":["acl1"]
                                }
            }
            {
              "kind":"object#class-map",
              "match-type":"match-all",
              "cmap-name":"qos-bulk",
              "match-criteria":{
                                  "protocol":["sftp"],
                                  "dscp":[{"ip":true,"value":"af11"}, {"value":"af21"}],
                                  "acl":["ac21"]
                                }
            }
          ]
]
```

Retrieve a Class Map

Resource URI

Verb	URI
GET	/api/v1/qos/class-map/{class-map-name}

Example

JSON Request

```
GET /api/v1/qos/class-map/qos-voice
Accept: application/json
```

JSON Response

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

{
"kind":"object#class-map",
"match-type":"match-any",
"cmap-name":"qos-voice",
"match-criteria":{
                    "protocol":["rtp"],
                    "dscp":[{"value":"af11"},{"value":"af21"}],
                    "acl":["ac121"]
                  }
}
```

Modify a Class Map

Resource URI

Verb	URI
PUT	/api/v1/qos/class-map/{class-map-name}

Example

JSON Request

```
PUT /api/v1/qos/class-map/qos-voice
Content-Type: application/json
{
  "match-type":"match-any",
  "match-criteria":{
                      "dscp":[{"value":"af21"}],
                    }
}
```

JSON Response

```
204 No Content
```

Delete a Class Map

Resource URI

Verb	URI
DELETE	/api/v1/qos/class-map/{class-map-name}

Example

JSON Request

```
DELETE /api/v1/qos/class-map/qos-voice
```

JSON Response

```
204 No Content
```

QoS Policy Map

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties: Configuring a Policy Map

Property	Type	Required for POST and PUT	Description
pmap-name	string	mandatory	Name for the policy-map
description	string	optional	Description of the policy
interface-list	List of objects	optional	Interface to attach the policy-map
direction	string	optional	(sub-property of interface-list) Assign a policy-map to the input or output of an interface. Possible values: "input" or "output"

Property	Type	Required for POST and PUT	Description
name	string	optional	(sub-property of interface-list) Name of the interface Supported interfaces: 'gigabitethernet', 'loopback', 'lisp', 'tunnel', 'virtual-template'
class-list	List of objects	mandatory	List of class-maps with names. For each class-map, can: • Configure dscp value or bandwidth • Configure shaping/policing • Set a pre-defined service policy as a sub-policy under the class-map Specifying a class that does not exist or a policy-name under the service-policy attribute that does not exist results in an error.

Properties: Configuring a Class Object under a Policy Map

Property	Type	Required for POST and PUT	Description
cmap-name	string	mandatory	Name of the pre-defined class
queue-limit	number	optional	Queue max threshold for tail drop
priority	object	optional	Strict scheduling priority for the class
enable	boolean	mandatory	(sub-property of priority) Prioritize the traffic
unit	string	optional	(sub-property of priority) Possible values: "percent", "kbps"
value	number	optional	(sub-property of priority) Range: 1 to 100% or 1 to 10000000 kbps
level	boolean	optional	(sub-property of priority) Enter level of Multi-Level Priority Queue
burst-bytes	number	optional	(sub-property of priority) Range: 32 to 2000000
set-dscp	object	optional	
tunnel	boolean	optional	(sub-property of set-dscp) Enable configuring tunnel traffic

Property	Type	Required for POST and PUT	Description
value	string	optional	(sub-property of set-dscp) DSCP value
set-precedence	object	optional	Precedence type
tunnel	boolean	optional	(sub-property of set-precedence) Enable configuring tunnel traffic
value	string	optional	(sub-property of set-precedence) Possible values: 0 to 7
set-mpls-experimental	object	optional	Set mpls
imposition	number	optional	(sub-property of set-mpls-experimental) Range: 0 to 7
topmost	number	optional	(sub-property of set-mpls-experimental) Range: 0 to 7
set-cos	number	optional	IEEE 802.1Q/ISL class of service/user priority
set-cos-inner	number	optional	Inner CoS
set-qos-group	number	optional	QoS Group
set-discard-class	number	optional	Discard behavior identifier
bandwidth	object	optional	Specify bandwidth
unit	string	mandatory	(sub-property of bandwidth) Possible values: "percent", "remaining-percent", "kbps"
value	number	mandatory	(sub-property of bandwidth) Range: 1 to 10000000
shape	object	optional	Both average values can be specified or both peak values, but not a combination of average and peak.
shape-type	string	mandatory	(sub-property of shape) Possible values: "peak", "average"
unit	string	mandatory	(sub-property of shape) Possible values: "percent", "kbps"
value	number	mandatory	(sub-property of shape) Range: range 1 to 100 percent or 8000 to 10000000000 kbps

Property	Type	Required for POST and PUT	Description
random-detect	List of objects	optional	Configure random detect Sets dscp values and min and max threshold in packets.
dscp	string	mandatory	(sub-property of random-detect) dscp
min-threshold	number	mandatory	(sub-property of random-detect) Range: 1 to 512000000
max-threshold	number	mandatory	(sub-property of random-detect) Range: 1 to 512000000
service-policy	string	optional	To specify hierarchical policies, add a previously-defined policy under the class using this string.
police	object	optional	Instead of shaping, if policing is required, use this object to configure. This object property listed below.

Properties: Policy Map Policing—Rate/CIR Configuration Properties

Policy-map policing rate can be configured using one of the following (not both):

- Committed Information Rate (CIR)
- Rate object

Property	Type	Required for POST and PUT	Description
cir-target-bit-rate	object	optional	Committed information rate Raw bitrate input fields
bit-rate	number	mandatory	(sub-property of cir-target-bit-rate) Target bit rate Range: 8000 to 10000000000
conform-burst	number	optional	(sub-property of cir-target-bit-rate) Conformed burst Range: 1000 to 512000000
excess-burst	number	optional	(sub-property of cir-target-bit-rate) Excess burst Range: 1000 to 512000000

Property	Type	Required for POST and PUT	Description
peak-info-rate	number	optional	(sub-property of cir-target-bit-rate) Peak information rate Range: 8000 to 10000000000
cir-percent	object	optional	Committed information rate (in percentage)
percent	number	mandatory	(sub-property of cir-percent) Percent of interface bandwidth for committed information rate Range: 1 to 100
conform-burst-ms	number	optional	(sub-property of cir-percent) Conformed burst Range: 1 to 2000 (milliseconds)
excess-burst-ms	number	optional	(sub-property of cir-percent) Excess burst Range: 1 to 2000 (milliseconds)

