



A through E Commands

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announce config

To specify that an unsolicited configuration inventory is sent out by the CNS inventory agent at bootup, use the **announce config** command in CNS inventory configuration mode. To disable the sending of the configuration inventory, use the **no** form of this command.

announce config

no announce config

Syntax Description This command has no arguments or keywords.

Command Default Disabled

Command Modes CNS inventory configuration (cns_inv)

| Release | Modification |
|---------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2SX | This command is supported in the Cisco IOS Release 12.2SX train. Support in a specific 12.2SX release of this train depends on your feature set, platform, and platform hardware. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines Use this command to limit inventory requests by the CNS inventory agent. When configured, the routing device details will be announced on the CNS event bus, but the routing device will not respond to any queries from the CNS event bus.

Examples The following example shows how to configure the CNS inventory agent to send out an unsolicited configuration inventory one time only at bootup:

```
Router(config)# cns inventory
Router(cns_inv)# announce config
```

Related Commands

| Command | Description |
|---------------|--|
| cns inventory | Enables the CNS inventory agent and enters CNS inventory configuration mode. |

clear cns config stats

To clear the statistics about the Cisco Networking Services (CNS) configuration agent, use the **clear cns config stats** command in privileged EXEC mode.

clear cns config stats

Syntax Description This command has no arguments or keywords.

Command Default No statistics are cleared.

Command Modes Privileged EXEC (#)

| Release | Modification |
|--------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines The **clear cns config stats** command clears all the statistics displayed by the **show cns config stats** command.

Examples The following example shows how to clear all of the statistics for the CNS configuration agent:

```
Router# clear cns config stats
```

| Command | Description |
|------------------------------|--|
| show cns config stats | Displays statistics about the CNS configuration agent. |

clear cns counters

To clear all Cisco Networking Services (CNS) statistics, use the **clear cns counters** command in privileged EXEC mode.

clear cns counters

Syntax Description This command has no arguments or keywords.

Command Default No statistics are cleared.

Command Modes Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines The **clear cns counters** command clears all the statistics tracked and displayed by CNS agents.

Examples The following example shows how to clear all of the statistics used by CNS:

```
Router# clear cns counters
```

Related Commands

| Command | Description |
|------------------------------|--|
| show cns config stats | Displays statistics about the CNS configuration agent. |
| show cns event stats | Displays statistics about the CNS event agent. |
| show cns image stats | Displays statistics about the CNS image agent. |

clear cns event stats

To clear the statistics about the Cisco Networking Services (CNS) event agent, use the **clear cns event stats** command in privileged EXEC mode.

clear cns event stats

Syntax Description This command has no arguments or keywords.

Command Default No statistics are cleared.

Command Modes Privileged EXEC (#)

| Release | Modification |
|--------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines The **clear cns event stats** command clears all the statistics displayed by the **show cns event stats** command.

Examples The following example shows how to clear all of the statistics for the CNS event agent:

```
Router# clear cns event stats
```

Related Commands

| Command | Description |
|-----------------------------|--|
| show cns event stats | Displays statistics about the CNS event agent. |

clear cns image connections

To clear the Cisco Networking Services (CNS) image agent connections statistics, use the **clear cns image connections** command in privileged EXEC mode.

clear cns image connections

Syntax Description This command has no arguments or keywords.

Command Default No statistics are cleared.

Command Modes Privileged EXEC (#)

| Release | Modification |
|------------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release XE 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines The **clear cns image connections** command clears all the statistics displayed by the **show cns image connections** command.

Examples The following example shows how to clear all of the connection statistics for the CNS image agent:

```
Router# clear cns image connections
```

Related Commands

| Command | Description |
|-----------------------------------|--|
| show cns image connections | Displays connection information for the CNS image agent. |

clear cns image status

To clear the Cisco Networking Services (CNS) image agent status statistics, use the **clear cns image status** command in privileged EXEC mode.

clear cns image status

Syntax Description This command has no arguments or keywords.

Command Default No statistics are cleared.

Command Modes Privileged EXEC (#)

| Command History | Release | Modification |
|-----------------|---------------------------|---|
| | 12.3(1) | This command was introduced. |
| | 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| | 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| | 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| | 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| | Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines The **clear cns image status** command clears all the statistics displayed by the **show cns image status** command.

Examples The following example shows how to clear all the status statistics for the CNS image agent:

```
Router# clear cns image status
```

| Related Commands | Command | Description |
|------------------|------------------------------|--|
| | show cns image status | Displays status information for the CNS image agent. |

clear netconf

To clear network configuration protocol (NETCONF) statistics counters or NETCONF sessions and to free associated resources and locks, use the **clear netconf** command in privileged EXEC mode.

clear netconf {counters| sessions}

Syntax Description

| | |
|-----------------|---|
| counters | Clears the NETCONF statistics counters to zero. |
| sessions | Clears currently connected NETCONF sessions. |

Command Default

NETCONF statistics counters are incremented and configured NETCONF sessions remain active.

Command Modes

Privileged EXEC(#)

Command History

| Release | Modification |
|--------------------------|---|
| 12.2(33)SRA | This command was introduced. |
| 12.4(9)T | This command was integrated into Cisco IOS Release 12.4(9)T. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use this command to clear NETCONF statistics counters to zero, to clear all or specified NETCONF sessions and to disconnect and free associated resources and locks.

Examples

The following example shows how to clear all NETCONF counters:

```
Router# clear netconf counters
```

Related Commands

| Command | Description |
|----------------------|--|
| debug netconf | Enables debugging of NETCONF sessions. |

| Command | Description |
|-----------------------------|--|
| netconf lock-time | Specifies the maximum time a NETCONF configuration lock is in place without an intermediate operation. |
| netconf max-sessions | Specifies the maximum number of concurrent NETCONF sessions allowed. |
| netconf ssh | Enables NETCONF over SSHv2. |
| show netconf | Displays NETCONF statistics counters and session information. |

cli (cns)

To specify the command lines of a Cisco Networking Services (CNS) connect template, use the **cli** command in CNS template connect configuration mode. To disable this configuration, use the **no** form of this command.

cli *config-text*

no cli *config-text*

Syntax Description

| | |
|--------------------|--|
| <i>config-text</i> | Command line to be included in a CNS connect template. |
|--------------------|--|

Command Default

No command lines are specified in the CNS connect template.

Command Modes

CNS template connect configuration (config-templ-conn)

Command History

| Release | Modification |
|--------------------------|--|
| 12.3(2)XF | This command was introduced. |
| 12.3(8)T | This command was integrated into Cisco IOS Release 12.3(8)T. |
| 12.3(9) | This command was integrated into Cisco IOS Release 12.3(9). The CNS connect variable \${dcli} is not supported in this release. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

First use the **cns template connect** command to enter CNS template connect configuration mode and define the name of the CNS connect template to be configured. Then use the **cli** command to specify the command lines of the CNS connect template.



Note

Effective with Cisco IOS Releases 12.3(8)T and 12.3(9), and 12.2(33)SRA the **config-cli** and **line-cli** commands are replaced by the **cli (cns)** command.

The command lines specified using the **cli** command can include CNS connect variables (see the table below). These variables act as placeholders within the command lines of a CNS connect template. Each variable is

defined by an associated **discover** command. Before a CNS connect template that contains these variables is applied to a router's configuration, the variables are replaced by the values defined by their associated **discover** command. For example, if the **discover interface serial** command was configured, and you were able to connect to the CNS configuration engine using Serial0/0, then the **cli ip route 0.0.0.0 0.0.0.0 \${interface}** command would generate the **cli ip route 0.0.0.0 0.0.0.0 serial0/0** command.

**Note**

When creating a CNS connect template, you must enter the **exit** command to complete the configuration of the template and exit from CNS template connect configuration mode. This requirement was implemented to prevent accidentally entering a command without the **cli** command.

Table 1: Summary of the CNS Connect Variables

| Variable | Description |
|-----------------------|---|
| \${line} | The line type defined by the associated discover line line-type command. |
| \${controller} | The controller type defined by the associated discover controller controller-type command. |
| \${interface} | The interface type defined by the associated discover interface command. |
| \${dlci} | The active DLCI defined by the associated discover dlci command. |
| \${next-hop} | <p>The next hop interface. This variable is identical to the \${interface} variable unless the discover dlci command has been configured. In this case, the \${next-hop} variable is identical to the \${interface}.\${subinterface} variable, where the {subinterface} variable is specified by the discover dlci command.</p> <p>The \${next-hop} variable should only be used in the CNS connect templates after the last discover command has been entered.</p> <p>A typical use of this variable is to allow the default IP route to be configured to send traffic towards the CNS configuration engine. Note that the CNS configuration engine may not be on the same LAN as the router. Therefore, configuring a route to the CNS configuration engine may require deployment-specific knowledge. Common practice is to define a default route to the interface using the ip route command (for example, cli ip route 0.0.0.0 0.0.0.0 \${next-hop}).</p> |
| \$\$ | A literal substitution of the \$ symbol. |

**Note**

Effective with Cisco IOS Releases 12.3(8)T and 12.3(9), the **&** variable is replaced by the **#{interface}** variable.

Examples

The following example shows how to configure a CNS connect template named template1:

```
Router(config)# cns template connect template-1
Router(config-templ-conn)# cli command-1
Router(config-templ-conn)# cli command-2
Router(config-templ-conn)# cli no command-3
Router(config-templ-conn)# exit
Router(config)#
```

When the template1 template is applied, the following commands are sent to the router's parser:

```
command-1
command-2
no command-3
```

When the template1 template is removed from the router's configuration after an unsuccessful ping attempt to the CNS configuration engine, the following commands are sent to the router's parser:

```
no command-1
no command-2
command-3
```

Related Commands

| Command | Description |
|-----------------------------|---|
| cns connect | Enters CNS connect configuration mode and defines the parameters of a CNS connect profile for connecting to the CNS configuration engine. |
| cns template connect | Enters CNS template connect configuration mode and defines the name of a CNS connect template. |
| discover (cns) | Defines the interface parameters within a CNS connect profile for connecting to the CNS configuration engine. |
| template (cns) | Specifies a list of CNS connect templates within a CNS connect profile to be applied to a router's configuration. |

cns aaa authentication

To enable Cisco Networking Services (CNS) Authentication, Authorization, and Accounting (AAA) options, use the **cns aaa authentication** command in global configuration mode. To explicitly disable CNS AAA options, use the **no** form of this command.

cns aaa authentication *authentication-method*

no cns aaa authentication *authentication-method*

Syntax Description

| | |
|------------------------------|---|
| <i>authentication-method</i> | Specifies the AAA authentication method to be used. |
|------------------------------|---|

Command Default

AAA is enabled when using CNS by default.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|--|
| 12.2(33)SRA | This command was introduced. |
| 12.4(9)T | This command was integrated into Cisco IOS Release 12.4(9)T. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S |

Usage Guidelines

Use the **cns aaa authentication** command to enable AAA when using CNS. When the **cns aaa authentication** command is configured, CNS notification messages sent to the device are rejected if they do not have sender credentials. By default, no authentication is enabled. This command must be enabled to configure AAA authentication for CNS messages. Use the **no cns aaa authentication** command to explicitly disable AAA support when using CNS.

