



Enabling Management by REST API

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Introduction

You can use the Cisco IOS XE REST API to manage the Cisco CSR 1000v as an alternative to configuring and managing selected features on the router using the Cisco IOS XE CLI. This chapter describes how to configure the Cisco CSR 1000v to enable management using the REST API. For detailed information about using the REST API, see [Cisco IOS XE REST API Management Reference Guide](#).



Note REST API is not supported from the IOS-XE 16.7.x release onwards. If you are using the 16.7.x version or above, Cisco recommends that you use Restconf. For more information on using Restconf, see the [Restconf documentation](#).

Enabling REST API Support During Cisco CSR 1000v OVA Deployment

If you are deploying the Cisco CSR 1000v OVA template, support for REST API is configured in the Bootstrap Properties screen of the OVA Wizard. The required fields are different depending on the Cisco IOS XE release. The tables below list the fields required to enable REST API support when deploying the OVA template.

For more information on deploying the OVA template, see *the Deploying the Cisco CSR 1000v OVA to the VM* section in this guide.

Table 1: Cisco CSR 1000v OVA Template Bootstrap Properties Required for REST API Support (Cisco IOS XE Release 3.12S and Later)

Property	Description
Management Interface	Designates the management interface for the Cisco CSR 1000v. The format must be GigabitEthernetx or GigabitEthernetx.xxx.

Property	Description
Management Interface IPv4 Address/Mask	Configures the IPv4 address and subnet mask for the management interface.
Management IPv4 Gateway (Cisco IOS XE Release 3.12S)	Configures the IPv4 management default gateway address. If using DHCP, enter “dhcp” in the field.
Management IPv4 Network (Cisco IOS XE Release 3.12S)	Configures the IPv4 Network (such as “192.168.2.0/24” or “192.168.2.0 255.255.255.0”) that the management gateway should route to. If a default route (0.0.0.0/0) is desired, this may be left blank.

Table 2: Cisco CSR 1000v OVA Template Bootstrap Properties Required for REST API Support (Cisco IOS XE Release 3.11S and Later)

Property	Description
Management Interface	Designates the management interface for the Cisco CSR 1000v. The format must be GigabitEthernetx or GigabitEthernetx.xxx.
Management Interface IPv4 Address/Mask	Configures the IPv4 address and subnet mask for the management interface.
Management IPv4 Default Gateway	Configures the IPv4 management default gateway address. If using DHCP, enter “dhcp” in the field.
Remote Management IPv4 Address(not used if configuring the shared management interface to support REST API).	Configures the IP address used for remote management of the Cisco CSR 1000v by the REST API or by Cisco PNSC. The address must be in the same subnet as the management interface address.

Table 3: Cisco CSR 1000v OVA Template Bootstrap Properties Required for REST API Support (Cisco IOS XE Release 3.10S)

Property	Description
Management IPv4 Address/Mask	Sets the management gateway address and mask in IPv4 format for the GigabitEthernet0 management interface.
Management IPv4 Default Gateway	Sets the default management gateway IP address in IPv4 format for the GigabitEthernet0 management interface. Note The GigabitEthernet0 interface is no longer supported beginning in Cisco IOS XE Release 3.11S.
Enable HTTPS Server	Enables an HTTPS server for system configuration and administration via a web browser. Required if using the REST API to perform system management in Cisco IOS XE Release 3.10S.

Enabling REST API Support Using the Cisco IOS XE CLI

Introduction to REST API Configuration Options

You need to configure the management interface to support REST API using the Cisco IOS XE CLI if you installed the Cisco CSR 1000v in either of the following ways:

- If you installed the Cisco CSR 1000v using the .iso file.
- If you deployed the Cisco CSR 1000v using an Amazon Machine Image (AMI).



Note If upgrading a REST API configuration from Cisco IOS XE Release 3.10S to a later release, you must add your REST API configuration to the IOS configuration.

Before configuring the shared management interface, perform the steps in [Enabling REST API Support, on page 3](#).

The REST API management is located in a management virtual services container that is separate from the router components, including the router management interface. You have two choices for configuring the REST API management support, and the steps for each of these are in the following two sections:

- [Configuring the Shared Management Interface to Support the REST API , on page 4](#)
(Cisco IOS XE 3.13S and later, and IOS XE Denali 16.3 and later) The router management interface and the virtual services management container can share the same IP address. This can be used to save an IP address to be allocated for other purposes.
- [Configuring the Dual Management Interface to Support the REST API , on page 6](#)
(Required in Cisco IOS XE 3.11S and 3.12S, optional in later releases.) The router management interface and the virtual services management container use different IP addresses.