Properties: Policy Map Policing—Rate Configuration Properties

Policy-map policing rate can be configured using one of the following (not both):

- Committed Information Rate (CIR)
- Rate object

Property	Type	Required for POST and PUT	Description
rate-target-bit-rate	object	optional	Police rate Raw bitrate input
bit-rate	number	mandatory	(sub-property of rate-target-bit-rate) Rate value Range: 1 to 10000000000
burst-bytes	number	optional	(sub-property of rate-target-bit-rate) Conformed bit rate Range: 1000 to 512000000
peak-burst-bytes	number	optional	(sub-property of rate-target-bit-rate) Specify 'peak-burst' parameter for 'peak-rate' Range: 1000 to 512000000

Property	Type	Required for POST and PUT	Description
peak-rate-bytes	number	optional	(sub-property of rate-target-bit-rate) Peak rate in bytes Range: 1 to 10000000000
bits-per-sec	boolean	optional	(sub-property of rate-target-bit-rate) Treat 'rate' value in bits-per-second - "bps" if this is set to 1, else regular
rate-percent	object	optional	Police rate (in percentage)
percent	number	mandatory	(sub-property of rate-percent) Percent of interface bandwidth for committed information rate. Range: 1 to 100 (%)
burst-ms	number	optional	(sub-property of rate-percent) Specifies 'burst' parameter Range: 1 to 2000 ms (milli seconds)
peak-burst-ms	number	optional	(sub-property of rate-percent) Specifies 'peak-burst' parameter for 'peak-rate' Range: 1 to 2000 ms (milli seconds)
peak-rate-percent	number	optional	(sub-property of rate-percent) Specifies peak rate or PCR for single-level ATM 4.0 policies Range: 1 to 100

Properties: Policy Map Policing—Action Configuration

Property	Type	Required for POST and PUT	Description
action-list	List of objects	optional	List of actions
action-type	string	Mandatory	(sub-property of action-list) Possible values: conform-action, exceed-action, violate-action

Property	Type	Required for POST and PUT	Description
action	string	mandatory	(sub-property of action-list) The following values for action require specifying a value for the **value** property: set-cos-inner-transmit, set-cos-transmit, set-discard-class-transmit, set-dscp-transmit, set-dscp-tunnel-transmit, set-mpls-exp-imposition-transmit, set-mpls-exp-topmost-transmit, set-prec-transmit, set-prec-tunnel-transmit, set-qos-transmit The following values for **action** do not require specifying a value for the **value** property: drop, transmit, set-clp-transmit
value	string	optional	(sub-property of action-list) Possible values (depending on the value of the action property): • 0 to 7 • 0 to 99 • "af11"

JSON Representation: Policy Map Policing

```
{
"kind":"object#policy-map",
  "pmap-name":{string},
  "description":{string},
  "interface-list":[{"name":{string},"direction":{string}}],

  "class-list":
     [
       {
         "cmap-name":{string},
         "queue-limit":number,
         "priority": {
              "enable":{boolean},
              "unit":{string},
              "value":number,
              "level":{boolean},
              "burst-bytes":number
         },
```

```
            "set-dscp":{
                  "tunnel":{boolean},
                  "value":{string}
            },
            "set-precedence":{
                  "tunnel":{boolean},
                  "value":{string}
            },
            "set-cos":number,
            "set-cos-inner":number,
            "set-qos-group":number,
            "set-discard-class":number,
            "set-mpls-experimental":{
                  "imposition":number,
                  "topmost":number
            },

            "bandwidth":{
                "unit":{string},
                "value":number
             },
            "shape":{
                "shape-type":{string},
                "unit":{string},
                "value":number
             },
            "random-detect":[
            {
                  "dscp":{string},
                   "min-threshold":number,
                   "max-threshold":number
            },
            ]
            "service-policy":{string},
             "police":POLICE_OBJECT
       }
     ]
}
```

Expansion of POLICE_OBJECT Above

```
"police":{
        "cir-target-bit-rate":{
                "bit-rate":number,
                "conform-burst":number,
                "excess-burst":number,
                "peak-info-rate":number
       },
       "cir-percent":{
                "percent":number,
                "conform-burst-ms":number,
                "excess-burst-ms":number,
        },
```

```
        "rate-target-bit-rate":{
                "bit-rate":number,
                "bits-per-sec":"boolean",
                "burst-bytes":number,
                "peak-burst-bytes":number,
                "peak-rate-bytes":number
        },
        "rate-percent":{
                "percent":number,
                "burst-ms":number,
                "peak-burst-ms":number,
                "peak-rate-percent":number
        },
        "action-list":[
         {
           "action-type":{string},
           "action":{string},
           "value":{string}
         }
       ]
}
```

Create a Policy Map

Resource URI

Verb	URI
POST	/api/v1/qos/policy-map

Example

JSON Request

```
POST /api/v1/qos/policy-map
Content-Type: application/json

{
"pmap-name":"OUTBAND-LEARNING",
 "interface-list":[{"name":"gigabitethernet1",
                    "direction":"output"}],
 "class-list":
               [
                  {"cmap-name":"qos-control",
                    "set-mpls-experimental":{"imposition":4},
                    "set-precedence":{"tunnel":true,"value":4}
                  },
                  { "cmap-name":"qos-bulkdata",
                    "police":{
                       "cir-target-bit-rate":
                         { "bit-rate":100000,
                           "conform-burst":1000,
                           "excess-burst":1000,
                           "peak-info-rate":100000
                         }
                     }
                  },
```

```
                    {"cmap-name":"qos-cos",
                       "police":{
                           "rate-percent":
                             { "percent":95,
                               "burst-ms":250,
                               "peak-burst-ms":250,
                               "action-list":
                                 [
                                  {
                                   "action-type":"conform-action",
                                   "action":"set-prec-tunnel-transmit",
                                    "value":"4"
                                  },
                                  {
                                   "action-type":"exceed-action",
                                   "action":"set-mpls-exp-imposition-transmit",
                                   "value":"3"
                                  },
                                  {
                                   "action-type":"violate-action",
                                   "action":"drop"
                                  }
                                 ]
                             }
                       }
                    },
                    {"cmap-name":"routing",
                     "bandwidth":{"unit":"percent","value":40}
                    },
                    {"cmap-name":"class-default",
                     "shape":{"shape-type":"peak","unit":"percent","value":10}
                    }
                  ]
}
```