Examples

The following example shows how to enable AAA authentication when using CNS:

```
Device(config)# cns aaa authentication method1
```

Related Commands

| Command | Description |
|--|--|
| cns message format notification | Configures the message format for notification messages from a CNS device. |

cns config cancel

To remove a partial Cisco Networking Services (CNS) configuration from the list of outstanding partial configurations, use the **cns config cancel** command in privileged EXEC mode.

cns config cancel *queue-id*

Syntax Description

| | |
|-----------------|---|
| <i>queue-id</i> | Indicates which partial configuration in the list of outstanding partial configurations to remove from the list. This list can be displayed by issuing the show cns config outstanding command in user EXEC or privileged EXEC mode. |
|-----------------|---|

Command Default

No default behavior or values.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|--------------------------|---|
| 12.2(2)T | This command was introduced. |
| 12.0(18)ST | This command was integrated into Cisco IOS Release 12.0(18) ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22) S. |
| 12.2(8)T | This command was implemented on additional platforms. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Incremental (partial) configurations take place in two steps:

- 1 The configuration agent receives the partial configuration. It checks the configuration commands for syntax, publishes the success or failure of the read and syntax-check operation to the sync-status subject "cisco.cns.config.sync-status," and stores the configuration.

- The configuration agent receives a second event message directing it to either apply or cancel the stored configuration.

Use the **cns config cancel** command in error scenarios where the second event message is not received and you need to remove the configuration from the list of outstanding configurations. Currently the maximum number of outstanding configurations is one.

Examples

The following example shows the process of checking the existing outstanding CNS configurations and canceling the configuration with the *queue-id* of 1:

```
Router# show cns config outstanding

The outstanding configuration information:
queue id  identifier      config-id
1         identifierREAD    config_idREAD
Router# cns config cancel 1
Router# show cns config outstanding

The outstanding configuration information:
queue id  identifier      config-id
```

Related Commands

| Command | Description |
|------------------------------------|---|
| cns config partial | Starts the CNS configuration agent, which provides CNS configuration services to Cisco IOS clients. |
| cns event | Configures the CNS event gateway, which provides CNS event services to Cisco IOS clients. |
| show cns config outstanding | Displays information about incremental CNS configurations that have started but not yet completed. |
| show cns event connections | Displays the status of the CNS event agent connection. |

cns config connect-intf


Note

Effective with Cisco IOS Releases 12.3(8)T and 12.3(9), the **cns config connect-intf** command is replaced by the **cns connect** and **cns template connect** commands. See the **cns connect** and **cns template connect** commands for more information.

To specify the interface for connecting to the Cisco Networking Services (CNS) configuration engine, use the **cns config connect-intf** command in global configuration mode. To disable this interface for the connection, use the **no** form of this command.

cns config connect-intf *type number* [**ping-interval** *seconds*] [**retries** *number*]

no **cns config connect-intf** *type number*

Syntax Description

| | |
|----------------------|--|
| <i>type</i> | Type of connecting interface. |
| <i>number</i> | Number of the connecting interface. |
| ping-interval | (Optional) Specifies an interval between successive ping attempts. |
| <i>seconds</i> | (Optional) Interval between successive ping attempts, in seconds. Values are from 1 to 30. The default is 10. |
| retries | (Optional) Indicates that a ping will be retried a specified number of times. |
| <i>number</i> | (Optional) Number of times that a ping will be retried, in seconds. Values are from 1 to 30. The default is 5. |

Command Default

Interfaces are not configured to connect to the CNS configuration engine.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|----------|---|
| 12.2(8)T | This command was introduced. |
| 12.3(8)T | This command was replaced by the cns connect and cns template connect commands. |

| Release | Modification |
|-----------|---|
| 12.3(9) | This command was replaced by the cns connect and cns template connect commands. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |

Usage Guidelines

Use this command to connect to the CNS configuration engine using a specific type of interface. You must specify the interface type but need not specify the interface number; the router's bootstrap configuration on the router finds the connecting interface, regardless of the slot in which the card resides or the modem dialout line for the connection, by trying different candidate interfaces or lines until it successfully pings the registrar.

Use this command to enter CSN Connect-interface configuration mode (config-cns-conn-if). Then use one of the following bootstrap-configuration commands to connect to the registrar for initial configuration:

- **config-cli** followed by commands that, used as is, configure the interface.
- **line-cli** followed by a command to configure modem lines to enable dialout and, after that, commands to configure the modem dialout line.

The **config-cli** command accepts the special directive character "&," which acts as a placeholder for the interface name. When the configuration is applied, the & is replaced with the interface name. Thus, for example, if we are able to connect using FastEthernet0/0, the **config-cli ip route 0.0.0.0 0.0.0.0 &** command generates the **ip route 0.0.0.0 0.0.0.0 FastEthernet0/0** command. Similarly, the **config-virtual terminal line (vty) cns id & ipaddress** command generates the **cns id FastEthernet0/0 ipaddress** command.

Examples

In the following example, the user connects to a configuration engine using the asynch interface and issues several commands:

```
Router(config)# cns config connect-intf Async
Router(config-cns-conn-if)# config-cli encapsulation ppp
Router(config-cns-conn-if)# config-cli ip unnumbered FastEthernet0/0
Router(config-cns-conn-if)# config-cli dialer rotary-group 0
Router(config-cns-conn-if)# line-cli modem InOut
Router(config-cns-conn-if)# line-cli
...<other line commands>...
Router(config-cns-conn-if)# exit
```

These commands result in the following configuration being applied:

```
line 65
modem InOut
.
.
.
interface Async65
encapsulation ppp
dialer in-band
dialer rotary-group 0
```

Related Commands

| Command | Description |
|--------------------------|---|
| cns config cancel | Cancels an incremental two-phase synchronization configuration. |

| Command | Description |
|---------------------------|---|
| cns config initial | Starts the CNS configuration agent and initiates an initial configuration. |
| cns config notify | Detects CNS configuration changes and sends an event containing the previous and current configuration. |
| cns config partial | Starts the CNS configuration agent, which provides CNS configuration services to Cisco IOS clients. |

cns config initial

To enable the Cisco Networking Services (CNS) configuration agent and initiate a download of the initial configuration, use the **cns config initial** command in global configuration mode. To remove an existing **cns config initial** command from the running configuration of the routing device, use the **no** form of this command.

cns config initial {*host-name*|*ip-address*} [**encrypt**] [*port-number*] [**page** *page*] [**syntax-check**] [**no-persist**] [**source** *interface name*] [**status** *url*] [**event**] [**inventory**]

no cns config initial

Syntax Description

| | |
|--------------------------|---|
| <i>host-name</i> | Hostname of the configuration server. |
| <i>ip-address</i> | IP address of the configuration server. |
| encrypt | (Optional) Uses a Secure Sockets Layer (SSL) encrypted link to the event gateway. |
| <i>port-number</i> | (Optional) Port number of the configuration service. The value is from 0 to 65535. The default is 80 with no encryption and 443 with encryption. |
| page | (Optional) Indicates that the configuration is located on a web page. |
| <i>page</i> | (Optional) Web page where the configuration is located. The default is /cns/config.asp. |
| syntax-check | (Optional) Turns on syntax checking. |
| no-persist | (Optional) Suppresses the default automatic writing to NVRAM of the configuration pulled as a result of issuing the cns config initial command. If not present, issuing the cns config initial command causes the resultant configuration to be automatically written to NVRAM. |
| source | (Optional) Specifies the source of CNS communications. |
| <i>interface name</i> | (Optional) Interface name of the source of CNS communications. |
| status <i>url</i> | (Optional) Sends an event to the specified URL via HTTP, either notifying successful completion of the configuration or warning that the configuration contained errors. |

| | |
|------------------|---|
| event | (Optional) Sends an event to the Event Bus notifying successful completion of the configuration or warning that the configuration contained errors. If the CNS event agent is not configured, the event will be saved until the CNS event agent is enabled. If the event keyword is not specified, a log message is sent to the console of the device after the configuration is complete. |
| inventory | (Optional) Sends an inventory of the line cards and modules in the router to the CNS configuration engine as part of the HTTP request. |

Command Default

The port number defaults to 80 with no encryption and 443 with encryption. Default web page of the initial configuration is /cns/config.asp.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|--------------------------|--|
| 12.2(2)T | This command was introduced. |
| 12.0(18)ST | This command was integrated into Cisco IOS Release 12.0(18)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |
| 12.2(2)XB | This command was implemented on Cisco IAD2420 series Integrated Access Devices (IADs). |
| 12.2(8)T | The source and encrypt keywords were added. |
| 12.3(1) | The inventory keyword was added. |
| 12.3(8)T | The status url keyword/argument pair was added. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use this command when a basic configuration—called a bootstrap configuration—is added to multiple routers before being deployed. When a router is initially powered (or each time a router is reloaded when the **no-persist** keyword is used) the **cns config initial** command will cause a configuration file—called an initial configuration—for the router to be downloaded from the configuration server. The initial configuration can be unique for each router.

When the configuration has been received by the router, each line of the configuration will be applied in the same order as it was received. If the Cisco IOS parser has an error with one of the lines of the configuration, then all the configuration up to this point will be applied to the router, but none of the configuration beyond the error will be applied. If an error occurs, the command will retry until it successfully completes. Once the configuration has successfully completed the **cns config initial** command will be removed from the running configuration. By default, NVRAM will be updated except when the **no-persist** keyword is configured.

When this command is used with the **event** keyword, a single message will be published on the event bus after the configuration is complete. The event bus will display one of the following status messages:

- `cisco.mgmt.cns.config.complete`—CNS configuration agent successfully applied the initial configuration.
- `cisco.mgmt.cns.config.warning`—CNS configuration agent fully applied the initial configuration but encountered possible semantic errors.

When this command is used with the **status** keyword, a single message will be published to the URL specified after the configuration is complete.

Examples

The following example shows how to enable the CNS configuration agent and initiate an initial configuration:

```
Router(config)# cns config initial 10.19.4.5 page /cns/config/first.asp
```

Related Commands

| Command | Description |
|--------------------------------|---|
| cns config connect-intf | Specifies the interface for connecting to the CNS configuration engine. |
| cns config notify | Detects CNS configuration changes and sends an event containing the previous and current configuration. |
| cns config retrieve | Enables the CNS configuration agent and initiates a download of the initial configuration. |
| cns event | Configures the CNS event gateway, which provides CNS event services to Cisco IOS clients. |
| show cns config status | Displays information about the status of the CNS configuration agent. |

cns config notify


Note

Effective with Cisco IOS Release 15.1(1)T1, the **cns config notify** command is not available in Cisco IOS software.