The remainder of this section contains information about:

- [Configuring the REST API Local Port and AutoSave Options, on page 8](#)
- [Configuring HTTPS Support for the REST API Using the Cisco IOS XE CLI, on page 9](#)
- [Disabling REST API Support, on page 10](#)
- [Viewing the REST API Container Status, on page 11](#)

Enabling REST API Support

Beginning with Cisco IOS XE Release 3.11S, and including IOS XE Denali 16.3.1 and later, you can enable REST API support on the remote management interface. To disable REST API support, see [Disabling REST API Support, on page 10](#). To enable the REST API, perform the following steps.

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **remote-management**
4. **restful-api**
5. **end**

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: <code>router> enable</code>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: <code>router# configure terminal</code>	Enters global configuration mode.
Step 3	remote-management Example: <code>router(config)# remote-management</code>	Enters remote-management configuration mode.
Step 4	restful-api Example: <code>router(cfg-remote-mgmt)# restful-api</code>	Enables support for the REST API.
Step 5	end Example: <code>router(cfg-remote-mgmt)# end</code>	Exits remote-management configuration mode and enters configuration mode.

Configuring the Shared Management Interface to Support the REST API**SUMMARY STEPS**

1. **enable**
2. **configure terminal**
3. **interface** *mgmt-interface*
4. **ip address** *mgmt-ipv4-addr subnet-mask*
5. **no shutdown**
6. **exit**
7. **virtual-service** *csr_mgmt*

8. no activate
9. ip shared host-interface *mgmt-interface*
10. activate
11. end

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: <pre>Router> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: <pre>Router# configure terminal</pre>	Enters global configuration mode.
Step 3	interface <i>mgmt-interface</i> Example: <pre>Router(config)# interface gigabitethernet1</pre>	Enters interface configuration mode for the management interface.
Step 4	ip address <i>mgmt-ipv4-addr subnet-mask</i> Example: <pre>Router(config-if)# ip address 172.25.29.235 255.255.255.128</pre>	Configures the IP address for the management interface.
Step 5	no shutdown Example: <pre>Router(config-if)# no shutdown</pre>	Enables the management interface.
Step 6	exit Example: <pre>Router(config-if)# exit</pre>	Exits interface configuration mode.
Step 7	virtual-service <i>csr_mgmt</i> Example: <pre>router(config)# virtual-service csr_mgmt</pre>	Configures the csr_mgmt virtual services container and enters virtual services configuration mode.
Step 8	no activate Example: <pre>router(config-virt-serv)# no activate</pre>	Deactivates the csr_mgmt virtual services container.

	Command or Action	Purpose
Step 9	ip shared host-interface <i>mgmt-interface</i> Example: <pre>router(config-virt-serv)# ip shared host-interface gigabitethernet 1</pre>	Maps the virtual service container to the management interface.
Step 10	activate Example: <pre>router(config-virt-serv)# activate</pre>	Activates the csr_mgmt virtual services container.
Step 11	end Example: <pre>router(config-virt-serv)# end</pre>	Exits virtual services configuration mode and enters global configuration mode.

Configuring the Dual Management Interface to Support the REST API

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **interface** *GigabitEthernetx*
4. **ip address** *ipv4-addr subnet-mask*
5. **no shutdown**
6. **exit**
7. **interface virtualportgroup** *virtualportgroup-number*
8. **ip unnumbered** *GigabitEthernetx*
9. **no shutdown**
10. **exit**
11. **virtual-service** *csr_mgmt*
12. **vnic gateway virtualportgroup** *virtualportgroup_number*
13. **guest ip address** *remote-mgmt-ipv4-addr*
14. **exit**
15. **end**
16. **ip route** *ipaddress subnetmask virtualportgroup virtualportgroupnumber*

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: <pre>Router> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.