JSON Response

```
201 Created
Location: http://host/api/v1/qos/policy-map/OUTBOUND-LEARNING
```

Retrieve All Policy Maps

Resource URI

Verb	URI
GET	/api/v1/qos/policy-map

Example

JSON Request

```
GET /api/v1/qos/policy-map
Accept: application/json
```

JSON Response


```
{
"kind":"collection# policy-map policy-map",
"items":
  [
      {
      "kind":"object#policy-map",
      "pmap-name":"OUTBAND-CLASSIFY",
      "class-list":
    [
      {"cmap-name":"qos-voice","set-dscp": {"value":"af11"}},
      {"cmap-name":"qos-buldata",
        "bandwidth":{"unit":"percent","value":20},
      },
      {"cmap-name":"routing",
        "bandwidth":{"unit":"kbps","value":5000},
      },
      {
        "cmap-name":"class-default",
        "shape":{"shape-type":"average",
         "unit":"percent",
          "value":30
          },
          "random-detect": [
            {
              "dscp":"af11",
              "min-threshold":100,
              "max-threshold":100000
            }
          ]
      }
    ]
      },
    {
    "kind":"object#policy-map",
    "pmap-name":"OUTBOUND-LEARNING",
    "interface-list":[{"name":"gigabitethernet1","direction":"output"},}
                      {"name":"gigabitethernet2","direction":"output"}],
    "class-list":
      [
        {"cmap-name":"qos-voice","set-dscp": {"value":"af11"}},
        {"cmap-name":"qos-buldata",
          "bandwidth":{"unit":"percent","value":50}
        },
        {"cmap-name":"routing",
         "bandwidth":{"unit":"kbps","value":8000}
        {"cmap-name":"class-default",
          "shape":{"shape-type":"peak","unit":"percent","value":10},
          "service-policy":"OUTBAND-CLASSIFY"
        },
      ]
    }

  ]
}
```

Retrieve a Policy Map

Resource URI

Verb	URI
GET	/api/v1/qos/policy-map/{policy-map-name}

Example

JSON Request

```
GET /api/v1/qos/policy-map/OUTBAND-LEARNING
Accept: application/json
```

JSON Response

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

{
"kind":"object#policy-map",
 "pmap-name":"OUTBAND-LEARNING",
  "interface-list":[{"name":"gigabitethernet1",
                     "direction":"input"}],
 "class-list":[
                 {"cmap-name":"qos-voice","set-dscp":{"value":"af11"}},
                 {"cmap-name":"qos-buldata",
                   "bandwidth":{"unit":"percent","value":50}
                 }
                 {"cmap-name":"routing",
                   "bandwidth":{"unit":"kbps","value":8000}
                 },
                 {"cmap-name":"class-default",
                   "shape":{"shape-type":"peak","unit":"percent","value":10}
                   "service-policy":"OUTBAND-CLASSIFY"
                 }
               ]
}
```

Modify a Policy Map

A policy map can be applied to a list of interfaces while creating the policy map. Alternatively, the policy map can be applied to an interface after creating the policy map by specifying only the policy map name and interface name(s) (see Example 2: Applying Policy map to an Existing Configuration, page 22-19).

Resource URI

Verb	URI
PUT	/api/v1/qos/policy-map/{policy-map-name}

Example 1

JSON Request

```
PUT /api/v1/qos/policy-map/OUTBAND-LEARNING
Content-Type: application/json
{
"interface-list":[{"name":"gigabitethernet1",
                   "direction":"output"}],
 "class-list":
        [
          {"cmap-name":"qos-voice","set-dscp":{"value":"af11"}},
          {"cmap-name":"qos-bulkdata",
           "bandwidth":{"unit":"percent","value":50}
          },
          {"cmap-name":"routing",
           "bandwidth":{"unit":"percent","value":40}
          },
          {"cmap-name":"class-default",
           "shape":{"shape-type":"peak","unit":"percent","value":10}
          }
        ]
}
```

JSON Response

```
204 No Content
```

Example 2: Applying Policy map to an Existing Configuration

The following example updates a policy map by applying the "OUTBAND-CLASSIFY" policy map to the interface "gigabitethernet2". Doing so does not delete the existing configuration; it only adds the policy to the interface.

```
PUT /api/v1/qos/policy-map/OUTBAND-LEARNING
Content-Type: application/json
{
  "interface-list": [ {
                        "name":"gigabitethernet2",
                        "direction":"output"
                      }
                    ]
}
```

Delete a Policy Map

Resource URI

Verb	URI
DELETE	/api/v1/qos/policy-map/{policy-map-name}

JSON Request

