Cisco IOS Software Activation Command Reference

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
http://www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

CONTENTS

clear license agent through debug license

clear license agent

To clear license agent statistics counters or connection statistics, use the **clear license agent** command in privileged EXEC mode.

clear license agent {**counters** | **sessions**}

Syntax Description

counters	Clears license agent statistics counters.
sessions	Clears license agent connection statistics.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
15.0(1)M	This command was introduced.
Cisco IOS XE Release 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.

Examples

The following example clears license agent statistics counters:

```
Router# clear license agent counters
```

Related Commands

Command	Description
show license	Displays information about a Cisco IOS software license.

debug license

To enable controlled Cisco IOS software license debugging activity on a device, use the **debug license** command in privileged EXEC mode. To disable debugging, use the **no** form of this command.

debug license {**agent** {**all** | **error**} | **core** {**all** | **errors** | **events**} | **errors** | **events** | **ipc**}
no debug license {**agent** {**all** | **error**} | **core** {**all** | **errors** | **events**} | **errors** | **events** | **ipc**}

Cisco ASR 903 Router Platforms
debug license {**agent** {**all** | **errors**} | **core** {**all** | **errors** | **events**} | **errors** | **events** | **feature atm** | **ipc**}
no debug license {**agent** {**all** | **errors**} | **core** {**all** | **errors** | **events**} | **errors** | **events** | **feature atm** | **ipc**}

Cisco ASR 1001 Router Platforms
debug license {**core** {**all** | **errors** | **events**} | **errors** | **ipc**}
no debug license {**core** {**all** | **errors** | **events**} | **errors** | **ipc**}

Syntax Description

agent	Debugs license agent information. • **all**--Debugs all license agent messages. • **error**--Debugs only license agent error messages.
core	Debugs messages from a license core module. • **all**--Debugs all license core messages. • **errors**--Debugs only license core error messages. • **events**--Debugs only license core event messages.
errors	Debugs license warnings and errors.
events	Debugs license event messages.
feature atm	Debugs the ATM feature license.
ipc	Debugs license interprocess communication (IPC) messages.

Command Default

Debugging is disabled.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Release	Modification
Cisco IOS XE Release 3.2S	This command was integrated into Cisco IOS XE Release 3.2S and implemented on the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **feature atm** keywords were added for the Cisco ASR 903 router.

Usage Guidelines

Use this command to help troubleshoot issues with licenses on a device.

On the Cisco ASR 1001 router, the output from the **debug license** command is not in standard IOS format. You must execute the **request platform software trace rotate all** privileged EXEC command to make the output in the log files in the bootflash:tracelogs directory.

Examples

The following example shows how to enable debugging for license warnings and errors on a router:

```
Router# debug license errors
License warnings and errors debugging is on
```