	Command or Action	Purpose
Step 2	configure terminal Example: <pre>Router# configure terminal</pre>	Enters global configuration mode.
Step 3	interface GigabitEthernetx Example: <pre>Router(config)# interface gigabitethernet1</pre>	Enters interface configuration mode for the interface designated by <i>x</i> . The range of GigabitEthernet ports depends on the platform.
Step 4	ip address ipv4-addr subnet-mask Example: <pre>Router(config-if)# ip address 172.25.29.235 255.255.255.128</pre>	Configures the IP address for the management interface.
Step 5	no shutdown Example: <pre>Router(config-if)# no shutdown</pre>	Enables the management interface.
Step 6	exit Example: <pre>Router(config-if)# exit</pre>	Exits interface configuration mode.
Step 7	interface virtualportgroup virtualportgroup-number Example: <pre>Router(config)# interface virtualportgroup 0</pre>	Creates a virtual port group and enters virtual port group interface configuration mode.
Step 8	ip unnumbered GigabitEthernetx Example: <pre>router(config-if)# ip unnumbered gigabitethernet1</pre>	Enables IP processing on an interface without assigning it an explicit IP address.
Step 9	no shutdown Example: <pre>router(config-if)# no shutdown</pre>	Enables the virtual port group interface.
Step 10	exit Example: <pre>router(config-if)# exit</pre>	Exits virtual port group interface mode.

	Command or Action	Purpose
Step 11	virtual-service csr_mgmt Example: router(config)# virtual-service csr_mgmt	Configures the csr_mgmt virtual services container and enters virtual services configuration mode.
Step 12	vnic gateway virtualportgroup virtualportgroup_number Example: router(config-virt-serv)# vnic gateway virtualportgroup 0	Creates a vNIC gateway interface for the virtual services container and maps it to the virtual port group.
Step 13	guest ip address remote-mgmt-ipv4-addr Example: router(config-virt-serv-intf)# guest ip address 172.25.29.236	Configures the remote-management IP address for the vNIC gateway interface for the virtual services container.
Step 14	exit Example: router(config-virt-serv-intf)# exit	Exits virtual services interface configuration mode and enters virtual services configuration mode.
Step 15	end Example: router(config-virt-serv)# end	Exits virtual services configuration mode and enters global configuration mode.
Step 16	ip route ipaddress subnetmask virtualportgroup virtualportgroupnumber Example: router(config)# ip route 172.25.29.236 255.255.255.255 VirtualPortGroup0	Creates an IP route that maps to the virtual port group. Use the same IP address that was configured using the guest ip address command.

Configuring the REST API Local Port and AutoSave Options

Beginning with Cisco IOS XE 3.13S, you can configure the REST API local port and autosave options.

SUMMARY STEPS

1. **remote-management**
2. **restful-api local-port** *local-port-number*
3. **restful-api autosave** *interval*

DETAILED STEPS

	Command or Action	Purpose
Step 1	remote-management Example: <pre>router(config)# remote-management</pre>	Enters remote-management configuration mode.
Step 2	restful-api local-port <i>local-port-number</i> Example: <pre>router(cfg-remote-mgmt)# restful-api local-port 55443</pre>	Configures the REST API local port number. The valid range depends on whether the REST API virtual services container uses the same IP address as the management interface, or if it uses a different IP address: <ul style="list-style-type: none"> • Valid range if the dual management interface is configured is from 1 to 61000. • Valid range if the shared management interface is configured is from 55001 to 61000. In both cases, the default value is 55443.
Step 3	restful-api autosave <i>interval</i> Example: <pre>Router(cfg-remote-mgmt)# restful-api autosave 60</pre>	Configures the REST API autosave interval. The range is from 30-300 seconds, and the default is 30.

Configuring HTTPS Support for the REST API Using the Cisco IOS XE CLI

The REST API requires HTTPS server support. Beginning with Cisco IOS XE Release 3.11S, HTTPS server support is enabled by default and no additional configuration is required. However, if using Cisco IOS XE Release 3.10S, you must manually configure HTTPS support for the REST API in the following situations:

- If you did not specify the Enable HTTPS Server option when deploying the OVA.
- If you installed the Cisco CSR 1000v using the .iso file.



Note The HTTPS session must have an identity certificate. For more information, see the “HTTPS-HTTP Server and Client with SSL 3.0” section of the [HTTP Services Configuration Guide, Cisco IOS XE Release 3S](#).

SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **ip http secure-server**
4. **transport-map type persistent webui *transport-map-name***
5. **secure-server**
6. **transport type persistent webui input *transport-map-name***

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: router> enable	Enables privileged EXEC mode. • Enter your password if prompted.
Step 2	configure terminal Example: router# configure terminal	Enters global configuration mode.
Step 3	ip http secure-server Example: router(config)# ip http secure-server	Enables HTTPS on port 443 (the default HTTPS port). A self-signed identity certificate is automatically generated.
Step 4	transport-map type persistent webui <i>transport-map-name</i> Example: router(config)# transport-map type persistent webui https-webui	Creates and names a persistent web user interface transport map.
Step 5	secure-server Example: router(config)# secure-server	Enables the secure HTTPS server.
Step 6	transport type persistent webui input <i>transport-map-name</i> Example: router(config)# transport type persistent webui input https-webui	Enables the transport map to support HTTPS.