```
DELETE /api/v1/qos/policy-map/OUTBAND-CLASSIFY
```

JSON Response

```
204 No Content
```

HSRP, Tracking Object, IP SLA

Introduction to HSRP

Cisco HSRP provides high network availability through redundancy of IP hosts on an IEEE 802 LAN. HSRP enables a group of router interfaces to work together to present the appearance of a single virtual router to hosts on a LAN.

Active and Standby Routers

Within the group or routers, only one router is designated as “active” at any one time. The active router is the router of choice for routing packets. Another router in the group is designated as the “standby” router, which takes over routing duties if the active router fails or when preset conditions are met.

The group of routers communicates periodically to determine which router is active. The active router is elected according to a preconfigured set of priorities.

Load Sharing

To enable load sharing, it is possible to configure multiple HSRP groups on a router interface. A router can play an active role in one HSRP group and standby role in another group.

HSRP Interface Configuration

To enable HSRP, standby configurations must be added into the participating router's LAN interfaces. All of the LAN interfaces must be in the same subnet as the standby IP address. The interfaces communicate periodically with each other to ensure that at any given time, one is assigned to serve as the standby IP address.

The standby address is a key element of the HSRP feature; it identifies a group of configurations. Consequently, standby address is a used for identifying HSRP resources.

HSRP supports IPv6 and VPN routing/forwarding table (VRF) standby addresses. If the interface is defined in a VRF, the standby address will be a VRF standby address. If the interface is removed from the VRF, the active and standby address associated with the interface will be removed with it.

Resource Summary for HSRP, Tracking Objects, and IP SLA

		HTTP Method			
Resource	**URL (BaseURL)**	**GET**	**POST**	**PUT**	**DELETE**
HSRP: Standby addresses	/api/v1/hsrp/	Y	Y	N	N
	/api/v1/hsrp/<standby address> Supports IPv4 addresses.	Y	N	Y	Y
Tracking objects	/api/v1/tracking-objects	Y	Y	N	N
	/api/v1/tracking-objects/<object-id>	Y	N	Y	Y
IP SLA	/api/v1/vrf/<vrf-name>/ip-sla	Y	Y	N	N
	/api/v1/ip-sla/[1]	Y	Y	N	N
	/api/v1/vrf/<vrf-name>/ip-sla/<sla-id>	Y	N	Y	Y
	/api/v1/ip-sla/<sla-id>[2]	Y	N	Y	Y
	/api/v1/ip-sla/responder[3]	Y	Y	N	Y
	/api/v1/ip-sla/responder/<sla-type>/<ip-address>/<port>	Y	N	N	Y

1. Similar to the API above, but for configurations that do not require VRF.
2. Similar to the API above, but for configurations that do not require VRF.
3. The responder APIs work only for TCP-connect and UDP-echo SLA types.

HSRP Standby Resource

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
virtual-ip-address	string	Mandatory	Virtual IPv4 or IPv6 address of the group's standby. A different address on the same interface uses different group number.
interface-name	string	Mandatory	L3, LAN interface participating in HSRP. The interface should be in the same subnet as the standby IP address. One router can have a maximum of 32 interfaces configured for HSRP.
virtual-mac-address	string	Optional	Virtual MAC address Default: 0000.0c07.acXX XX is the group number.
group	number	Optional	HSRP group number. All participants that standby the same IP address must be in the same group. If one interface needs to standby two different IP addresses, the addresses must be in different groups. A group can only have one standby address. Default: 0
name	string		Name of the group
version	number	Optional	(sub-property of name) HSRP message version to communicate within the group. Possible values: 1, 2 The two versions are not compatible. **Usage** • All participants in the same group must communicate in the same version. • IPv6 requires version 2. • One interface can communicate in only one version.

Property	Type	Required for POST and PUT	Description
priority	number	Optional	(sub-property of name) Priority number of the router. Possible values: 1 to 255 The highest priority living router is the candidate to be the active router. Default: 100
preempt	object	Optional	(sub-property of name) Possible values (all optional): • minimum-delay • sync-delay • reload-delay (description of each option below)
(continued)		Optional	**minimum-delay** (number) Preemption may be delayed for a minimum number of seconds with the minimum delay extension. This is useful for enabling routing tables, and so on, to be updated before a router becomes active. Range: 0 to 3600 Default: 0
(continued)		Optional	**sync-delay** (number) Maximum synchronization period (seconds) for IP redundancy clients. The synchronization delay is the maximum time that a group will wait to synchronize with the IP redundancy clients. This delay specifies the maximum time allowed before preemption may occur. **Note**: Consider delay as the minimum time that must pass before preemption may occur. Configuring a sync of 120 specifies that after 120 seconds, preemption will attempt.
(continued)		Optional	**reload-delay** (number) Preemption delay (seconds) after a reload only. This delay period applies only to the first interface-up event after the router has reloaded.

Property	Type	Required for POST and PUT	Description
tracking-object	object	Optional	(sub-property of name) Possible values (all optional): • object-index • decrement (description of each option below) When the object is down, the standby priority is decrement by that value. Default: 10 **Usage** • There is no error if the object is not configured. • No tracking object by default. • The Cisco IOS CLI supports a list of tracking objects on the interface, but in this usage only one tracking object is supported per standby group.
(continued)		Mandatory	**object-id** (number) Tracking-object index
(continued)		Optional	**decrement** (number) When the tracking object is down, the system decrements the HSRP priority by this amount.

Configure HSRP Interface

Resource URI

Verb	URI
POST	/api/v1/hsrp/

Example

JSON Request

```
POST  /api/v1/hsrp/

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

{
  "virtual-ip-address":"11.1.2.1",
  "interface-name": "gigabitethernet2",
```

```
  "group"             : 2,
  "name"           :"tier2-hsrp",
  "version"        : 2,
  "priority"       : 130,
  "preempt"        : {"minimum-delay":60, "sync-delay":60,
                      "reload-delay":60}},
  "tracking-object":{"object-id":3, "decrement":50 }
}
```

JSON Response