The following example shows how to enable debugging for all license agent information on a switch:

```
Switch# debug license agent all
license agent app https[0x43FBC7C]: urlhook function
license agent app https[0x43FBC7C]: https action function
LIC_AGENT:Processing XML message
<?xml version="1.0" encoding="UTF-8"?>
<SOAP:Envelope xmlns:SOAP="http://www.w3.org/2003/05/soap-envelope">
<SOAP:Header>
<clm:Header version="1.0" xmlns:clm="http://www.cisco.com/clm">
<clm:Time>2003-04-23T20:27:19.827Z</clm:Time>
</clm:Header>
</SOAP:Header>
<SOAP:Body>
<lica:request xmlns:lica="http://www.cisco.com/clm">
<lica:installRequest>
<lica:license encoding="BASE64">
PENJU0NPX1dUX0FSVElGQUNUUyB2ZXJzaW9uPSIxLjAiPjxDSVNDT19XVF9MSUNFTlNFIHZlcnNp
b249IjEuMCI+PEZFQVRVUkVfTkFNRT5pcGJhc2U8L0ZFQVRVUkVfTkFNRT48RkVBVFVSRV9WRVJT
SU9OPjEuMDwvRkVBVFVSRV9WRVJTSU9OPjxVREk+PFBJRD5CVUxMU0VZRTI0PC9QSUQ+PFNOPkNB
VDEwMDZSMEU4PC9TTj48L1VEST48U09VUkNFPkNpc2NvIEhRPC9TT1VSQ0U+PENSUFURV9EQVRF
PjIwMDYtMTEtMjJUMDA6MzM6NTA8L0NSUFURV9EQVRFPjxMSUNFTlNFX0xJTkVfSEFTSCBoYXNo
QWxnbz0iU0hBMSI+NDJiNFVWWFpOd3pJK0ZNdEV6QlNZSDRWdzFFPTwvTElDRU5TRV9MSU5FX0hB
U0g+PFRZUEU+UkVHVUxBUjwvVFlQRT48TElDRU5TRV9MSU5FPjwhW0NEQVRBWzExIGlwYmFzZSAx
LjAgTE9ORyBOT1JNQUwgU1RBTkRBTE9ORSBFWENMIElORklOVRFX0tFWVMgSU5GSU5JVEVfS0VZ
UyBORVZFUiBORVZFUiBOaUwgU0xNX0NPREUgQ0xfTkRfTENLIE5pTCAqMVZBUlY5WlJESzREOU5U
NDAwIE5pTCBOaUwgTmlMIDVfTUlOUyA8VURJPjxQSUQ+QlVMTFNFWUUyNDwvUElEPjxTTj5DQVQx
MDA2UjBFODwvU04+PC9VREk+IGUxWW8wS1U2VnJLOnBJZXRib1dJVkEyZlVaVGdieUlEaklHWERR
VXc3dkxOYWlXRzZ0dUJOMG5lTXpKaHpzQ2tMN1l3TWFxS2paem05YW5FbVJHUUVPTHlDdmRVZksw
QmNLN0pPcnZsUkw0VjMyJDxXTEM+QVFFQklRQUIvLy9GbS8vWDkybThNb0NOZkVMSHJiVzRjWDFM
ZGNpdDNMVU5GWlV1OWppT0phcXB5Q2N6TTFpaUlKbVE3NEd5WHJFY3F2UGlBbVdTYUVtVVQ1NnJz
dGs2Z3ZtaitFUUtSZkQ5QTBpbWUxY3pyZEt4ZklMVDBMYVhUNDE2bndtZnA5MlR5YTZ2SVE0Rm5s
QmRxSjFzTXpYZVNxOFBtVmNUVTlBNG85aGlsOXZLdXI4TjlGODg1RDlHVkYwYkpIY2lUNU09PC9X
TEM+XV0+PC9MSUNFTlNFX0xJTkU+PFVTRVJfTU9ESUZJQUJMRV9DT01NRU5UIGZpZWxkUmVzdHJp
Y3Rpb25zPSJNYXggOTkgQVNDSUkgY2hhcmFjdGVycyBpbiBsZW5ndGguIj48L1VTRVJfTU9ESUZJ
QUJMRV9DT01NRU5UPjwvQ0lTQ09fV1RfTElDRU5TRT48L0NJU0NPX1dUX0FSVElGQUNUUz4=
</lica:license>
</lica:installRequest>
</lica:request>
</SOAP:Body>
```

```
</SOAP:Envelope>
LIC_AGENT: XML received opcode(1)
LIC_AGENT: License ipbase
%IOS_LICENSE_IMAGE_APPLICATION-6-LICENSE_LEVEL: Next reboot level = ipbase and License =
ipbase
LIC_AGENT: Notification Event type = 1 License Installed
LIC_AGENT: Notification Event type = 13 License Annotate
```

license accept end user agreement through request license new-udi

license accept end user agreement

To accept the end-user license agreement (EULA) for all Cisco IOS software packages and features at one time, use the **license accept end user agreement** command in global configuration mode.

license accept end user agreement

Syntax Description

This command has no arguments or keywords.

Command Default

EULA is not accepted.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M4	This command was introduced for the fixed Cisco ISR and the Cisco ISR G2 platforms.

Usage Guidelines

The **license accept end user agreement** command is used to accept the EULA for all Cisco IOS software packages and features. After the command is issued and the EULA accepted, it is automatically applied for all Cisco IOS software packages and feature licenses.