To notify Cisco Networking Services (CNS) agents of configuration changes on Cisco IOS devices, use the **cns config notify** command in global configuration mode. To disable notifications, use the **no** form of this command.

cns config notify {all|diff} [interval *minutes*] [no_cns_events] [old-format]

no cns config notify {all|diff} [interval *minutes*] [no_cns_events] [old-format]

Cisco IOS Release 12.4(9)T or Later Releases

cns config notify diff [interval *minutes*] [no_cns_events] [qlen *number*]

no cns config notify diff [interval *minutes*] [no_cns_events] [qlen *number*]

Syntax Description

| | |
|--------------------------------|--|
| all | Captures all configuration commands for the config-changed event output. |
| diff | Captures commands that change configuration for the config-changed event output. |
| interval <i>minutes</i> | (Optional) Specifies the amount of time after the last configuration change that the config-changed event is sent. The default is 5 minutes. The timer starts when you make a configuration change and you remain in configuration mode after the configuration change. If you enter the end command, the config-changed event is sent immediately. |
| no_cns_events | (Optional) Disables event notification for configurations changed through an XML file. If the configuration is changed using the command-line interface (CLI), the config-changed event will be sent. |
| old-format | (Optional) Provides the event notification in the old XML format for backwards compatibility. Note This keyword is no longer available in Cisco IOS Release 12.4(9)T or later releases. |
| qlen <i>number</i> | (Optional) Specifies the number of configuration changes that must occur before the CNS agent is notified of the changes. The range is 1 to 1000. The default is 100. |

Command Default CNS agents do not receive notifications.

Command Modes Global configuration (config)

Command History

| Release | Modification |
|-------------|---|
| 12.2(8)T | This command was introduced. |
| 12.2(11)T | The diff keyword was removed. |
| 12.3(1) | The diff and old-format keywords were added. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.4(9)T | The old-format and all keywords were removed. The qlen number keyword/attribute pair were added. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| 15.1(1)T1 | This command was removed. |

Usage Guidelines

When the **cns config notify** command is enabled, commands entered in configuration mode are detected. If the **all** keyword is specified, the command is stored for future notification. If the **diff** keyword is specified, the command is stored for future notification if the software determines that the command will cause a configuration change. The **diff** keyword also allows the software to store information about the command including previous configuration states, source of the change (for example, a telnet user), and the time of configuration.

The stored information is formatted in XML and sent as part of a CNS config agent change notification event. A CNS configuration agent change notification event is sent to the CNS event bus when configuration mode is exited or no activity from that source has occurred for the configured interval time.

You must enable the CNS event agent using the **cns event** command before configuring this command. If the CNS event agent is not configured, the notification event will be queued and sent when the CNS event agent is enabled. If the CNS configuration notify queue is full, subsequent events are dropped and a "lost" CNS configuration change notification is sent when the CNS event agent is enabled.

Use the **no_cns_events** for applications that already record configuration changes sent to the routing device through the CNS event bus.

Use the **old-format** keyword to generate XML output--only the entered command and previous configuration state--that is compatible with the versions of this commands when the **diff** keyword was removed.

Use the **qlen** *number* keyword/argument pair to send configuration changes to the CNS agent only after the specified number of changes has occurred.

Examples

The following example shows how to configure the CNS agent to receive configuration change notifications for all configuration commands:

```
Router(config)# cns config notify all
```

The following example shows how to configure the CNS agent to receive configuration change notifications only after 50 changes have been made:

```
Router(config)# cns config notify diff qlen 50
```

Related Commands

| Command | Description |
|--------------------------------|---|
| cns config cancel | Cancels an incremental two-phase synchronization configuration. |
| cns config connect-intf | Specifies the interface for connecting to the CNS configuration engine. |
| cns config initial | Starts the CNS configuration agent and initiates an initial configuration. |
| cns config partial | Starts the CNS configuration agent, which provides CNS configuration services to Cisco IOS clients. |
| cns event | Enables and configures CNS event agent services. |

cns config partial

To start the Cisco Networking Services (CNS) configuration agent and accept a partial configuration, use the **cns config partial** command in global configuration mode. To shut down the CNS partial configuration agent, use the **no** form of this command.

cns config partial {*host-name*| *ip-address*} [**encrypt**] [*port-number*] [**source** *interface name*] [**inventory**]
no cns config partial

Syntax Description

| | |
|-----------------------|--|
| <i>host-name</i> | Hostname of the configuration server. |
| <i>ip-address</i> | IP address of the configuration server. |
| encrypt | (Optional) Uses a Secure Sockets Layer (SSL) encrypted link between the router and the web server. |
| <i>port-number</i> | (Optional) Port number of the configuration service. The value is from 0 to 65535. The default is 80 with no encryption and 443 with encryption. |
| source | (Optional) Specifies the source of this device. |
| <i>interface name</i> | (Optional) Interface name to use as the source of this device. |
| inventory | (Optional) Sends an inventory of the line cards and modules in the router to the CNS configuration engine as part of the HTTP request. |

Command Default

The CNS configuration agent is not enabled to accept a partial configuration and the router does not request or receive updates.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|------------|--|
| 12.2(2)T | This command was introduced. |
| 12.0(18)ST | This command was integrated into Cisco IOS Release 12.0(18)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |

| Release | Modification |
|---------------------------|--|
| 12.2(2)XB | This command was implemented on Cisco IAD2420 series Integrated Access Devices (IADs). |
| 12.2(8)T | The source keyword and encrypt arguments were added. |
| 12.3(1) | The inventory keyword was added. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.4(4)T | This command was modified to include enhanced CNS error messages. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines

Use this command to start the CNS partial configuration agent. You must enable the CNS event agent using the **cns event** command before configuring this command. The CNS event agent sends an event with the subject "cisco.mgmt.cns.config.load" to specify whether configuration data can be pushed to the CNS partial configuration agent or pulled from a configuration server by the CNS partial configuration agent.

In the push model, the event message delivers the configuration data to the partial configuration agent.

In the pull model, the event message triggers the partial configuration agent to pull the configuration data from the CNS configuration engine. The event message contains information about the CNS configuration engine, not the actual configuration data. The host name or IP address is the address of the CNS configuration engine from which the configuration is pulled. Use the **cns trusted-server** command to specify which CNS configuration engines can be used by the CNS partial configuration agent.

When the configuration has been received by the router, each line of the configuration will be applied in the same order as it was received. If the Cisco IOS parser has an error with one of the lines of the configuration, then all the configuration up to this point will be applied to the router, but none of the configuration beyond the error will be applied. If an error occurs, the command will retry until the configuration successfully completes. In the pull mode, the command will not retry after an error. By default, NVRAM will be updated except when the **no-persist** keyword is configured.

A message will be published on the CNS event bus after the partial configuration is complete. The CNS event bus will display one of the following status messages:

- `cisco.mgmt.cns.config.complete`—CNS configuration agent successfully applied the partial configuration.
- `cisco.mgmt.cns.config.warning`—CNS configuration agent fully applied the partial configuration, but encountered possible semantic errors.
- `cisco.mgmt.cns.config.failure(CLI syntax)`—CNS configuration agent encountered a command line interface (CLI) syntax error and was not able to apply the partial configuration.

- `cisco.mgmt.cns.config.failure`(CLI semantic)—CNS configuration agent encountered a CLI semantic error and was not able to apply the partial configuration.

In Cisco IOS Releases 12.4(4)T, 12.2 (33)SRA, and later releases, a second message is sent to the subject “`cisco.cns.config.results`” in addition to the appropriate message above. The second message contains both overall and line-by-line information about the configuration that was sent and the result of the action requested in the original message. If the action requested was to apply the configuration, then the information in the results message is semantic in nature. If the action requested was to check syntax only, then the information in the results message is syntactical in nature.

Examples

The following example shows how to configure the CNS partial configuration agent to accept events from the event gateway at 172.28.129.22. The CNS partial configuration agent will connect to the CNS configuration server at 172.28.129.22, port number 80. The CNS partial configuration agent requests are redirected to a configuration server at 172.28.129.40, port number 80.

```
Device(config)# cns event 172.28.129.22
Device(config)# cns trusted-server config 172.28.129.40
Device(config)# cns config partial 172.28.129.22
```

The following example shows an enhanced error message sent to the subject “`cisco.mgmt.cns.config.results`”:

```
[2005-09-08 14:30:44]: subject=cisco.mgmt.cns.config.results.dvlpr-7200-6, message=
<?xml version="1.0" encoding="UTF-8"?>
<SOAP:Envelope xmlns:SOAP="http://www.w3.org/2003/05/soap-envelope">
<SOAP:Header>
<wsse:Security xmlns:wsse="http://schemas.xmlsoap.org/ws/2002/04/secext"
SOAP:mustUnderstand="true">
<wsse:UsernameToken>
<wsse:Username>user1</wsse:Username>
<wsse:Password>password1</wsse:Password>
</wsse:UsernameToken>
</wsse:Security>
<CNS:cnsHeader Version="2.0" xmlns:CNS="http://www.cisco.com/management/cns/envelope">
<CNS:Agent>CNS_CONFIG</CNS:Agent>
<CNS:Response>
<CNS:correlationID>SOAP_IDENTIFIER</CNS:correlationID>
</CNS:Response>
<CNS:Time>2005-09-13T08:34:36.523Z</CNS:Time>
</CNS:cnsHeader>
</SOAP:Header>
<SOAP:Body xmlns="http://www.cisco.com/management/cns/config">
<configResults version="2.0" overall="Success">
<configId>AAA</configId>
</configResults>
</SOAP:Body>
</SOAP:Envelope>
```

Related Commands

| Command | Description |
|---------------------------------|--|
| <code>cns config initial</code> | Starts the CNS configuration agent and initiates an initial configuration. |
| <code>cns event</code> | Enables and configures CNS event agent services. |
| <code>cns trusted-server</code> | Specifies a trusted server for CNS agents. |

| Command | Description |
|------------------------------------|--|
| show cns config outstanding | Displays information about incremental CNS configurations that have started but are not yet completed. |

cns config retrieve

To enable the Cisco Networking Services (CNS) configuration agent and initiate a download of the initial configuration, use the **cns config retrieve** command in privileged EXEC mode.

```
cns config retrieve {host-name|ip-address} [encrypt] [port-number] [page page] [overwrite-startup]
[retry retries interval seconds] [syntax-check] [no-persist] [source interface name] [status url] [event]
[inventory]
```