```
201 Created
Location: http://host/api/v1/hsrp/11.1.2.1
```

Retrieve All Standby IP Address Information in the Router

Resource URI

Verb	URI
GET	/api/v1/hsrp/

Tracking Object Resource

The tracking object feature creates a separate, standalone tracking process that can be used by processes such as HSRP, VRRP, GLBP, and so on. This feature allows tracking of other objects such as interface line-protocol state, IP routing state, Service Level Agreement (SLA) operations, and so on. The feature can even track a list of many sub-objects.

A client process, such as HSRP, can register an interest in tracking objects and request notification of when the tracked object changes state. Several clients can track the same object, and can take different actions when the object changes state.

A maximum of 1000 tracking objects can be configured.

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms

Properties

Property	Type	Required for POST and PUT	Description
object-id	number	Mandatory	Index of the tracking object. Maximum number of tracking objects: 1000
object-type	string	Mandatory	Object type. The object type determines which sub-properties are relevant. Possible values: • ip-sla • interface • ip-route • list (list of objects)
ip-sla	object	Optional	(sub-property of object-type) (Required only if object-type is “ip-sla”) SLA entry
sla-id	number	Mandatory	(sub-property of ip-sla) SLA entry ID Range: 1 to 2147483647 (2 giga) **Note**: Specifying a non-existent SLA entry does not generate an error.
selection	string	Optional	(sub-property of ip-sla) Possible values: reachability, state Default: state
interface	object	Optional	(sub-property of object-type) (Required only if object-type is “interface”) Interface
interface-name	string	Mandatory	(sub-property of interface) Valid interface name. **Note**: If the specified interface is a virtual interface and the virtual interface does not exist, it will be created automatically.
selection	string	Mandatory	(sub-property of ip-sla) Possible values: ip-routing or line-protocol

Property	Type	Required for POST and PUT	Description
ip-route	object	Optional	(sub-property of object-type) (Required only if object-type is “ip-route”) IP-route entry **Note**: Although Cisco IOS supports both IPv4 and IPv6 entries, the Tracking Object resource supports only IPv4 in the current release.
address	string	Mandatory	(sub-property of ip-route) IP address (IPv4 or IPv6)
mask	string	Mandatory	(sub-property of ip-route) IP mask (IPv4 or IPv6)
vrf-name	string	Optional	(sub-property of ip-route) VRF name Default: none A tracking object can track a route in VRF scope, but the object can be tracked by non-VRF applications. **Note**: Ensure that the VRF is already configured.
selection	string	Optional	(sub-property of ip-route) Select different type of objects or entries Possible values: reachability, metric threshold Default: reachability
list	object	Optional	(sub-property of object-type) (Required only if object-type is “list”) List of tracked objects. Can include a boolean expression.
base-on	string	Mandatory	(sub-property of list) List of sub-objects. The object state is determined by the state of the sub-objects in the list. This property selects the logic to apply when evaluating the states of the sub-objects. Possible values: “boolean-and” and “boolean-or”

Property	Type	Required for POST and PUT	Description

object-list	list of objects	Mandatory	(sub-property of list)
			List of other object IDs.
			The objects can be:
			• interface objects
			• IP route objects
			• SLA objects
			Each object in the list can have an optional “not” keyword. The keyword “not” reverses the state of the object—when the object is up, the tracked list detects the object as down.
			Example:
			`{{"object-id": 10, "state": "not"},`
			`{"object-id":20},`
			`{object-id":30}`
			`}`
			"object-id" is a number: index of an object.
			"state" is an optional string; value is "yes" or "not"; default is "yes".
			Note: There is no error when the sub-object does not exist.

Create a Tracking Object

Resource URI

Verb	URI
POST	/api/v1/tracking-objects/

Example 1: IP SLA Tracking Object

This example configures an IP SLA tracking object.

JSON Request

```
POST  /api/v1/tracking-objects/

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

{
  "object-id": 10,
  "object-type": "ip-sla",
  "ip-sla":
    {
      "sla-id":2,
      "selection":"reachability"
    },
}
```

JSON Response

```
201 Created
Location: http://host/api/v1/tracking-objects/10
```

Example 2: Interface Tracking Object

This example configures an interface tracking object.

JSON Request

```
POST  /api/v1/tracking-objects/

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

{
  "object-id": 11,
  "object-type":  "interface",
  "interface":
    {
      "interface-name":"gigabitethernet1",
      "selection":"line-protocol"
    }
}
```

JSON Response

```
201 Created
Location: http://api/v1/tracking-objects/11
```

Example 3: IP Route Tracking Object

This example configures an IP route tracking object.

JSON Request

```
POST  /api/v1/tracking-objects/

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

{
  "object-id": 12,
  "object-type": "ip-route",

  "ip-route":{"address":"10.0.0.1",
              "mask":"255.255.255.0",
              "vrf-name":"vrf2",
              "selection":"reachability"
             }
}
```

JSON Response

```
201 Created
Location: http://api/v1/tracking-objects/12
```

Example 4: List Tracking Object

This example configures a list tracking object.

JSON Request

```
POST  /api/v1/tracking-objects/

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

{
  "object-id": 15,
  "object-type": "list",
  "list":
    {
      "base-on":"boolean and",
      "object-list": [{"object-id":1},
                      {"object-id":2, "state": "not"},
                      {"object-id":30}
                     ]
    }
}
```

JSON Response