- If this configuration command is part of the start-up configuration, it implies that the EULA is accepted. The EULA is automatically applied to any subsequent license that is activated; the EULA is not displayed and the user is not prompted to accept the EULA.
- A copy of the terms of the EULA is available at http://www.cisco.com/en/US/docs/general/warranty/English/EU1KEN_.html

Examples

The following example shows how to configure the EULA:

```
Router(config)# license accept end user agreement
```

Related Commands

Command	Description
license install	Installs a stored license file.
show license	Displays information about a Cisco IOS software license.

license agent default

To configure license agent authentication, use the **license agent default** command in global configuration mode.

license agent default authenticate [**none**]

Syntax Description

authenticate	Authenticates by using the HTTP mechanism.
none	(Optional) Disables (bypasses) HTTP authentication.

Command Default

The license agent is enabled, and it monitors the HTTP path /lic-agent by using plaintext.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced.
15.0(1.1)M	This command was modified. The **no** form of the command was removed.
Cisco IOS XE Release 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.

Usage Guidelines

By default, the license agent starts automatically when the device boots up.

The agent responds to ConnectRequest XML messages and, depending on the configuration of the **license agent listener http** command, all other Cisco License Manager XML messages.

Examples

The following example shows how to use the default HTTP mechanism for authentication:

```
Router(config)# license agent default authenticate
```

Related Commands

Command	Description
license agent listener	Configures the path that the license agent authentication monitors.
license agent max-sessions	Limits the number of HTTP sessions to the license agent.
license agent notify	Specifies the URL to send license agent notifications.

license agent listener

To configure the path that the license agent authentication monitors, use the **license agent listener** command in global configuration mode. To return to the default setting, use the **no** form of this command.

license agent listener http {**encrypt** | **plaintext**} *url-path* **authenticate** [**acl** *access-list*] [**max-message** *size*] [**none**]
no license agent listener http

Syntax Description

http	Uses the HTTP listener transport.
encrypt	Accepts encrypted connections.
plaintext	Accepts plaintext connections.
url-path	The HTTP servlet path to respond to.
authenticate	Authenticates by using the default HTTP mechanism.
acl *access-list*	(Optional) Uses the specified access list for trusted clients on this session. The range is 1 to 65536.
max-message *size*	(Optional) Defines the maximum message size that the license agent accepts. The range is 1000 to 4294967295.
none	(Optional) Disables (bypasses) HTTP authentication.

Command Default

The license agent authentication monitors the HTTP path /lic-agent by using plaintext.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced.
Cisco IOS XE Release 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.

Usage Guidelines

This command starts the license agent in listener mode.

If the value for the *url-path* argument is not **/lic-agent**, then /lic-agent (for example, license agent default) accepts only the ConnectRequest message. Otherwise, if the value for the *url-path* argument is **/lic-agent** (and **encrypt** is specified), then encrypt /lic-agent accepts all requests and plaintext /lic-agent accepts only the ConnectRequest message.

Examples

The following example shows how to authenticate the license agent by using the HTTP encrypted authentication mechanism:

```
Router(config)# license agent listener http encrypt /lic-agent authenticate
```

Related Commands

Command	Description
license agent default	Configures license agent authentication.
license agent max-sessions	Limits the number of HTTP sessions to the license agent.
license agent notify	Specifies the URL to send license agent notifications.

license agent max-sessions

To limit the number of HTTP sessions to the license agent, use the **license agent max-sessions** command in global configuration mode. To return to the default setting, use the **no** form of this command.

license agent max-sessions *number*
no license agent max-sessions

Syntax Description

number	Maximum number of license agent sessions. The range is 4 to 25.

Command Default

The default number of HTTP sessions is 9.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced.
Cisco IOS XE Release 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.

Examples

The following example shows how to limit the number of concurrent license agent sessions on a router:

```
Router(config)# license agent max-sessions 5
Router(config)# exit
Router# show license agent session
License Agent Sessions: 0 open, maximum is 5
```

Related Commands

Command	Description
license agent default	Configures license agent authentication.
license agent listener	Configures the path that the license agent authentication monitors.
license agent notify	Specifies the URL to send license agent notifications.

license agent notify

To specify the URL to send license agent notifications, use the **license agent notify** command in global configuration mode. To remove the configuration, use the **no** form of this command.

license agent notify *url-path user password version*
no license agent notify

Syntax Description

url-path	URL to use (for example, http://10.1.1.1/abc).
user	HTTP-level username to use.
password	HTTP-level password to use.
version	Notification version number.