Syntax Description

| | |
|--------------------------------|---|
| <i>host-name</i> | Hostname of the configuration server. |
| <i>ip-address</i> | IP address of the configuration server. |
| encrypt | (Optional) Uses a Secure Sockets Layer (SSL) encrypted link to the event gateway. |
| <i>port-number</i> | (Optional) Port number of the configuration service. The value is from 0 to 65535. The default is 80 with no encryption and 443 with encryption. |
| page | (Optional) Indicates that the configuration is located on a web page. |
| <i>page</i> | (Optional) Web page where the configuration is located. The default is /cns/config.asp. |
| overwrite-startup | (Optional) Replaces the startup configuration file. Does not apply to the running configuration file. |
| retry <i>retries</i> | (Optional) Specifies the retry interval. The range is 0 to 100. The default is 0. |
| interval <i>seconds</i> | (Optional) Specifies the time in seconds, before the next attempt to request the configuration of a device from a configuration server. The range is 1 to 3600. |
| syntax-check | (Optional) Turns on syntax checking. |
| no-persist | (Optional) Suppresses the default automatic writing to NVRAM of the configuration pulled as a result of issuing the cns config retrieve command. If not present, issuing the cns config retrieve command causes the resultant configuration to be automatically written to NVRAM. |
| source | (Optional) Specifies the source of CNS communications. |

| | |
|-----------------------|--|
| <i>interface name</i> | (Optional) Interface name of the source of the configuration. |
| status url | (Optional) Sends the configuration the specified URL via HTTP, either notifying successful completion of the configuration or warning that the configuration contained errors. |
| event | (Optional) Sends an event to the CNS Event Bus stating successful completion of the configuration, a warning that the configuration contained errors, or a message noting that the configuration failed. If the CNS event agent is not configured, the event will be saved until the CNS event agent is enabled. If the event keyword is not specified, a log message is sent to the console of the device after the configuration is complete. |
| inventory | (Optional) Sends an inventory of the line cards and modules in the router to the CNS configuration engine as part of the HTTP request. |

Command Default

The port number defaults to 80 with no encryption and 443 with encryption. Default web page of the initial configuration is /cns/config.asp.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|----------------|--|
| 12.2(2)T | This command was introduced. |
| 12.0(18)ST | This command was integrated into Cisco IOS Release 12.0(18)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |
| 12.3(1) | The inventory keyword was added. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.4(15)T | This command was modified. The retry <i>retries</i> and interval <i>seconds</i> keywords and arguments were added. |
| 12.2(33)SRC | This command was integrated into Cisco IOS Release 12.2(33)SRC. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |

| Release | Modification |
|--------------------------|---|
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use this command to request the configuration of a device from a configuration server. Use the **cns trusted-server** command to specify which configuration server can be used (trusted).

When the configuration has been received by the router, each line of the configuration will be applied in the same order as it was received. If the Cisco IOS parser has an error with one of the lines of the configuration, then all the configuration up to this point will be applied to the router, but none of the configuration beyond the error will be applied. If an error occurs, the command will not retry.

A single message will be published on the event bus after the partial configuration is complete. The event bus will display one of the following status messages:

- `cisco.mgmt.cns.config.complete`—CNS configuration agent successfully applied the configuration.
- `cisco.mgmt.cns.config.warning`—CNS configuration agent fully applied the configuration, but encountered possible semantic errors.
- `cisco.mgmt.cns.config.failure`—CNS configuration agent encountered an error and was not able to apply the configuration.

The **cns config retrieve** command can be used with Command Scheduler commands (for example, **kron policy-list** and **cli** commands) in environments where it is not practical to use the CNS event agent and the **cns config partial** command. Configured within the **cli** command, the **cns config retrieve** command can be used to poll the configuration server to detect configuration changes.

You can use the optional **retry** and **interval** keywords to specify an amount of time in seconds to wait before attempting to retrieve a configuration from a trusted server. The number of retries is restricted to 100 to prevent the configuration agent from indefinitely attempting to reach an unreachable server. Use the keyboard combination **Ctrl-Shift-6** to abort this command.

Examples

The following example shows how to request a configuration from a trusted server at 10.1.1.1:

```
Router(config)# cns trusted-server all 10.1.1.1
Router(config)# exit
Router# cns config retrieve 10.1.1.1
```

The following example shows how to request a configuration from a trusted server at 10.1.1.1 and to configure a CNS configuration retrieve interval:

```
Router(config)# cns trusted-server all 10.1.1.1
Router(config)# exit
Router# cns config retrieve 10.1.1.1 retry 50 interval 1500
CNS Config Retrieve Attempt 1 out of 50 is in progress
Next cns config retrieve retry is in 1499 seconds (Ctrl-Shft-6 to abort this command).
..
00:26:40: %CNS-3-TRANSPORT: CNS_HTTP_CONNECTION_FAILED:10.1.1.1 -Process= "CNS config retv",
ipl= 0, pid= 43
```

```
00:26:40: %CNS-3-TRANSPORT: CNS_HTTP_CONNECTION_FAILED -Process= "CNS config retv", ipl=
0, pid= 43.....
```

Related Commands

| Command | Description |
|-------------------------------|--|
| cli | Specifies EXEC CLI commands within a Command Scheduler policy list. |
| cns config initial | Starts the CNS configuration agent and initiates an initial configuration. |
| cns trusted-server | Specifies a trusted server for CNS agents. |
| kron policy-list | Specifies a name for a Command Scheduler policy and enters kron-policy configuration mode. |
| show cns config status | Displays information about the status of the CNS configuration agent. |

cns connect

To enter Cisco Networking Services (CNS) connect configuration mode and define the parameters of a CNS connect profile for connecting to the CNS configuration engine, use the **cns connect** command in global configuration mode. To disable the CNS connect profile, use the **no** form of this command.

cns connect *name* [**retry-interval** *interval-seconds*] [**retries** *number-retries*] [**timeout** *timeout-seconds*] [**sleep** *sleep-seconds*]

no cns connect *name* [**retry-interval** *interval-seconds*] [**retries** *number-retries*] [**timeout** *timeout-seconds*] [**sleep** *sleep-seconds*]

Syntax Description

| | |
|---|--|
| <i>name</i> | Name of the CNS connect profile to be configured. |
| retry-interval <i>interval-seconds</i> | (Optional) Sets the interval (in seconds) between each successive attempt to ping the CNS configuration engine. The default value is 10 seconds. The valid range is 8 to 40 seconds. |
| retries <i>number-retries</i> | (Optional) Sets the number of times the CNS connect function will try to ping the CNS configuration engine. The default value is 3. |
| timeout <i>timeout-seconds</i> | (Optional) Sets the amount of time (in seconds) after which an interface is no longer used for ping attempts. The default value is 120 seconds. |
| sleep <i>sleep-seconds</i> | (Optional) Sets the amount of time (in seconds) before the first ping is attempted for each interface. This option provides time for the far end of a link to stabilize. The default value is 0 seconds. |

Command Default No CNS connect profiles are defined.

Command Modes Global configuration (config)

Command History

| Release | Modification |
|-----------|--|
| 12.3(2)XF | This command was introduced. |
| 12.3(8)T | This command was integrated into Cisco IOS Release 12.3(8)T. |
| 12.3(9) | This command was integrated into Cisco IOS Release 12.3(9). |

| Release | Modification |
|--------------------------|---|
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. The ping-interval keyword was replaced by the retry-interval keyword. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| 12.2(33)SRD | This command was modified to allow users to reenter CNS connect configuration mode after configuring the CNS connect profile. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use the **cns connect** command to enter CNS connect configuration mode and define the parameters of a CNS connect profile for connecting to the CNS configuration engine. Then use the following CNS connect commands to create a CNS connect profile:

- **discover**
- **template**

A CNS connect profile specifies the **discover** commands and associated **template** commands that are to be applied to a router's configuration. Multiple **discover** and **template** commands configured in a CNS connect profile are processed in the order in which they are entered.



Note

Effective with Cisco IOS Releases 12.3(8)T, 12.3(9), and 12.2(33)SRA the **cns config connect-intf** command is replaced by the **cns connect** and **cns template connect** commands.

Examples

The following example shows how to create a CNS connect profile named profile-1:

```
Router(config)# cns connect profile-1
Router(config-cns-conn)# discover interface Serial
Router(config-cns-conn)# template template-1
Router(config-cns-conn)# exit
```

In this example, the following sequence of events occurs for each serial interface when the **cns connect profile-1** command is processed:

- 1 Enter interface configuration mode and apply all commands in the template-1 template to the router's configuration.
- 2 Try to ping the CNS configuration engine.
- 3 If the ping is successful, then download pertinent configuration information from the CNS configuration engine and exit. The **cns connect profile-1** command has completed its process.
- 4 If the ping is unsuccessful, enter interface configuration mode and remove all commands in the template-1 template from the router's configuration. The **cns connect profile-1** command has failed to retrieve any configuration information from the CNS configuration engine.

Related Commands

| Command | Description |
|-----------------------------|---|
| cli (cns) | Specifies the command lines of a CNS connect template. |
| cns template connect | Enters CNS template connect configuration mode and defines the name of a CNS connect template. |
| discover (cns) | Defines the interface parameters within a CNS connect profile for connecting to the CNS configuration engine. |
| template (cns) | Specifies a list of CNS connect templates within a CNS connect profile to be applied to a router's configuration. |

cns dhcp

To enable Cisco Networking Service (CNS) with permission to process incoming DHCP Option 43 messages, use the **cns dhcp** command in global configuration mode. To disable this permission, use the **no** form of this command.

cns dhcp

no cns dhcp

Syntax Description This command has no arguments or keywords.

Command Default The permission to process the incoming DHCP Option 43 message is disabled.

Command Modes Global configuration (config)

| Command History | Release | Modification |
|-----------------|---------------------------|--|
| | 15.1(1)T | This command was introduced. |
| | Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S |

Usage Guidelines If you need to pass CNS configuration commands to the router via the DHCP option 43 message, the **cns dhcp** command enables the DHCP option 43 message that the CNS processes.