```
201 Created
Location: http://api/v1/tracking-objects/15
```

IP SLA Resource

History

Release	Modification
IOS XE 3.13	Introduced for the CSR1000V platform
IOS XE 3.14	Introduced for ASR1001-X and ASR1002-X platforms
IOS XE 3.17	Introduced several IP SLA APIs and properties

Properties

Property	Type	Required for POST and PUT	Description
sla-id	number	Not applicable	Index of the SLA entry
schedule	boolean	Mandatory	Activate/deactivate the SLA entry. true—Schedule SLA entry to run. false—Do not schedule SLA entry to run An already scheduled SLA cannot be modified. When modifying attributes of an SLA and configuring `schedule=true`, the SLA is first deactivated, then the modifications are configured, then the SLA entry is scheduled to run. When modifying attributes of an SLA and configuring `schedule=false`, the SLA is first deactivated, then the modifications are configured. The SLA entry is not scheduled to run after the modification.
lifetime	string	Optional	(Only required when scheduling an SLA) Length of time that the SLA entry will be active. Possible values: "forever" or number of seconds
start-time	string	Optional	(Only required when scheduling an SLA) Start time Possible values: "now" or specific date/time **Example**: "12:00:00 Nov 22" **Note**: For this feature to work, the clock must be set correctly on the router.

Property	Type	Required for POST and PUT	Description
sla-type	string	Mandatory	SLA type Possible values: "icmp-echo", "path-echo", "path-jitter", "udp-echo", "udp-jitter", "tcp-connect","dhcp", "dns", "ftp", "http"
<sla-type>	object	Mandatory	Define the configuration from the sub properties of sla types. Possible values for <sla-type>: "icmp-echo", "path-echo", "path-jitter", "udp-echo", "udp-jitter", "tcp-connect","dhcp", "dns", "ftp", "http" See sections below for sub-properties relevant to each of these options.

Sub-properties:

- Sub-properties for sla-type: icmp-echo, page 23-13
- Sub-properties for sla-type: path-echo, page 23-14
- Sub-properties for sla-type: path-jitter, page 23-15
- Sub-properties for sla-types: udp-echo, tcp-connect, page 23-15
- Sub-properties for sla-type: udp-jitter, page 23-16
- Sub-properties for sla-type: dhcp, page 23-17
- Sub-properties for sla-type: dns, page 23-18
- Sub-properties for sla-type: ftp, page 23-18
- Sub-properties for sla-type: http, page 23-19

Sub-properties for sla-type: icmp-echo

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000

Property	Type	Required for POST and PUT	Description
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255
vrf-name	string	Optional	(sub-property of <sla-type>) VRF name. **Notes**: • The VRF name must already exist. • An SLA in one VRF can be used in another scope; it is visible globally.

Sub-properties for sla-type: path-echo

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255

Sub-properties for sla-type: path-jitter

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255
interval	number	Optional	(sub-property of <sla-type>) Inter Packet Interval Possible values: 1 to 1000
num-packets	number	Optional	(sub-property of <sla-type>) Number of Packets to be transmitted Possible values: 1 to 100

Sub-properties for sla-types: udp-echo, tcp-connect

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
port-number	number	Optional	(sub-property of <sla-type>) Port number Possible values: 0 to 65535 (Recommend using ports greater than 1023)
dest-ipaddr	string	Optional	(sub-property of <sla-type>) Destination IP address

Property	Type	Required for POST and PUT	Description
dest-port	number	Optional	(sub-property of <sla-type>) Port number Possible values: 0 to 65535 (Recommend using ports greater than 1023)
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255

Sub-properties for sla-type: udp-jitter

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
port-number	number	Optional	(sub-property of <sla-type>) Port number Possible values: 0 to 65535 (Recommend using ports greater than 1023)
dest-ipaddr	string	Optional	(sub-property of <sla-type>) Destination IP address
dest-port	number	Optional	(sub-property of <sla-type>) Port number Possible values: 0 to 65535 (Recommend using ports greater than 1023)

Property	Type	Required for POST and PUT	Description
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255
codec	string	Optional	(sub-property of <sla-type>) codec type to be configured. Possible values: • g711alaw: G.711 A Law, 64000 bps • g711ulaw: G.711 U Law, 64000 bps • g729a: G.729, 8000 bps
interval	number	Optional	(sub-property of <sla-type>) Inter Packet Interval Possible values: 1 to 1000
num-packets	number	Optional	(sub-property of <sla-type>) Number of Packets to be transmitted Possible values: 1 to 100

Sub-properties for sla-type: dhcp

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)

Property	Type	Required for POST and PUT	Description
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)

Sub-properties for sla-type: dns

Property	Type	Required for POST and PUT	Description
address	string	Mandatory	(sub-property of <sla-type>) Address (IPv4 or IPv6)
name-server	number	Mandatory	(sub-property of <sla-type>) IP address of name server
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)

Sub-properties for sla-type: ftp

Property	Type	Required for POST and PUT	Description
url	string	Mandatory	(sub-property of <sla-type>) URL for ftp/http
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)

Property	Type	Required for POST and PUT	Description
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255

Sub-properties for sla-type: http

Property	Type	Required for POST and PUT	Description
url	string	Mandatory	(sub-property of <sla-type>) URL for ftp/http
frequency	number	Optional	(sub-property of <sla-type>) Frequency of sending ping packets Possible values: 1 to 604800 (seconds)
http-raw-request	string	Optional	(sub-property of <sla-type>) Sets a request in case the http raw request requires configuration.
threshold	number	Optional	(sub-property of <sla-type>) Possible values: 0 to 60000
timeout	number	Optional	(sub-property of <sla-type>) ICMP timeout Ping packet round trip time which, if exceeded, results in timeout. Possible values: 0 to 604800000 (milliseconds)
tos	number	Optional	(sub-property of <sla-type>) tos value in the ping packet Possible values: 0 to 255

JSON Representation

```
{
  "description" : "Service Level Agreements Schema",
  "type":"object",
```

```
  "properties":
   {
      "sla-id":{"type":"number","minimum":1," maximum" :2147483647, "required":True},
      "schedule":{"type":"boolean"},
      "start-time":{"type":"string", "required":False},
      "lifetime":{"type":"string", "required":False},
      "sla-type":{"type":"string", "enum":["icmp-echo",  "path-echo", "path-jitter",
      "udp-echo", "udp-jitter", "tcp-connect","dhcp",  "dns",  "ftp",  "http"],
      "required":True},
      <sla-type>:SLA_TYPE_CONFIG
   },
  "additionalProperties" : False
}
```

SLA type configuration:

```
<SLA_TYPE> =
{
  "type":"object",  "required":False,
  "properties":
  {
    "address":{"type":"string", "format":"ip-address"},
    "timeout":{"type":"number", "required":False, "minimum":0, "maximum": 604800000},
    "threshold":{"type":"number", "required":False, "minimum":0, "maximum": 60000},
    "frequency":{"type":"number", "required":False, "minimum":1, "maximum": 604800},
    "tos":{"type":"number", "required":False, "minimum":0, "maximum": 255},
  }
}
```

JSON Representation—Responder

```
{
  "description" : "Service Level Agreements Responder Schema",
  "type":"object",
  "properties":
   {
     "sla-type":{"type":"string", "required":True, "enum":["udp-echo","tcp-connect"]},
     "ipadress":{"type":"string", "required":True, "format":"ip-address"},
     "port":{"type":"number", "required":True, "minimum":1, "maximum": 65535}
    }
}
```

About the IP-SLA Responder

The IP SLA Responder listens on a specific port for control protocol messages sent by an IP SLA operation. When it receives a control message, the responder enables the specified UDP or TCP port for the specified duration. During this time, the responder accepts requests and responds to them. The responder disables the port after it responds to the IP SLA packet, or when the specified time expires. For added security, MD5 authentication for control messages is available.

Create an IP-SLA

Resource URI

Verb	URI
POST	/api/v1/vrf/<vrf-name>/ip-sla

Example 1: tcp-connect operation

JSON Request

```
POST /api/v1/vrf/coke/ip-sla
Content-Type: application/json
{
   "kind" : "object#ip-sla",
   "sla-id": 2,
   "schedule" : true,
   "lifetime" : "forever",
   "start-time" : "now",
   "sla-type":"tcp-connect",
   "tcp-connect":
   {
     "address": "1.2.3.4",
     "port-number": 1056,
     "frequency":3
     "threshold":2000,
     "timeout" :2000,
     "tos" :192,
   }
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/vrf/coke/ip-sla/2
```

Retrieve an IP-SLA

Resource URI

Verb	URI
GET	/api/v1/vrf/<vrf-name>/ip-sla/<sla-id>

Example

JSON Request