Command Default

The URL is not configured.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced.
Cisco IOS XE Release 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.

Usage Guidelines

You can also configure this command by using the Cisco License Manager message ConnectRequest.

Examples

The following example shows how to specify the URL to send license agent notifications:

```
Router(config)# license agent notify http://10.1.1.1/abc users anonymous 1
```

Related Commands

Command	Description
license agent default	Configures license agent authentication.
license agent listener	Configures the path that the license agent authentication monitors.
license agent max-sessions	Limits the number of HTTP sessions to the license agent

license boot

To configure or change the boot license on the device, use the **license boot** command in global configuration mode. To remove a configured boot license, use the **no** form of this command. If you remove all boot license configurations on the device, the system reverts to the default value.

license boot { **level** *technology-package* | **suite** *suite* } [**disable**]

no license boot { **level** *technology-package* | **suite** *suite* } [**disable**]

Syntax Description

level *technology-package*	Configures a technology package. A technology package is an image level license. You can configure one or more of the following technology packages: appxk9, securityk9, uck9. **Note** If a technology package is configured, do not configure the suite, which the technology package belongs to - even in releases where the system permits this. For example, if you configure **appxk9**, or **securityk9**, then don't also configure **FoundationSuiteK9**. For more information, see the *Usage Guidelines* below.
suite *suite*	Configures a suite license. A suite is a superset of one or more image level and feature licenses. If a suite is configured, you cannot additionally configure technology packages that are included in the suite. The system rejects such configuration if you do. You can configure the following suites: • FoundationSuiteK9: This suite includes the “appxk9” and “securityk9” licenses. • AdvUCSuiteK9: This suite includes the "uck9", "cme-srst", and “cube” licenses.
disable	Disables a PAK license and sets it to “not-in-use”. **Note** Although visible on the CLI, this keyword is not supported starting with Cisco IOS XE Gibraltar 16.10.1.

Command Default

The **ipbasek9** technology package is activated by default. It is always enabled, and you can display it by using the **show version** privileged EXEC command. It is not displayed in any of the licensing related **show** command outputs .

You cannot disable it or enable it, using the command line interface.

No other boot license is configured by default.

Command Modes

Global configuration (config)

Command History

Release	Modification
Cisco IOS XE Release 3.9.1S	This command was implemented on Cisco 4000 Series Integrated Services Routers.

Release	Modification
Cisco IOS XE Everest 16.6.2	This command was implemented on Cisco 1000 Series Integrated Services Routers.
Cisco IOS XE Gibraltar 16.10.1	The **disable** keyword is no longer supported.
Cisco IOS XE Cupertino 17.9.1a	Inconsistent system behavior was rectified. The system does not allow duplicate suite *and* technology package configuration to co-exist.

Usage Guidelines

Use the **license boot** command to:

- Configure a the boot license.
- Change the boot license.
- Remove boot license configuration.

Depending on your requirements, configure the required technology packages, and suites. If you configure a technology package, do not also configure the suite it belongs to. If you configure a suite, do not configure the technology packages that are included in the suite. For example, if you configure the **appxk9**, or **securityk9** technology packages, do not configure the **FoundationSuiteK9** suite. But you can configure **AdvUCSuiteK9**.

After you configure the command, remember to save configuration changes. Only then does the configuration change take effect at the next reboot. When the device reloads, the licensing infrastructure checks the startup configuration for any licenses. If there is a license in the configuration, the device boots with that license. If there is no license, the licensing infrastructure follows the image hierarchy to check for licenses.

In scenarios where you change or remove existing boot license configurations, after you save and reload the first time, the changes are reflected correctly in the output of the **show running-config | include boot** privileged EXEC command, but not in certain other **show** command outputs, like **show version** or **show license summary**. *This has no functional impact, and it does not mean that the configuration changes have not taken effect.* You only have to save and reload a second time for the **show** command outputs to be synchronized.

