



# CNS Image Agent

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## Finding Feature Information

Your software release may not support all the features documented in this module. For the latest caveats and feature information, see [Bug Search Tool](#) and the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the feature information table at the end of this module.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

## Prerequisites for CNS Image Agent

- Determine where to store the Cisco images on a file server to make the image available to many other networking devices. If the Cisco Networking Services Event Bus is to be used to store and distribute the images, the Cisco Networking Services event agent must be configured.
- Set up a file server to enable the networking devices to download the new images. Protocols such as TFTP, HTTP, HTTPS, and rcp can be used.
- Determine how to handle error messages generated by Cisco Networking Services image agent operations. Error messages can be sent to the Cisco Networking Services Event Bus or an HTTP or HTTPS URL.

# Restrictions for CNS Image Agent

During automated image loading operations you must try to prevent the Cisco device from losing connectivity with the file server that is providing the image. Image reloading is subject to memory issues and connection issues. Boot options must also be configured to allow the Cisco device to boot another image if the first image reload fails. For more details see the “Managing Configuration Files” module of the *Cisco IOS Configuration Fundamentals Configuration Guide*.

## Information About CNS Image Agent

### Cisco Networking Services Image Agent

Administrators maintaining large networks of Cisco devices need an automated mechanism to load image files onto large numbers of remote devices. Existing network management applications are useful to determine which images to run and how to manage images received from the Cisco online software center. Other image distribution solutions do not scale to cover thousands of devices and cannot distribute images to devices behind a firewall or using Network Address Translation (NAT). The Cisco Networking Services image agent enables the managed device to initiate a network connection and request an image download allowing devices using NAT, or behind firewalls, to access the image server.

The Cisco Networking Services image agent can be configured to use the Cisco Networking Services Event Bus. To use the Cisco Networking Services Event Bus, the Cisco Networking Services event agent must be enabled and connected to the Cisco Networking Services event gateway in the Cisco Networking Services Configuration Engine. The Cisco Networking Services image agent can also use an HTTP server that understands the Cisco Networking Services image agent protocol. Deployment of Cisco Networking Services image agent operations can use both the Cisco Networking Services Event Bus and an HTTP server.

## How to Configure CNS Image Agent

### Configuring the Cisco Networking Services Image Agent

Cisco Networking Services uses a unique identifier to identify an image agent associated with that Cisco device. Using the same process as Cisco Networking Services event and configuration agents, the configuration of the **cns id** command determines whether an IP address or MAC address of a specified interface, the hardware serial hardware number of the device, an arbitrary text string, or the hostname of the device is used as the image ID. By default, the system uses the hostname of the device.

The Cisco Networking Services image ID is sent in the content of the messages sent by the image agent and allows an application to know the unique image ID of the Cisco device that generated the message. A password can be configured and associated with the image ID in the image agent messages.

#### Before you begin

Perform this task to configure Cisco Networking Services image agent parameters using CLI commands.

- To configure the Cisco Networking Services image agent to use HTTP or HTTP over SSL (HTTPS) to communicate with an image server, you need to know the URL for the image server and the URL to which status messages can be sent.
- If you are using HTTPS to communicate with the image server, you must set up security certificates to allow the server to be authenticated by the image agent when the connection is established.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. Do one of the following:
  - **cns id** *type number* {**ipaddress**|**mac-address**} [**event**|**image**]
  - 
  - **cns id** {**hardware-serial**|**hostname**|**string text**} [**event**|**image**]
4. **cns password** *password*
5. **cns image** [**server** *server-url* [**status** *status-url*]]
6. **cns image password** *image-password*
7. **cns image retry** *seconds*
8. **exit**