```
GET /api/v1/vrf/coke/ip-sla/2
Accept: application/json
```

JSON Response

```
200 OK
Content-type: application/json
{
   "kind" : "object#ip-sla",
  "sla-id": 2,
  "schedule" : true,
  "lifetime" : "forever",
  "start-time" : "now",
  "sla-type":"path-echo",
  "path-echo":
  {
    "address": "1.2.3.4",
    "threshold":2000,
    "timeout" :2000,
    "tos" :192,
    "frequency":3
  }
}
```

Retrieve ALL IP-SLA

Resource URI

Verb	URI
GET	/api/v1/vrf/<vrf-name>/ip-sla

Example

JSON Request

```
GET /api/v1/vrf/coke/ip-sla
Accept: application/json
```

JSON Response

```
{
    "kind": "collection#ip-sla",
    "items": [
        {
            "kind": "object#ip-sla",
            "sla-id": 2,
            "schedule": true,
            "lifetime": "forever",
            "start-time": "now",
            "sla-type": "tcp-connect",
            "tcp-connect": {
                "address": "1.2.3.4",
                "port-number": 1056,
                "frequency": 3,
                "threshold": 2000,
                "timeout": 2000,
                "tos": 192
            }
        },
        {
            "kind": "object#ip-sla",
            "sla-id": 3,
            "schedule": true,
            "lifetime": "forever",
            "start-time": "now",
            "sla-type": "udp-echo",
            "tcp-connect": {
                "address": "1.2.3.5",
                "port-number": 1059,
                "frequency": 3,
                "threshold": 2000,
                "timeout": 2000,
                "tos": 192
            }
        }
    ]
}
```

Modify an IP-SLA

Resource URI

Verb	URI
PUT	/api/v1/vrf/<vrf-name>/ip-sla/<sla-id>

Example

JSON Request

```
PUT /api/v1/vrf/coke/ip-sla/2
Content-Type: application/json
{
  "kind" : "object#ip-sla",
  "sla-id": 2,
  "schedule" : true,
  "lifetime" : "forever",
  "start-time" : "now",
  "sla-type":"path-echo",
  "path-echo":
  {
      "address": "1.2.3.4",
      "threshold":2000,
      "timeout" :2000,
      "tos" :192,
      "frequency":3
  }
}
```

JSON Response

```
204 No Content
```

Delete an IP-SLA

Resource URI

Verb	URI
DELETE	/api/v1/vrf/<vrf-name>/ip-sla/<sla-id>

Example

JSON Request

```
DELETE /api/v1/vrf/coke/ip-sla/2
```

JSON Response

```
204 No Content
```

Create IP SLA Responder

Resource URI

Verb	URI
POST	/api/v1/ip-sla/responder

Example 1: Create an IP SLA Responder

JSON Request

```
POST /api/v1/ip-sla/responder
Content-Type: application/json
{
  "kind" : "object#ip-sla-responder-entry",
  "sla-type":"tcp-connect",
  "ipadress": "1.2.3.4",
  "port": 1056
}
```

JSON Response

```
201 Created
Location: https://host/api/v1/ip-sla/responder/tcp-connect/1.2.3.4/1056
```

Example 2: Create an IP SLA Responder with No JSON Data

Used in udp-echo responder configuration and tcp-connect responder configuration.

JSON Request

```
POST /api/v1/ip-sla/responder
Content-Type: application/json
{ }
```

JSON Response

```
201 Created
Location: https://host/api/v1/ip-sla/responder
```

Retrieve an IP-SLA Responder

Resource URI

Verb	URI
GET	/api/v1/ip-sla/responder/<sla-type>/<ip-address>/<port>

Example

JSON Request

```
GET /api/v1/ip-sla/responder/tcp-connect/1.2.3.4/1056
Accept: application/json
```

JSON Response

```
200 OK
Content-type: application/json
{
  "kind" : "object#ip-sla-responder-entry",
  "sla-type":"tcp-connect",
  "ipadress": "1.2.3.4",
  "port": 1056
}
```

Retrieve ALL IP-SLA Responder Entries

Resource URI

Verb	URI
GET	/api/v1/ip-sla/responder

Example

JSON Request

```
GET /api/v1/ip-sla/responder
Accept: application/json
```

JSON Response

```
200 OK
Content-type: application/json
{
"kind"    : "collection#ip-sla-responder",
"items"    : [
 {
  "kind" : "object#ip-sla-responder-entry",
  "sla-type":"tcp-connect",
  "ipadress": "1.2.3.4",
  "port": 1056
 },
 {
    "kind" : "object#ip-sla-responder",
   "sla-type":"udp-echo",
   "ipadress": "10.20.30.40",
   "port": 1058
 }
 ]
}
```

Delete an IP-SLA TCP-Connect Responder

Deletes the tcp-connect reponder. This API deletes the entire responder, not only the IP-address and port number.

Resource URI

Verb	URI
DELETE	/api/v1/ip-sla/responder/<sla-type>/<ip-address>/<port>

Example

JSON Request

```
DELETE /api/v1/ip-sla/responder/tcp-connect/1.2.3.4/1056
```

JSON Response

```
204 No Content
```

Delete an IP-SLA Responder

Deletes the IP-SLA responder.

Resource URI

Verb	URI
DELETE	/api/v1/ip-sla/responder

Example

JSON Request

```
DELETE /api/v1/ip-sla/responder
```

JSON Response

```
204 No Content
```

Batch Operations

The HSRP feature supports configuring multiple tracking objects or IP-SLA entries at once, using a batch operation.

Limitations

- Maximum of 25 entries.
- If there is failure in the middle of the batching operation, the JSON response indicates which operations were successful and which failed, as well as the reason for failure.
- For a batch delete, any non-existing elements are reported as "not found" and the batch operation continues. If this occurs, the final status code is 200.

Batch Examples

Creating Tracking Objects

This batch example creates the following tracking objects:

- Track 1

  ip sla 1 reachability
- Track 3

  list boolean-and

  object 1

  object 2 not

  object 6
- Track 4

  interface GigabitEthernet1 line-protocol
- Track 5

  interface GigabitEthernet2 ip-routing
- Track 6

  ip route 9.9.9.9 255.255.255.0 metric threshold

  ip vrf vrf2

Example

JSON Request