System Behaviour Change in Boot License Configuration

- *Prior to Cisco IOS XE Cupertino 17.9.1a*:

  If you configure a suite followed by a technology package which belongs to the suite, the technology package configuration is rejected.

  If you configure a technology package followed by the suite, which the technology package belongs to, the technology package configuration is permitted by the system, but *not* recommended. This inconsistent and incorrect system behaviour also causes license count to be reflected incorrectly.

- *Starting with Cisco IOS XE Cupertino 17.9.1a*: The system does not allow overlapping suite and technology package configuration to co-exist, regardless of the order in which you configure.

Examples

- Example 1: Configuring a Suite, on page 16
- Example 2: Configuring a Technology Package Along With Existing Suite License Configuration, on page 18
- Example 3: Configuring Multiple Technology Packages, on page 19

Example 1: Configuring a Suite

The following example shows you how to configure a suite.

If you configure a suite, you cannot configure any of the technology packages that are included in the suite after that. In this example, we're configuring the AdvUCSuiteK9 suite. After this the "uck9", "cme-srst" and "cube" technology packages cannot be configured, but the "appxk9" and "securityk9" technology packages can.

```
Device# show running-config | include boot
boot-start-marker
boot system flash bootflash: isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Device(config)# license boot suite AdvUCSuiteK9
% use 'write' command to make license boot config take effect on next boot

Device(config)# exit
Device# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Device# show running-config | include boot
boot-start-marker
boot system flash bootflash: isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot suite AdvUCSuiteK9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# show version
Cisco IOS XE Software, Version 17.09.01a
Cisco IOS Software [Cupertino], ISR Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version
17.9.1, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2022 by Cisco Systems, Inc.
Compiled Mon 07-Mar-22 01:36 by mcpre
.
.
.
Suite License Information for Module:'esg'

--------------------------------------------------------------------------------
Suite                 Suite Current         Type           Suite Next reboot
--------------------------------------------------------------------------------
FoundationSuiteK9     None                  Smart License  None
securityk9
appxk9
```

```
AdvUCSuiteK9          AdvUCSuiteK9          Smart License  AdvUCSuiteK9
uck9
cme-srst
cube


Technology Package License Information:

-----------------------------------------------------------------
Technology    Technology-package           Technology-package
              Current       Type           Next reboot
-----------------------------------------------------------------
appxk9           None             Smart License    None
uck9             uck9             Smart License    None
securityk9       None             Smart License    None
ipbase           ipbasek9         Smart License    ipbasek9

<output truncated>
Device# reload
Proceed with reload? [confirm]

*May 27 09:43:35.850: %SYS-5-RELOAD: Reload requested by test on console. Reload Reason:
Reload Command.
Initializing Hardware ...
<output truncated>

Device# show version

<output truncated>

Suite License Information for Module:'esg'

--------------------------------------------------------------------------------
Suite                 Suite Current         Type           Suite Next reboot
--------------------------------------------------------------------------------
FoundationSuiteK9     None                  Smart License  None
securityk9
appxk9

AdvUCSuiteK9          AdvUCSuiteK9          Smart License  AdvUCSuiteK9
uck9
cme-srst
cube


Technology Package License Information:

-----------------------------------------------------------------
Technology    Technology-package           Technology-package
              Current       Type           Next reboot
-----------------------------------------------------------------
appxk9           None             Smart License    None
uck9             None             Smart License    None
securityk9       None             Smart License    None
ipbase           ipbasek9         Smart License    ipbasek9

Device# show license summary
Account Information:
  Smart Account: BU Production Test  As of May 20 18:53:04 2022 UTC
  Virtual Account: DLC-VA1

License Usage:
  License                Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
```

```
  booster_performance      (ISR_4431_BOOST)                  1 IN USE
  AdvUCSuiteK9             (ISR_4400_AdvancedUCSuite)        1 IN USE
```

Example 2: Configuring a Technology Package Along With Existing Suite License Configuration

The following example shows how to configure a technology package, when a suite license configuration already exists. In this example, AdvUCSuiteK9 is already configured. Therefore, the only technology packages you can configure are the ones that are not included in AdvUCSuiteK9, that is, appxk9 and securityk9.