Examples The following example shows how to enable permissions to process the incoming DHCP Option 43 message:

```
Router(config)# cns dhcp
```

| Related Commands | Command | Description |
|------------------|------------------|--|
| | wsma dhcp | Permits a WSMA to process the incoming DHCP Option 43 message. |

cns event

To configure the Cisco Networking Services (CNS) event gateway, which provides CNS event services to Cisco IOS clients, use the **cns event** command in global configuration mode. To remove the specified event gateway from the gateway list, use the **no** form of this command.

cns event {*hostname*|*ip-address*} [**encrypt**] [*port-number*] [**backup**] [**failover-time** *seconds*] [**keepalive** *seconds* *retry-count*] [**source** {*ipv4-address*|*ipv6-address*|*interface-name*}] [**clock-timeout** *time*] [**reconnect-time** *time*]

no cns event [*hostname*|*ip-address*] [*port-number*] [**encrypt**] [**backup**] [**failover-time** *seconds*] [**keepalive** *seconds* *retry-count*] [**source** {*ipv4-address*|*ipv6-address*|*interface-name*}] [**clock-timeout** *time*] [**reconnect-time** *time*]

Syntax Description

| | |
|--|---|
| <i>hostname</i> | Hostname of the event gateway. |
| <i>ip-address</i> | IP address of the event gateway. |
| encrypt | (Optional) Uses a Secure Sockets Layer (SSL) encrypted link to the event gateway. Note This keyword is available only in images that support SSL. |
| <i>port-number</i> | (Optional) Port number for the event gateway. <ul style="list-style-type: none">The range is from 0 to 65535. The default is 11011 with no encryption or 11012 with encryption. |
| backup | (Optional) Indicates a backup gateway. <ul style="list-style-type: none">If omitted, indicates the primary gateway. A primary gateway must be configured before you can configure a backup gateway. Optional keywords, if omitted, are set as for the primary gateway. |
| failover-time <i>seconds</i> | (Optional) Specifies a time interval, in seconds, to wait for the primary gateway route after the route to the backup gateway is established. <ul style="list-style-type: none">The range is from 0 to 65535. The default is 3. |
| keepalive <i>seconds</i> <i>retry-count</i> | (Optional) Specifies a keepalive timeout, in seconds, and retry count. |
| source <i>interface-name</i> | (Optional) Indicates the interface name or IP address of the source for CNS communications. |

| | |
|-----------------------------------|--|
| <i>ipv4-address</i> | (Optional) IPv4 address of the source device. |
| <i>ipv6-address</i> | (Optional) IPv6 address of the source device. |
| <i>interface-name</i> | (Optional) Interface name of the source. |
| clock-timeout <i>time</i> | (Optional) Specifies the maximum time, in minutes, that the CNS event agent will wait for the clock to be set for transports (such as SSL) that require an accurate clock. The default is 10. |
| reconnect-time <i>time</i> | (Optional) Specifies the configurable upper limit of the maximum retry timeout, in seconds. <ul style="list-style-type: none"> The range is from 1 to 65535. The default is 3600. |

Command Default

No CNS event gateway is configured.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|----------------|---|
| 12.2(2)T | This command was introduced. |
| 12.0(18)ST | This command was integrated into Cisco IOS Release 12.0(18)ST. |
| 12.0(22)S | This command was integrated into Cisco IOS Release 12.0(22)S. |
| 12.2(2)XB | This command was integrated into Cisco IOS Release 12.2(2)XB and implemented on Cisco IAD2420 series Integrated Access Devices (IADs). |
| 12.2(8)T | This command was modified. The encrypt , init-retry , source , and force-fmt1 keywords were added. |
| 12.3 | This command was modified. The reconnect-time keyword was added. |
| 12.3(1) | This command was modified. The init-retry keyword was replaced with the failover-time keyword. The force-fmt1 keyword was removed. The clock-timeout keyword was added. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |

| Release | Modification |
|--------------------------|---|
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |
| 15.0(1)M | This command was modified in a release earlier than Cisco IOS Release 15.0(1)M. The <i>ipv4-address</i> and <i>ipv6-address</i> arguments were added. |

Usage Guidelines

The CNS event agent must be enabled before any of the other CNS agents are configured because the CNS event agent provides a transport connection to the CNS event bus for all other CNS agents. The other CNS agents use the connection to the CNS event bus to send and receive messages. The CNS event agent does not read or modify the messages.

The **failover-time** keyword is useful if you have a backup CNS event gateway configured. If the CNS event agent is trying to connect to the gateway and it discovers that the route to the backup is available before the route to the primary gateway, the *seconds* argument specifies how long the CNS event agent will continue to search for a route to the primary gateway before attempting to link to the backup gateway.

Unless you are using a bandwidth-constrained link, you should set a keepalive timeout and retry count. Doing so allows the management network to recover gracefully should a Cisco IE2100 configuration engine ever fail. Without the keepalive data, such a failure requires manual intervention on every device. The value of the *seconds* argument multiplied by the value of the *retry-count* argument determines the length of the idle time before the CNS event agent will disconnect and attempt to reconnect to the gateway. We recommend a minimum *retry-count* of two.

If the optional **source** keyword is used, the source IP address might be a secondary IP address of a specific interface to allow a management network to run on top of a production network.

If network connectivity between the Cisco IOS router running the CNS event agent and the gateway is absent, the event agent goes into an exponential backoff retry mode and gets stuck at the maximum limit (which may be hours). The **reconnect-time** keyword allows a configurable upper limit of the maximum retry timeout.

If you configure CNS passwords using the **cns password** command, existing event connections will be closed and reopened.

Examples

The following example shows how to set the address of the primary CNS event gateway to the configuration engine software running on IP address 10.1.2.3, port 11011, with a keepalive of 60 seconds and a retry count of 5:

```
Router(config)# cns event 10.1.2.3 11011 keepalive 60 5
```

Related Commands

| Command | Description |
|---------------------|--|
| cns id | Sets the unique event ID, config ID, or image ID used by CNS services. |
| cns password | Configures a CNS password. |

| Command | Description |
|------------------------------|--|
| show cns event status | Displays status information about the CNS event agent. |

cns exec

To enable and configure the Cisco Networking Services (CNS) exec agent, which provides CNS exec agent services to Cisco IOS clients, use the **cns exec** command in global configuration mode. To disable the use of CNS exec agent services, use the **no** form of this command.

cns exec [encrypt] [port-number] [source {ipv4-address| ipv6-address| interface-type number}]

no cns exec [encrypt] [port-number] [source {ipv4-address| ipv6-address| interface-type number}]

Syntax Description

| | |
|-----------------------|--|
| encrypt | (Optional) Uses a Secure Sockets Layer (SSL) encrypted link to the exec agent server. Note This keyword is available only in images that support SSL. |
| <i>port-number</i> | (Optional) Port number for the exec server. The default is 80. |
| source | (Optional) Specifies the use of an IP address defined by the <i>ip-address</i> argument as the source for CNS exec agent communications. |
| <i>ipv4-address</i> | (Optional) IPv4 address of the source device. |
| <i>ipv6-address</i> | (Optional) IPv6 address of the source device. |
| <i>interface-type</i> | (Optional) Interface type. For more information, use the question mark (?) online help function. |
| <i>number</i> | (Optional) Interface or subinterface number. For more information about the numbering syntax for your networking device, use the question mark (?) online help function. |

Command Default No CNS exec agent is configured.

Command Modes Global configuration (config)

Command History

| Release | Modification |
|-----------|---|
| 12.3(1) | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |

| Release | Modification |
|--------------------------|---|
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| 15.0(1)M | This command was modified in a release earlier than Cisco IOS Release 15.0(1)M. The <i>ipv4-address</i> and <i>ipv6-address</i> arguments were added. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

The CNS exec agent allows a remote application to execute an EXEC mode command-line interface (CLI) command on a Cisco IOS device by sending an event message containing the command. A restricted set of EXEC CLI commands—**show** commands—is supported.

In previous Cisco IOS releases, the CNS exec agent was enabled when the CNS configuration agent was enabled through the **cns config partial** command.

Examples

The following example shows how to enable the CNS exec agent with an IP address of 10.1.2.3 for the exec agent server, a port number of 93, and a source IP address of 172.17.2.2:

```
Router(config)# cns exec
10.1.2.3
93 source 172.17.2.2
```

Related Commands

| Command | Description |
|-------------------------------|---|
| cns event | Enables and configures CNS event agent services. |
| show cns event subject | Displays a list of CNS event agent subjects that are subscribed to by applications. |

cns id

To set the unique event ID, config ID, or image ID used by Cisco Networking Services (CNS), use the **cns id** command in global configuration mode. To set the identifier to the hostname of the Cisco IOS device, use the **no** form of this command.

```
cns id {type number {ipaddress| mac-address}| hardware-serial| hostname| string string| udi} [event|  
image]
```

```
no cns id {type number {ipaddress| mac-address}| hardware-serial| hostname| string string| udi} [event|  
image]
```

Syntax Description

| | |
|-----------------------------|---|
| <i>type number</i> | Type of interface (for example, ethernet , group-async , loopback , or virtual-template) and the interface number. • Indicates from which interface the IP or MAC address should be retrieved in order to define the unique ID. |
| ipaddress | Uses the IP address specified in the <i>type number</i> arguments as the unique ID. |
| mac-address | Uses the MAC address specified in the <i>type number</i> arguments as the unique ID. |
| hardware-serial | Uses the hardware serial number as the unique ID. |
| hostname | Uses the hostname as the unique ID. This is the system default. |
| string <i>string</i> | Uses an arbitrary text string--typically the hostname--as the unique ID. |
| udi | Uses the product Unique Device Identifier (UDI) as the unique ID. |
| event | (Optional) Sets this ID to be the event ID value, which is used to identify the Cisco IOS device for CNS event services. • If both optional keywords are omitted, the event ID is set to the hostname of the Cisco IOS device. |

| | |
|--------------|--|
| image | (Optional) Sets this ID to be the image ID value, which is used to identify the Cisco IOS device for CNS image agent services. <ul style="list-style-type: none"> • If both optional keywords are omitted, the image ID is set to the hostname of the Cisco IOS device. |
|--------------|--|

Command Default

The system defaults to the hostname of the Cisco IOS device as the unique ID.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|--------------------------|--|
| 12.2(2)XB | This command was introduced on Cisco IAD2420 series IADs. |
| 12.2(8)T | This command was integrated into Cisco IOS Release 12.2(8)T. The dns-reverse keyword was removed. |
| 12.3(1) | The optional image keyword was added to set an image ID. |
| 12.3(14)T | The udi keyword was added to use the product UDI as the unique ID. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use this command to set the unique ID for the CNS configuration agent, which then pulls the initial configuration template to the Cisco IOS device during bootup.

You can set one or all three IDs: the config ID value for CNS configuration services, the event ID value for CNS event services, and the image ID value for CNS image agent services. To set all values, use the command three times.

An IP address can be assigned to an interface, and **cns id** global configuration command can use this IP address as the CNS ID string.

When CNS ID configuration fails, the system defaults to the hostname of the Cisco IOS device as the unique ID.

To set the CNS event ID to the hostname of the Cisco IOS device, use the **no** form of this command with the **event** keyword. To set the CNS config ID to the hostname of the Cisco IOS device, use the **no** form of this command without the **event** keyword. To set the CNS image ID to the hostname of the Cisco IOS device, use the **no** form of this command with the **image** keyword.

Unique Device Identifier

Each identifiable Cisco product is an entity, as defined by the Entity MIB (RFC 2737) and its supporting documents. Some entities, such as a chassis, will have subentities like slots. An Ethernet switch might be a member of a superentity, such as a stack. Most Cisco entities that are orderable products will leave the factory with an assigned UDI. The UDI information is printed on a label that is affixed to the physical hardware device, and it is also stored electronically on the device in order to facilitate remote retrieval. To use UDI retrieval, the Cisco product in use must be UDI-enabled.