```
POST  /api/v1/tracking-objects/batch

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

{
  "number-of-items":5,
  "item-list":[
   {"object-id":1,
    "object-type":"ip-sla",
    "ip-sla":{"sla-id":1, "selection":"reachability"}
   },
   {"object-id":3,
    "object-type":"list",
    "list":{"base-on":"boolean-and",
             "object-list":[
                    {"object-id": 1},
                    {"object-id": 6},
                    {"object-id": 2, "state": "not"}]
            }
   },
   {"object-id":4,
    "object-type":"interface",
    "interface":{"interface-name":"GigabitEthernet1",
                 "selection":"line-protocol"}
   },
   {"object-id":5,
    "object-type":"interface",
    "interface":{"interface-name":"GigabitEthernet2",
                 "selection":"ip-routing"}
   },
   {"object-id":6,
    "object-type":"ip-route",
    "ip-route":{"address":" 9.9.9.9",
                "mask":"255.255.255.0",
                "selection":"metric threshold",
                "vrf-name":"vrf2"}
   }
]
}
```

JSON Response Showing Successful Completion of the Batch Operations

```
201 Created
Location: https://host/api/v1/tracking-objects/
```

In the body of the response, the following appears:

```
{"object-id":1, "result":"https://host/api/v1/tracking-object/1"},
{"object-id":3, "result":"https://host/api/v1/tracking-object/3"},
{"object-id":4, "result":"https://host/api/v1/tracking-object/4"},
{"object-id":5, "result":"https://host/api/v1/tracking-object/5"},
{"object-id":6, "result":"https://host/api/v1/tracking-object/6"}
```

JSON Response Showing Some Failed Batch Operations

```
200 OK
```

In the body of the response, the following appears:

```
{"object-id":1, "result":"https://host/api/v1/tracking-object/1"},
{"object-id":3, "result":"https://host/api/v1/tracking-object/3"},
{"object-id":4, "result":"object already exist"},
{"object-id":5, "result":"not processed"},
{"object-id":6, "result":"not processed"}
```

Modifying Tracking Objects

PUT operations for modifying tracking objects are similar to the POST batch operations described earlier in this section.

Successful completion of the batch operation results in the following response:

```
204 (no content)
```

If some operations fail, the response is the following, with details described in the body of the response:

```
200 (OK)
```

Deleting Tracking Objects

JSON Representation

```
{
  "number-of-items":"number",
  "item-list":[{"object-id":"number"}]
}
```

Example

JSON Request

```
DELETE  /api/v1/tracking-objects/batch

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

{
"number-of-items":4,
"item-list":[{"object-id":100}, {"object-id":400},{"object-id":300},{"object-id":600}]
}
```

JSON Response Showing Successful Completion of the Batch Operations

```
204 (No content)
```

JSON Response Showing Some Failed Batch Operations

```
200 OK
```

In the body of the response, the following or similar appears:

```
{"object-id":100, "result":"OK"},
{"object-id":400, "result":"OK"},
{"object-id":300, "result":"object 300 not found"},
{"object-id":600, "result":"ok"}
```

Creating IP-SLA Entries

This batch example creates the following IP-SLA entries:

- IP SLA 1

  icmp-echo 1.2.0.1

  tos 192

  vrf vrf2

  threshold 2000

  timeout 2000

  frequency 3

  ip sla schedule 1 life forever start-time now
- ip sla 20

  icmp-echo 2::2
- ip sla 21**

  icmp-echo 2.3.4.5

  ip sla schedule 21 life 900000 start-time 12:30:00 Nov 21

Example

JSON Request

```
POST  /api/v1/ip-sla/batch

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

{
  "number-of-items":3,
  "item-list":
  [
    {"sla-id":1,
     "schedule":true, "lifetime":"forever", "start-time":"now",
     "sla-type":"icmp-echo",
     "icmp-echo":{"address":"1.2.0.1", "tos":192, "timeout":2000,
                  "frequency":3, "threshold":2000, "vrf-name":"vrf2"}
    },
    {"sla-id":21
     "schedule":true, "lifetime":"9000000", "start-time":"12:30:00 Nov 21",
     "sla-type":"icmp-echo",
     "icmp-echo":{"address":"2.3.4.5"}
    },
    {"sla-id":20,
     "schedule":false,
     "sla-type":"icmp-echo",
     "icmp-echo":{"address":"2::2"}
    }
  ]
}
```

JSON Response Showing Successful Completion of the Batch Operations

```
201 Created
Location: https://host/api/v1/ip-sla
```

In the body of the response, the following appears:

```
{"sla-id":1, "result":"https://host/api/v1/ip-sla/1"},
{"sla-id":21, "result":https://host/api/v1/ip-sla/21"},
{"sla-id":20, "result":https://host/api/v1/ip-sla/20"}
```

JSON Response Showing Some Failed Batch Operations

```
200 OK
```

In the body of the response, the following or similar appears:

```
{"sla-id":1, "result":"https://host/api/v1/ip-sla/1"},
{"sla-id":21, "result":"https://host/api/v1/ip-sla/21"},
{"sla-id":20, "result":"<reason for failure>"}
```

Modifying IP-SLA Entries

PUT operations for modifying IP-SLA entries are similar to the POST batch operations described earlier in this section.

Successful completion of the batch operation results in the following response:

```
204 (no content)
```

If some operations fail, the response is the following, with details described in the body of the response:

```
200 (OK)
```

Deleting IP-SLA Entries

Example

JSON Request

```
DELETE  /api/v1/ip-sla/batch

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

{
  "number-of-items":"number",
  "item-list":[{"sla-id":"number"}]
}
```

JSON Response Showing Successful Completion of the Batch Operations

```
204 (No content)
```

JSON Response Showing Some Failed Batch Operations

```
200 OK
```

In the body of the response, the following or similar appears:

```
{"sla-id":1, "result" :"ok"},
{"sla-id":21, "result":"ok"},
{"sla-id":20, "result":"ip sla not found"}
```