## DETAILED STEPS

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
<b>Step 3</b>	Do one of the following: <ul style="list-style-type: none"> <li>• <b>cns id</b> <i>type number</i> {<b>ipaddress</b> <b>mac-address</b>} [<b>event</b> <b>image</b>]</li> <li>•</li> <li>• <b>cns id</b> {<b>hardware-serial</b> <b>hostname</b> <b>string text</b>} [<b>event</b> <b>image</b>]</li> </ul> <b>Example:</b> Device(config)# <b>cns id</b> fastethernet 0/1 ipaddress image <b>Example:</b> Device(config)# <b>cns id</b> hardware-serial image	Specifies a unique Cisco Networking Services ID and interface type and number from which to retrieve the unique ID. or Specifies a unique Cisco Networking Services ID assigned from the hardware serial number, device hostname, or an arbitrary text string. The following information applies to either version of the syntax. <ul style="list-style-type: none"> <li>• Use the <b>event</b> keyword to specify an event agent ID.</li> <li>• Use the <b>image</b> keyword to specify an image agent ID.</li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>If no keywords are used, the configuration agent ID is configured.</li> </ul>
<b>Step 4</b>	<b>cns password</b> <i>password</i> <b>Example:</b> <pre>Device(config)# cns password password1</pre>	<p>Specifies a password for the Cisco Networking Services ID.</p> <p>You must configure the Cisco Networking Services password the first time a device is deployed, and the Cisco Networking Services password must be the same as the bootstrap password set on the Configuration Engine (CE).</p>
<b>Step 5</b>	<b>cns image</b> [ <b>server</b> <i>server-url</i> ][ <b>status</b> <i>status-url</i> ] <b>Example:</b> <pre>Device(config)# cns image server https://10.21.2.3/cns/imgsvr status https://10.21.2.3/cns/status/</pre>	<p>Enables Cisco Networking Services image agent services and specifies the URL of the image distribution server.</p> <ul style="list-style-type: none"> <li>Use the optional <b>status</b> keyword and <i>status-url</i> argument to specify the URL of a web server to which error messages are written.</li> <li>If the <b>status</b> keyword and <i>status-url</i> argument are not specified, status messages are sent as events on the Cisco Networking Services Event Bus. To view the status messages on the Cisco Networking Services Event Bus, the Cisco Networking Services event agent must be configured.</li> </ul>
<b>Step 6</b>	<b>cns image password</b> <i>image-password</i> <b>Example:</b> <pre>Device(config)# cns image password abctext</pre>	<p>(Optional) Specifies a password for Cisco Networking Services image agent services.</p> <ul style="list-style-type: none"> <li>If a password is configured, the password is included with the image ID in Cisco Networking Services image agent messages sent out by the image agent. The receiver of these messages can use this information to authenticate the sending device.</li> </ul>
<b>Step 7</b>	<b>cns image retry</b> <i>seconds</i> <b>Example:</b> <pre>Device(config)# cns image retry 240</pre>	<p>(Optional) Specifies an image upgrade retry interval in seconds.</p> <ul style="list-style-type: none"> <li>The default interval is 60 seconds.</li> </ul>
<b>Step 8</b>	<b>exit</b> <b>Example:</b> <pre>Device(config)# exit</pre>	<p>Exits global configuration mode and returns the device to privileged EXEC mode.</p> <p><b>What to Do Next</b></p> <p>Proceed to the section to connect to the web server and download an image.</p> <p>If any of the commands in the task fail, proceed to the section to try to determine the problem.</p>

# Retrieving a Cisco Networking Services Image from a Server

Perform this task to poll the image distribution server using HTTP or HTTPS.



## Note Troubleshooting Tips

- If the web server appears to be down, use the **ping** command to check connectivity.
- If using HTTP, use the **show ip http client all** command to display information about HTTP clients and connections.

## Before you begin

This task assumes that you have already configured the Cisco Networking Services image agent using the tasks in the section.

## SUMMARY STEPS

1. **enable**
2. **configure terminal**
3. **cns image retrieve** [*server server-url*][*status status-url*]

## DETAILED STEPS

	Command or Action	Purpose
Step 1	<b>enable</b> <b>Example:</b> Device> enable	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
Step 2	<b>configure terminal</b> <b>Example:</b> Device# configure terminal	Enters global configuration mode.
Step 3	<b>cns image retrieve</b> [ <i>server server-url</i> ][ <i>status status-url</i> ] <b>Example:</b> Device(config)# cns image retrieve server https://10.19.2.3/imgsvr/ status https://10.19.2.3/imgsvr/status/	Contacts a Cisco Cisco Networking Services image distribution server and downloads a new image if a new image exists. <ul style="list-style-type: none"> <li>• Use the optional <b>status</b> keyword and <i>status-url</i> argument to specify the URL of a web server to which status messages are written.</li> <li>• If the <b>server</b> and <b>status</b> keywords are not specified, the server and status URLs configured with the <b>cns image</b> command are used.</li> </ul> <p><b>Note</b> We recommend using the <b>cns trusted-server</b> command to specify the host part of the server or status URL as a trusted server.</p>