A UDI consists of the following elements:

- Product identifier (PID)
- Version identifier (VID)
- Serial number (SN)

The PID is the name by which a product can be ordered; historically, it has been called the “Product Name” or “Part Number.” This identifier is the one to use to order an exact replacement part.

The VID is the version of the product. When a product is revised, the VID is incremented according to a rigorous process derived from Telcordia GR-209-CORE, an industry guideline that governs product change notices.

The SN is the vendor-unique serialization of the product. Each manufactured product carries a unique serial number assigned at the factory, which cannot be changed in the field. The serial number is used to identify an individual, specific instance of a product.



Note

The **udi** keyword will create an ID consisting of the PID, VID, and SN values. Any spaces in PID, VID, and SN values will be removed. To view the UDI for this product, use the **show inventory** command.

Examples

The following example shows how to pass the hostname of the Cisco IOS device as the config ID value:

```
Router(config)# cns id
hostname
```

The following example shows how to pass the hardware serial number of the Cisco IOS device as the event ID value:

```
Router(config)# cns id hardware-serial event
```

The following example shows how to pass the UDI as the event ID value:

```
Router(config)# cns id udi event
```

The following example shows how to pass the IP address of Ethernet interface 0/1 as the image ID value:

```
Router(config)# cns id ethernet 0/1 ipaddress image
```

Related Commands

| Command | Description |
|-----------------------|--|
| cns event | Enables the CNS event gateway, which provides CNS event services to Cisco IOS clients. |
| cns image | Enables the CNS image agent services to Cisco IOS clients. |
| show inventory | Displays the product inventory listing for all Cisco products that are installed in a networking device. |

cns image

To configure the CNS image agent services, use the **cns image** command in global configuration mode. To disable the use of CNS image agent services, use the **no** form of this command.

cns image [**server** *server-url* [**status** *status-url*]]

no cns image [**server** *server-url* [**status** *status-url*]]

Syntax Description

| | |
|-------------------|--|
| server | (Optional) Specifies an image distribution server to contact for information about an updated image to be downloaded. |
| <i>server-url</i> | (Optional) URL used to contact an image distribution server. An IP address or domain name can be used. |
| status | (Optional) Specifies that any status messages generated by CNS image agent operations will be sent to the URL specified by the <i>status-url</i> argument. |
| <i>status-url</i> | (Optional) URL of a web server to which status messages are written. |

Command Default

When configured, the CNS image agent always listens for image events on the CNS Event Bus server.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines

Use the **cns image** command to start the CNS image agent process and to listen for image-related events on the CNS Event Bus.

If the optional server details are specified, the CNS image agent uses the server URL to contact the image management server. If no server details are specified, the URL for the image server must be supplied using one of the following three methods. The first method is to specify the image server using the server options on the **cns image retrieve** command. The second method is to use the server configured by the CNS event agent and stored as an image server event that can be received from the CNS Event Bus. The third method does not require a server URL because it uses CNS Event Bus mode.

If the optional status details are not specified, the status messages are sent as events on the CNS Event Bus.

Examples

The following example shows how to enable the CNS image agent services and configure a path to the image distribution server and a status messages server:

```
Router(config)# cns image server https://10.20.2.3:8080/cns/imageserver/  
status https://10.20.2.3:8080/cns/imageserver/messages  
/
```

Related Commands

| Command | Description |
|------------------------------|--|
| show cns image status | Displays information about the CNS image agent status. |

cns image password

To configure a password to use with the Cisco Networking Services (CNS) image agent services, use the **cns image password** command in global configuration mode. To disable the use of a password, use the **no** form of this command.

cns image password *image-password*

no cns image password *image-password*

Syntax Description

| | |
|-----------------------|---|
| <i>image-password</i> | Password to be used for CNS image agent services. |
|-----------------------|---|

Command Default

No password is used with the CNS image agent services.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines

Use this command to create a password that is sent with the image ID in all CNS image agent messages. The recipient of these messages can use this information to authenticate the sending device. This password may be different from the username and password used for HTTP basic authentication configured with other CNS image agent commands.

Examples

The following example shows how to configure a password to be used for the CNS image agent services:

```
Router(config)# cns image password textabc
```

Related Commands

| Command | Description |
|---------|--|
| cns id | Sets the unique event ID, config ID, or image ID used by CNS services. |

cns image retrieve

To contact a Cisco Networking Services (CNS) image distribution server and download a new image if a new image exists, use the **cns image retrieve** command in privileged EXEC mode.

cns image retrieve [**server** *server-url* [**status** *status-url*]]

Syntax Description

| | |
|-------------------|--|
| server | (Optional) Specifies an image distribution server to contact for information about an updated image to be downloaded. |
| <i>server-url</i> | (Optional) URL used to contact an image distribution server. |
| status | (Optional) Specifies that any status messages generated by this command will be sent to the URL specified by the <i>status-url</i> argument. |
| <i>status-url</i> | (Optional) URL of a web server to which status messages are written. |

Command Default

An error occurs when CNS image server has not previously been configured in global configuration mode.

Usage Guidelines

When the **cns image retrieve** command is issued in privileged EXEC mode without the **server** keyword and *server-url* argument, an error occurs.

When a CNS image server has been configured and the **cns image retrieve** command is issued with no **server** keyword and *server-url* argument, the server path configured in the **cns image** command is used.

When the **cns image** command is issued in global configuration mode with the optional **server** keyword, no keywords are required and no error occurs when you issue the **cns image retrieve** command in privileged EXEC mode.

Command Modes

Privileged EXEC (#)

Command History

| Release | Modification |
|-------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |

| Release | Modification |
|---------------------------|---|
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines

You must enable the CNS image agent services using the **cns image** command before configuring this command.

Use this command to poll an image distribution server and download a new image to the Cisco IOS device if a new image exists.

Examples

The following example shows how to configure the CNS image agent to access the image distribution server at 10.19.2.3 and download a new image if a new image exists:

```
Router# cns image retrieve server https://10.20.2.3:8080
/cns/imageserver/ status
https://10.20.2.3:8080/cns/imageserver/messages
/
```

Related Commands

| Command | Description |
|------------------------------|--|
| cns image | Enables CNS image agent services. |
| cns trusted-server | Specifies a trusted server for CNS agents. |
| show cns image status | Displays information about the CNS image agent status. |

cns image retry

To set the Cisco Networking Services (CNS) image upgrade retry interval, use the **cns image retry** command in global configuration mode. To restore the default value, use the **no** form of this command.

cns image retry *seconds*

no cns image retry *seconds*

Syntax Description

| | |
|----------------|---|
| <i>seconds</i> | Integer in the range from 0 to 65535 that specifies the number of seconds in the interval. The default is 60 seconds. |
|----------------|---|

Command Default

The default retry interval is 60 seconds.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(31)SB2 | This command was integrated into Cisco IOS Release 12.2(31)SB2. |
| 12.2(33)SRB | This command was integrated into Cisco IOS Release 12.2(33)SRB. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines

Use this command to set an interval after which the CNS image agent will retry an image upgrade operation if the original upgrade attempt failed.

Examples

The following example shows how to set the CNS image upgrade interval to 240 seconds:

```
Router(config)# cns image retry 240
```

Related Commands

| Command | Description |
|-----------|-----------------------------------|
| cns image | Enables CNS image agent services. |

cns inventory

To enable the CNS inventory agent—that is, to send an inventory of the router’s line cards and modules to the CNS configuration engine—and enter CNS inventory mode, use the **cns inventory** command in global configuration mode. To disable the CNS inventory agent, use the **no** form of this command.

cns inventory

no cns inventory

Syntax Description This command has no arguments or keywords.

Command Default The CNS inventory agent is disabled.

Command Modes Global configuration (config)

| Release | Modification |
|---------------------------|---|
| 12.2(8)T | This command was introduced. |
| 12.3(1) | The config , event , and notify oir keywords were removed. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines Use this command with the **announce config** and **transport event** CNS inventory configuration mode commands to specify when to notify the CNS configuration engine of changes to the router’s port-adaptor and interface inventory. A transport must be specified in CNS inventory configuration mode before any of the CNS inventory commands are executed.

Examples The following example shows how to enable the CNS inventory agent and enter CNS inventory configuration mode:

```
Router(config)# cns inventory
Router(cns_inv)#
```

Related Commands

| Command | Description |
|---------------------------|---|
| announce config | Specifies that an unsolicited configuration inventory is sent out by the CNS inventory agent at bootup. |
| cns config initial | Starts the CNS configuration agent and initiates an initial configuration. |
| transport event | Specifies that inventory events are sent out by the CNS inventory agent. |

cns message format notification

To configure the message format for notification messages from a Cisco Networking Services (CNS) device, use the **cns message format notification** command in global configuration mode. To unconfigure a configured message format for notification messages from a CNS device, use the **no** form of this command.

cns message format notification {version 1| version 2}

no cns message format notification {version 1| version 2}

Syntax Description

| | |
|------------------|---|
| version 1 | Configures CNS notification messages to use the non Service-Oriented Access Protocol (SOAP) format. |
| version 2 | Configures CNS notification messages to use the SOAP format. |

Command Default

Non-SOAP notification messages are used by default.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|--|
| 12.2(33)SRA | This command was introduced. |
| 12.4(9)T | This command was integrated into Cisco IOS Release 12.4(9)T. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Usage Guidelines

Use this command to configure a CNS agent to use the SOAP format for CNS notification messages. SOAP message formats are supported by default. If the Cisco IOS device receives a request in the non-SOAP message format, the response will be sent in the non-SOAP format. If the Cisco IOS device receives a request in the SOAP format, the response will be sent in the SOAP format. By default, notification messages that are sent without any corresponding request messages will be sent in both SOAP and non-SOAP formats.

When this command is configured, received CNS notification messages that do not conform to the configured message format are rejected.

If the **cns aaa authentication notification** command is already configured, then the sender's credentials will be authenticated. If the **cns message format notification** command is configured, then the notification messages will be sent as per the configured version number. The default configuration is the legacy non-SOAP format.