Disabling REST API Support

Beginning with Cisco IOS XE Release 3.11S, and including IOS XE Denali 16.3.1 and later, you can disable REST API support on the remote management interface. To enable REST API support, see [Enabling REST API Support, on page 3](#). To disable the REST API, perform the following steps.

SUMMARY STEPS

1. enable
2. configure terminal
3. remote-management
4. no restful-api

5. end

DETAILED STEPS

	Command or Action	Purpose
Step 1	enable Example: <pre>router> enable</pre>	Enables privileged EXEC mode. <ul style="list-style-type: none"> • Enter your password if prompted.
Step 2	configure terminal Example: <pre>router# configure terminal</pre>	Enters global configuration mode.
Step 3	remote-management Example: <pre>router(config)# remote-management</pre>	Enters remote-management configuration mode.
Step 4	no restful-api Example: <pre>router(cfg-remote-mgmt)# no restful-api</pre>	Disables support for the REST API.
Step 5	end Example: <pre>router(cfg-remote-mgmt)# end</pre>	Exits remote-management configuration mode and enters configuration mode.

What to do next



Note When REST API support is disabled using the **no restful-api** command, the REST API PUT, POST and DELETE operations are disabled. However, the GET operation is still available.

Viewing the REST API Container Status

Use the **show virtual-service detail** command to view the REST API container status.

The following example shows the enabled status of the REST API container, along with the detailed guest status with a list of processes, status showing when these processes are up and running, and the number of restarts:

```
Router# show virtual-service detail
Virtual service csr_mgmt detail
  State           : Activated
  Package information
```

Viewing the REST API Container Status

```

Name           : csrmgmt.1_2_1.20131010_134115.ova
Path           : bootflash:/csrmgmt.1_2_1.20131010_134115.ova
Application
  Name         : csr_mgmt
  Installed version : 1.2.1
  Description   : CSR-MGMT
Signing
  Key type     : Cisco development key
  Method       : SHA-1
Licensing
  Name         : Not Available
  Version      : Not Available
Detailed guest status

```

```

-----
Process           Status           Uptime           # of restarts
-----
nginx             UP              0Y 0W 0D 0: 1: 1    0
climgr           UP              0Y 0W 0D 0: 1: 1    0
restful_api      UP              0Y 0W 0D 0: 1: 1    0
fcgicpa         UP              0Y 0W 0D 0: 0:13    0
pnsccag         UP              0Y 0W 0D 0: 0:13    0
pnsccdme        UP              0Y 0W 0D 0: 0:12    0
-----

```

```

-----
Feature           Status           Configuration
-----
Restful API      Enabled, UP      port: 443
                  (GET only)      auto-save-timer: 8 seconds
                  socket: unix:/usr/local/nginx/csrapifcgi.sock;
PNSC             Enabled, UP      host: 172.25.223.233
                  port: 8443
                  socket: unix:/usr/local/cpa-fcgi.sock;
-----

```

Network stats:

```

eth0: RX packets:38, TX packets:6
eth1: RX packets:87, TX packets:80

```

Coredump file(s):

```

Activated profile name: None
Resource reservation
  Disk       : 540 MB
  Memory     : 512 MB
  CPU        : 30% system CPU

```

Attached devices

```

Type           Name           Alias
-----
Serial/Trace           serial3
Serial/Syslog          serial2
Serial/aux             serial1
Serial/shell           serial0
Disk                   /opt/var
Disk                   _rootfs
NIC                    dp_2_0         net2
NIC                    ieobc_2        ieobc

```

Network interfaces

```

MAC address           Attached to interface
-----
00:1E:BD:DE:F8:BA    VirtualPortGroup0
54:0E:00:0B:0C:03    ieobc_2

```

Guest interface

```

---
Interface: eth1
ip address: 172.25.223.147/25
---

```

Guest routes

```

---
```

```
Address/Mask          Next Hop          Intf.
-----
0.0.0.0/0             172.25.223.137  eth1
---
Resource admission (without profile) : passed
Disk space      : 540MB
Memory          : 512MB
CPU             : 30% system CPU
VCPUs           : Not specified
```