# Configuration Examples for CNS Image Agent

## Example: Enabling and Configuring Cisco Networking Services Agents

The following example shows various Cisco Networking Services agents being enabled and configured starting with the configuration agent being enabled with the **cns config partial** command to configure an incremental (partial) configuration on a remote device. The Cisco Networking Services configuration engine IP address is 172.28.129.22, and the port number is 80. The Cisco Networking Services exec agent is enabled with an IP address of 172.28.129.23, and the Cisco Networking Services event agent is enabled with an IP address of 172.28.129.24. Until the Cisco Networking Services event agent is enabled, no other Cisco Networking Services agents are operational.

```
cns config partial 172.28.129.22 80
cns exec 172.28.129.23 source 172.22.2.2
cns event 172.28.129.24 source 172.22.2.1
exit
```

In the following example, the Cisco Networking Services image agent parameters are configured using the CLI. An image ID is specified to use the IP address of the GigabitEthernet interface 0/1/1, a password is configured for the Cisco Networking Services image agent services, the Cisco Networking Services image upgrade retry interval is set to four minutes, and image management and status servers are configured.

```
cns id GigabitEthernet0/1/1 ipaddress image
cns image retry 240
cns image password abctext
cns image server https://10.21.2.3/cns/imgsvr status https://10.21.2.3/cns/status/
```

In the following example, the Cisco Networking Services image agent is configured to use the Cisco Networking Services Event Bus. An image ID is specified as the hardware serial number of the networking device, the Cisco Networking Services event agent is enabled with a number of parameters, and the Cisco Networking Services image agent is enabled without any keywords or options. The Cisco Networking Services image agent will listen for events on the Cisco Networking Services Event Bus.

```
cns id hardware-serial image
cns event 10.21.9.7 11011 keepalive 240 120 failover-time 5
cns image
cns image password abctext
```

## Example: Retrieving a Cisco Networking Services Image from a Server

In the following example, the Cisco Networking Services image agent polls a file server using the **cns image retrieve** command. Assuming that the Cisco Networking Services image agent is already enabled, the file server and status server paths specified here will overwrite any existing image agent server and status configuration. The new file server will be polled and a new image, if it exists, will be downloaded to the networking device.

```
cns image retrieve server https://10.19.2.3/cns/ status https://10.19.2.3/cnsstatus/
```

# Additional References

## Related Documents

Related Topic	Document Title
Cisco IOS commands	<a href="#">Cisco IOS Master Commands List, All Releases</a>
Cisco Networking Services commands: complete command syntax, command mode, command history, defaults, usage guidelines, and examples.	<a href="#">Cisco IOS Cisco Networking Services Command Reference</a>
Cisco Networking Services Configuration Engine	<a href="#">Cisco CNS Configuration Engine Administrator Guide, 1.3</a>

## Standards and RFCs

Standard/RFC	Title
No new or modified standards/RFCs are supported by this feature, and support for existing standards/RFCs has not been modified by this feature.	--

## MIBs

MIB	MIBs Link
No new or modified MIBs are supported by this feature, and support for existing MIBs has not been modified by this feature.	To locate and download MIBs for selected platforms, Cisco software releases, and feature sets, use Cisco MIB Locator found at the following URL:  <a href="http://www.cisco.com/go/mibs">http://www.cisco.com/go/mibs</a>

## Technical Assistance

Description	Link
The Cisco Support and Documentation website provides online resources to download documentation, software, and tools. Use these resources to install and configure the software and to troubleshoot and resolve technical issues with Cisco products and technologies. Access to most tools on the Cisco Support and Documentation website requires a Cisco.com user ID and password.	<a href="http://www.cisco.com/cisco/web/support/index.html">http://www.cisco.com/cisco/web/support/index.html</a>

## Feature Information for CNS Image Agent

The following table provides release information about the feature or features described in this module. This table lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

Use Cisco Feature Navigator to find information about platform support and Cisco software image support. To access Cisco Feature Navigator, go to [www.cisco.com/go/cfn](http://www.cisco.com/go/cfn). An account on Cisco.com is not required.

**Table 1: Feature Information for Cisco Networking Services Image Agent**

Feature Name	Releases	Feature Information
Cisco Networking Services Image Agent	Cisco IOS XE Release XE3.8S 12.2(33)SEE 12.3(1) 12.2(31)SB2 12.2(33)SRB 12.2(33)SB 12.2(33)SXI	The Cisco Networking Services Image Agent feature is an infrastructure in Cisco IOS software to enable automated installation and activation of Cisco IOS images on Cisco IOS networking devices.  The following commands were introduced or modified by this feature: <b>clear cns image connections, clear cns image status, cns id, cns image, cns image password, cns image retrieve, cns image retry, debug cns image, show cns image connections, show cns image inventory, show cns image status.</b>