Examples

The following example shows how to configure CNS notification messages to use the SOAP format:

```
Router(config)# cns message format notification version 2
```

Related Commands

| Command | Description |
|-------------------------------|--------------------------|
| cns aaa authentication | Enables CNS AAA options. |

cns mib-access encapsulation

To specify whether Cisco Networking Services (CNS) should use nongranular (Simple Network Management Protocol [SNMP]) or granular (Extensible Markup Language [XML]) encapsulation to access MIBs, use the **cns mib-access encapsulation** command in global configuration mode. To disable the currently specified encapsulation, use the **no** form of this command.

cns mib-access encapsulation {snmp| xml [*size bytes*]}

no cns mib-access encapsulation {snmp| xml}

Syntax Description

| | |
|-------------------|--|
| snmp | Enables nongranular (SNMP) encapsulation for MIB access. |
| xml | Enables granular (XML) encapsulation for MIB access. |
| size bytes | (Optional) Maximum size in bytes for response events. The default is 3072. |

Command Default

For XML encapsulation, a maximum size of 3072 bytes.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|---|
| 12.2(8)T | This command was introduced on Cisco 2600 series and Cisco 3600 series routers. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Examples

The following example specifies that XML be used to access MIBs:

```
Router(config)# cns mib-access encapsulation xml
```

Related Commands

| Command | Description |
|--|--|
| cns notifications encapsulation | Specifies whether CNS notifications should be sent using nongranular (SNMP) or granular (XML) encapsulation. |

cns notifications encapsulation

To specify whether Cisco Networking Services (CNS) notifications should be sent using nongranular (Simple Network Management Protocol [SNMP]) or granular (Extensible Markup Language [XML]) encapsulation, use the **cns notifications encapsulation** command in global configuration mode. To disable the currently specified encapsulation, use the **no** form of this command.

cns notifications encapsulation {snmp| xml}

no cns notifications encapsulation {snmp| xml}

Syntax Description

| | |
|-------------|--|
| snmp | Uses nongranular (SNMP) encapsulation to send notifications. |
| xml | Uses granular (XML) encapsulation to send notifications. |

Command Default

CNS notifications are not sent using encapsulation.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|---------------------------|---|
| 12.2(8)T | This command was introduced on Cisco 2600 series and Cisco 3600 series routers. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| Cisco IOS XE Release 3.8S | This command was integrated into Cisco IOS XE Release 3.8S. |

Examples

The following example shows how to specify that granular notifications should be sent:

```
Router(config)# cns notifications encapsulation xml
```

Related Commands

| Command | Description |
|-------------------------------------|---|
| cns mib-access encapsulation | Specifies whether CNS should use granular (XML) or nongranular (SNMP) encapsulation to access MIBs. |

cns password

To configure a Cisco Networking Services (CNS) password, use the **cns password** command in global configuration mode. To disable the CNS password, use the **no** form of this command.

cns password *password*

no cns password *password*

Syntax Description

| | |
|-----------------|---|
| <i>password</i> | Any character string that specifies the CNS password. |
|-----------------|---|

Command Default

A CNS password is not configured.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|--------------------------|--|
| 12.4(8)T | This command was introduced. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

You must configure the CNS password the first time a router is deployed, and the CNS password must be the same as the bootstrap password set on the Configuration Engine (CE). If both the router and the CE bootstrap password use their default settings, a newly deployed router will be able to connect to the CE.

Once connected, the CE will change the CNS password from the bootstrap password to a random password. Network administrators must ensure not to change the CNS password. If the CNS password is changed, connectivity to the CE will be lost.

Examples

The following example shows how to set a CNS password named password1:

```
Router(config)# cns password password1
```

Related Commands

| Command | Description |
|---------------|--|
| cns id | Sets a unique event ID, config ID, or image ID used by CNS services. |

cns template connect

To enter Cisco Networking Services (CNS) template connect configuration mode and define the name of a CNS connect template, use the **cns template connect** command in global configuration mode. To disable the CNS connect template, use the **no** form of this command.

cns template connect *name*

no cns template connect *name*

Syntax Description

| | |
|-------------|--|
| <i>name</i> | Name of the CNS connect template to be configured. |
|-------------|--|

Command Default

No CNS connect templates are defined.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|--------------------------|---|
| 12.3(2)XF | This command was introduced. |
| 12.3(8)T | This command was integrated into Cisco IOS Release 12.3(8)T. |
| 12.3(9) | This command was integrated into Cisco IOS Release 12.3(9). |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |
| 12.2(33)SRD | This command was modified to allow users to reenter the CNS connect configuration mode after configuring the CNS connect profile. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use the **cns template connect** command to enter CNS template connect configuration mode and define the name of the CNS connect template to be configured. Then use the **cli** command to specify the command lines of the CNS connect template.



Note When you create a CNS connect template, you must enter the **exit** command to complete the configuration of the template and exit from CNS template connect configuration mode. This requirement was implemented to prevent accidentally entering a command without the **cli** command.



Note Effective with Cisco IOS Releases 12.3(8)T, 12.3(9), and 12.2(33)SRA the **cns config connect-intf** command is replaced by the **cns connect** and **cns template connect** commands.

Examples

The following example shows how to configure a CNS connect template named template1:

```
Router(config)# cns template connect template1
Router(config-templ-conn)# cli command-1
Router(config-templ-conn)# cli command-2
Router(config-templ-conn)# cli no command-3
Router(config-templ-conn)# exit
```

When the template1 template is applied, the following commands are sent to the router's parser:

```
command-1
command-2
no command-3
```

When the template1 template is removed from the router's configuration after an unsuccessful ping attempt to the CNS configuration engine, the following commands are sent to the router's parser:

```
no command-1
no command-2
command-3
```

Related Commands

| Command | Description |
|-----------------------|---|
| cli (cns) | Specifies the command lines of a CNS connect template. |
| cns connect | Enters CNS connect configuration mode and defines the parameters of a CNS connect profile for connecting to the CNS configuration engine. |
| discover (cns) | Defines the interface parameters within a CNS connect profile for connecting to the CNS configuration engine. |
| template (cns) | Specifies a list of CNS connect templates within a CNS connect profile to be applied to a router's configuration. |

cns trusted-server

To specify a trusted server for Cisco Networking Services (CNS) agents, use the **cns trusted-server** command in global configuration mode. To disable the use of a trusted server for a CNS agent, use the **no** form of this command.

cns trusted-server {**all-agents**| **config**| **event**| **exec**| **image**} *name*

no cns trusted-server {**all-agents**| **config**| **event**| **exec**| **image**} *name*

Syntax Description

| | |
|-------------------|---|
| all-agents | Specifies a trusted server for all CNS agents. |
| config | Specifies a trusted server for CNS config agent. |
| event | Specifies a trusted server for CNS event agent. |
| exec | Specifies a trusted server for CNS exec agent. |
| image | Specifies a trusted server for CNS image agent. |
| <i>name</i> | A string that specifies the hostname or IP address of the trusted server. |

Command Default

By default, only the implicit server strings are trusted.

The configuration of the CNS event agent's server string through the command-line interface (CLI) results in an implicit trust by all CNS agents. For the other CNS agents, the configuration of a server string using the CLI results in an implicit trust of the server for the specified agent. For example, **cns exec 10.2.1.2** implies the string 10.2.1.2 is implicitly trusted by the exec agent, and specifying **cns event 10.4.2.2** implies the string 10.4.2.2 is implicitly trusted by all the CNS agents.

Command Modes

Global configuration (config)

Command History

| Release | Modification |
|-------------|---|
| 12.3(1) | This command was introduced. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |
| 12.2(33)SB | This command was integrated into Cisco IOS Release 12.2(33)SB. |
| 12.2(33)SXI | This command was integrated into Cisco IOS Release 12.2(33)SXI. |

| Release | Modification |
|--------------------------|--|
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

Use the **cns trusted-server** command to specify a trusted server for an individual CNS agent or all the CNS agents. In previous Cisco IOS Releases, CNS agents could connect to any server and this could expose the system to security violations. An attempt to connect to a server not on the list results in an error message being displayed and an authentication failure reply extensible markup language (XML). For backwards compatibility the configuration of a server address using the configuration CLI for a CNS agent results in an implicit trust of the server for the specified agent.

Use this command when a CNS agent will redirect its response to a server address that is not explicitly configured on the command line for the specific CNS agent. For example, the CNS exec agent may have one server configured but receive a message from the CNS Event Bus that overrides the configured server. The new server address string has not been explicitly configured so the new server address is not a trusted server. An error will be generated when the CNS exec agent tries to respond to this new server address unless the **cns trusted-server** command has been configured for the new server address string.

The **cns trusted-server** command does not use Domain Name System (DNS). Instead a string comparison is done between the configured and implicit trusted servers and requested redirected server address.

Examples

The following example shows how to configure server 10.19.2.5 as a trusted server for the CNS event agent:

```
Router# cns trusted-server event 10.19.2.5
```

The following example shows how to configure server 10.2.2.8, which maps through DNS to host.somedomain.com as a trusted server for all CNS agents:

```
Router# cns trusted-server all-agents 10.2.2.8
Router# cns trusted-server all-agents host
Router# cns trusted-server all-agents host.somedomain.com
```

The following example shows how to configure the string 10.2.2.8 as an implicit trusted server for the CNS image agent:

```
Router# cns image server 10.2.2.8 status 10.2.2.8
```

Related Commands

| Command | Description |
|-------------------|--|
| cns config | Configures CNS configuration agent services. |
| cns event | Enables and configures CNS event agent services. |
| cns image | Configures CNS image agent services. |

config-cli



Note

Effective with Cisco IOS Releases 12.3(8)T and 12.3(9), the **config-cli** command is replaced by the **cli (cns)** command. See the **cli (cns)** command for more information.

To connect to the Cisco Networking Services (CNS) configuration engine using a specific type of interface, use the **config-cli** command in CNS Connect-interface configuration mode.

config-cli *type* [*number*] *interface-config-cmd*

Syntax Description

| | |
|-----------------------------|---|
| <i>type</i> | Type of interface. Indicates from which interface the IP or MAC address should be retrieved in order to define the unique ID. |
| <i>number</i> | (Optional) Interface number. Indicates from which interface the IP or MAC address should be retrieved in order to define the unique ID. |
| <i>interface-config-cmd</i> | Command that configures the interface. The <i>type</i> argument must be configured before other interface configuration commands. |

Command Default

No command lines are specified to configure the interface.

Command Modes

CNS connect-interface configuration (config-cns-conn-if)

Command History

| Release | Modification |
|-------------|---|
| 12.2(8)T | This command was introduced on Cisco 2600 series and Cisco 3600 series routers. |
| 12.3(8)T | This command was replaced by the cli (cns) command. |
| 12.3(9) | This command was replaced by the cli (cns) command. |
| 12.2(25)S | This command was integrated into Cisco IOS Release 12.2(25)S. |
| 12.2(33)SRA | This command was integrated into Cisco IOS Release 12.2(33)SRA. |

Usage Guidelines

Begin by using the **cns config connect-intf** command to enter CNS Connect-interface configuration (config-cns-conn-if) mode. Then use either this or its companion CNS bootstrap-configuration command to connect to the CNS configuration engine for initial configuration:

- **config-cli** connects to the registrar using a specific type of interface. You must specify the interface type but need not specify the interface number; the router's bootstrap configuration finds the connecting interface, regardless of the slot in which the card resides, by trying different candidate interfaces until it can ping the configuration engine.
- **line-cli** connects to the registrar using modem dialup lines.

Immediately after either of the commands, enter additional configuration commands as appropriate.

Examples

The following example enters CNS Connect-interface configuration mode, connects to a configuration engine using an asynchronous interface, and issues a number of commands:

```
Router(config)# cns config connect-intf Async
Router(config-cns-conn-if) # config-cli encapsulation ppp
Router(config-cns-conn-if) # config-cli ip unnumbered FastEthernet0/0
Router(config-cns-conn-if) # config-cli dialer rotary-group 0
Router(config-cns-conn-if) # line-cli modem InOut
Router(config-cns-conn-if) # line-cli
...<other line commands>...
Router(config-cns-conn-if) # exit
```

These commands apply the following configuration:

```
line 65
modem InOut
.
:
.
interface Async65
encapsulation ppp
dialer in-band
dialer rotary-group 0
```

Related Commands

| Command | Description |
|--------------------------------|---|
| cns config connect-intf | Specifies the interface for connecting to the CNS configuration engine. |
| line-cli | Connects to the CNS configuration engine using a modem dialup line. |

discover (cns)

To define the interface parameters within a Cisco Networking Services (CNS) connect profile for connecting to the CNS configuration engine, use the **discover** command in CNS connect configuration mode. To disable this functionality, use the **no** form of this command.

discover {**line** *line-type*| **controller** *controller-type*| **interface** [*interface-type*]} [**dlci** [**subinterface** *subinterface-number*]]

no discover {**line** *line-type*| **controller** *controller-type*| **interface** [*interface-type*]} [**dlci** [**subinterface** *subinterface-number*]]

Syntax Description

| | |
|------------------------|--|
| line | <p>Indicates that a line is used to connect to the CNS configuration engine.</p> <p>When the line <i>line-type</i> keyword and argument are specified, all the lines that create an interface that match the specified <i>line-type</i> argument are discovered.</p> <p>The CNS connect templates associated with the discover line <i>line-type</i> command are applied in line configuration mode.</p> |
| <i>line-type</i> | Type of line used to connect to the CNS configuration engine. |
| controller | <p>Indicates that a controller is used to connect to the CNS configuration engine.</p> <p>When the controller <i>controller-type</i> keyword and argument are specified, all the controllers that create an interface that match the specified <i>controller-type</i> argument are discovered.</p> <p>The CNS connect templates associated with the discover controller <i>controller-type</i> command are applied in controller configuration mode.</p> |
| <i>controller-type</i> | Type of controller used to connect to the CNS configuration engine. |

| | |
|-----------------------|--|
| interface | <p>Indicates that an interface is used to connect to the CNS configuration engine.</p> <p>If the discover interface <i>interface-type</i> command is the first discover command configured in a CNS connect profile, the interfaces that match the specified <i>interface-type</i> argument are discovered.</p> <p>If the discover interface <i>interface-type</i> command is configured after the discover line <i>line-type</i> or discover controller <i>controller-type</i> commands in a CNS connect profile, the specified <i>interface-type</i> argument is ignored. Instead, the CNS connect templates associated with the discover interface command are applied to all the interfaces associated with the preceding discover line <i>line-type</i> or discover controller <i>controller-type</i> commands.</p> <p>The CNS connect templates associated with the discover interface <i>interface-type</i> command are applied in interface configuration mode.</p> |
| <i>interface-type</i> | (Optional) Type of interface used to connect to the CNS configuration engine. |
| dlci | <p>Active DLCIs to be used for connecting to the CNS configuration engine.</p> <p>When this keyword is defined, all the active DLCIs are discovered on the interface specified by the preceding discover interface <i>interface-type</i> command. A Frame Relay LMI message will return a list of active DLCIs.</p> <p>Active DLCIs can only be discovered on interfaces configured with Frame Relay. Therefore, the location of the discover dlci command in a CNS connect profile is important. It must be entered after the interfaces have been configured with Frame Relay.</p> <p>The CNS connect templates associated with the discover dlci command are applied in subinterface (point-to-point) configuration mode.</p> <p>Defines the CNS connect variable \${dlci} and \${next-hop}.</p> <p>Note Any Cisco IOS command that requires knowledge of the active DLCIs must be configured after the discover dlci command.</p> |
| subinterface | (Optional) Indicates that a point-to-point subinterface is used to perform a search for active DLCIs. If a number is not specified, the default value is 9999. |

| | |
|----------------------------|---|
| <i>subinterface-number</i> | (Optional) Number of the point-to-point subinterface used to perform a search for active DLCIs. |
|----------------------------|---|

Command Default No interface parameters within a CNS connect profile are defined.

Command Modes CNS connect configuration (config-cns-conn)

Command History

| Release | Modification |
|--------------------------|---|
| 12.3(2)XF | This command was introduced. |
| 12.3(8)T | This command was integrated into Cisco IOS Release 12.3(8)T. |
| 12.3(9) | This command was integrated into Cisco IOS Release 12.3(9). The dlci subinterface <i>subinterface-number</i> keywords and argument and the CNS connect variable \${dlci} are not supported in this release. |
| Cisco IOS XE Release 2.1 | This command was integrated into Cisco IOS XE Release 2.1. |

Usage Guidelines

First use the **cns connect** command to enter CNS connect configuration mode and define the parameters of a CNS connect profile for connecting to the CNS configuration engine. Then use the following CNS connect commands to create a CNS connect profile:

- **discover**
- **template**

A CNS connect profile specifies the **discover** commands and associated **template** commands to apply to a router's configuration. The first **discover** command in a CNS connect profile defines the scope of interfaces to be searched and used to perform the ping iterations for connecting to the CNS configuration engine. Subsequent **discover** commands limit this scope.

The search is based on discovering all the interfaces that match the specified line, controller, or interface type. The search is case-insensitive and allows for abbreviations. For example, the **discover interface Serial**, **discover interface Ser**, **discover interface serial**, and **discover interface ser** commands all match the serial interface.

Each **discover** command must have at least one unique CNS connect template associated with it. Specifically, the **template** command must be configured after configuring the **discover** command. The **discover** command specifies the configuration mode in which the CNS connect templates (specified by the **template** command that is associated with the **discover** command) are to be applied. When multiple **discover** and **template** commands are configured in a CNS connect profile, they are processed in the order in which they are entered.

The table below provides a summary of the interface parameters that can be defined using the **discover** command.

Table 2: Summary of the discover Commands

| discover Command | Description | Associated CNS Connect Variable | Configuration Mode in Which CNS Connect Templates Are Applied | Prerequisite discover Command | Required Subsequent discover Command |
|--|--|---|---|---|---|
| discover line <i>line-type</i> | Discovers all the lines that create an interface that match the specified <i>line-type</i> argument. | \${line} | Line | — | discover interface <i>interface-type</i> |
| discover confgoller <i>controller-type</i> | Discovers all the controllers that create an interface that match the specified <i>controller-type</i> argument. | \${controller} | Controller | — | discover interface <i>interface-type</i> |
| discover interface [<i>interface-type</i>] | <ul style="list-style-type: none"> • If this is the first discover command configured, then all the interfaces that match the specified <i>interface-type</i> argument are discovered. • If configured after the discover line <i>line-type</i> or discover controller <i>controller-type</i> commands, then the specified <i>interface-type</i> argument is ignored. | \${interface} \${next-hop} | Interface | — | — |
| discover dlci [<i>subinterface subinterface-number</i>] | Discovers all active DLCIs on the interface specified by the preceding discover interface command. | \${dlci} \${next-hop} | Subinterface (point-to-point) | discover interface <i>interface-type</i> | — |

CNS connect variables can be used as placeholders within a CNS connect template configuration. Each variable is defined by an associated **discover** command (see the table above and the table below). Before a CNS connect

template that contains these variables is applied to a router's configuration, the variables are replaced by the values defined by their associated **discover** command. For example, if the **discover interface serial** command was configured, and you were able to connect to the CNS configuration engine using Serial0/0, the **cli ip route 0.0.0.0 0.0.0.0 \${interface}** command would generate the **cli ip route 0.0.0.0 0.0.0.0 serial0/0** command.

Table 3: Summary of the CNS Connect Variables

| Variable | Description |
|-----------------------|---|
| \${line} | The line type defined by the associated discoverline line-type command. |
| \${controller} | The controller type defined by the associated discover controller controller-type command. |
| \${interface} | The interface type defined by the associated discover interface command. |
| \${dlsi} | The active DLCI defined by the associated discover dlsi command. |
| \${next-hop} | <p>The next hop interface. This variable is identical to the \${interface} variable unless the discover dlsi command has been configured. In this case, the \${next-hop} variable is identical to the \${interface}.\${subinterface} variable, where the {subinterface} variable is specified by the discover dlsi command.</p> <p>The \${next-hop} variable should only be used in the CNS connect templates after the last discover command has been entered.</p> <p>A typical use of this variable is to allow the default IP route to be configured to send traffic towards the CNS configuration engine. Note that the CNS configuration engine may not be on the same LAN as the router. Therefore, configuring a route to the CNS configuration engine may require deployment-specific knowledge. Common practice is to define a default route to the interface using the ip route command (for example, cli ip route 0.0.0.0 0.0.0.0 \${next-hop}).</p> |
| \$\$ | A literal substitution of the \$ symbol. |



Note Effective with Cisco IOS Releases 12.3(8)T and 12.3(9), the **&** variable is replaced by the **\${interface}** variable.

Examples

The following example shows how to create a CNS connect profile named EG:

```
Router (config)# cns connect EG
Router (config-cns-conn)# discover controller T1
Router (config-cns-conn)# template timeslot-1
Router (config-cns-conn)# discover interface
Router (config-cns-conn)# template frame
Router (config-cns-conn)# exit
Router (config)#
```

In this example, the following sequence of events occur for each T1 controller when the **cns connect EG** command is processed:

- 1 Enter controller configuration mode and apply all commands in the timeslot-1 template to the router's configuration.
- 2 For each interface associated with each T1 controller:
 - 1 Enter interface configuration mode and apply all commands in the frame template to the router's configuration.
 - 2 Try to ping the CNS configuration engine.
 - 3 If the ping is successful, then download pertinent configuration information from the CNS configuration engine and exit. The **cns connect EG** command has completed its process.
 - 4 If the ping is unsuccessful, enter interface configuration mode and remove all commands in the frame template from the router's configuration.
- 3 Enter controller configuration mode and remove all commands in the timeslot-1 template from the router's configuration. The **cns connect EG** command has failed to retrieve any configuration information from the CNS configuration engine.

Related Commands

| Command | Description |
|-----------------------------|---|
| cli (cns) | Specifies the command lines of a CNS connect template. |
| cns connect | Enters CNS connect configuration mode and defines the parameters of a CNS connect profile for connecting to the CNS configuration engine. |
| cns template connect | Enters CNS template connect configuration mode and defines the name of a CNS connect template. |
| template (cns) | Specifies a list of CNS connect templates within a CNS connect profile to be applied to a router's configuration. |