The sample configuration also shows you what happens if you try to configure a technology package (uck9) that is part of the already configured suite (AdvUCSuiteK9).

```
Device# show running-config | include boot
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
license boot suite AdvUCSuiteK9

Device# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.

Device(config)# license boot level ?
  appxk9      Appx License Level
  securityk9  Security License Level

Device(config)# license boot level appxk9
% use 'write' command to make license boot config take effect on next boot

Device(config)# license boot level uck9
                                   ^
% Invalid input detected at '^' marker.

Device(config)# exit
Device# show running-config | include boot
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
license boot suite AdvUCSuiteK9
license boot level appxk9

Device# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Device# reload
Proceed with reload? [confirm]

*May 27 10:16:55.439: %SYS-5-RELOAD: Reload requested by test on console. Reload Reason:
Reload Command.
*May 27 10:17:07.137: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: process
exit with reload chassis code
<output truncated>

Device# show version
Cisco IOS XE Software, Version 17.09.01a
Cisco IOS Software [Cupertino], ISR Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version
17.9.1, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2022 by Cisco Systems, Inc.
Compiled Mon 07-Mar-22 01:36 by mcpre
.
.
.
-------------------------------------------------------------------------------
```

```
Suite                 Suite Current         Type           Suite Next reboot
--------------------------------------------------------------------------------
FoundationSuiteK9     None                  Smart License  None
securityk9
appxk9

AdvUCSuiteK9          AdvUCSuiteK9          Smart License  AdvUCSuiteK9
uck9
cme-srst
cube


Technology Package License Information:

-----------------------------------------------------------------
Technology    Technology-package              Technology-package
              Current              Type       Next reboot
-----------------------------------------------------------------
appxk9         appxk9              Smart License    appxk9
uck9           None                Smart License    None
securityk9     None                Smart License    None
ipbase         ipbasek9            Smart License    ipbasek9

<output truncated>

Device# show license summary
Account Information:
  Smart Account: Eg-SA As of May 20 18:53:04 2022 UTC
  Virtual Account: Eg-VA

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  booster_performance     (ISR_4431_BOOST)                1 IN USE
  appxk9                  (ISR_4400_Application)          1 IN USE
  AdvUCSuiteK9            (ISR_4400_AdvancedUCSuite)      1 IN USE
```

Example 3: Configuring Multiple Technology Packages

The following example shows you how to configure multiple technology packages. In this example there are no existing boot license configurations on the device - technology packages or suites. The appxk9 and uck9 technology packages are configured.

```
Device# show running-config | include boot
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Device(config)# license boot level appxk9
% use 'write' command to make license boot config take effect on next boot
Device(config)# license boot level uck9
% use 'write' command to make license boot config take effect on next boot
Device(config)# exit

Device# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
```

```
[OK]

Device# show running-config | include boot
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot level appxk9
license boot level uck9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# reload
Proceed with reload? [confirm]
*May 27 15:51:25.530: %SYS-5-RELOAD: Reload requested by test on console. Reload Reason:
Reload Command.

Device# show version
Suite License Information for Module:'esg'

--------------------------------------------------------------------------------
Suite                 Suite Current         Type           Suite Next reboot
--------------------------------------------------------------------------------
FoundationSuiteK9     None                  Smart License  None
securityk9
appxk9

AdvUCSuiteK9          None                  Smart License  None
uck9
cme-srst
cube

Technology Package License Information:

------------------------------------------------------------------
Technology    Technology-package           Technology-package
              Current       Type           Next reboot
------------------------------------------------------------------
appxk9           appxk9           Smart License    appxk9
uck9             uck9             Smart License    uck9
securityk9       None             Smart License    None
ipbase           ipbasek9         Smart License    ipbasek9

<output truncated>

Device# show license summary
Account Information:
  Smart Account: Eg-SA  As of May 20 18:53:04 2022 UTC
  Virtual Account: Eg-VA

License Usage:
  License                Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  booster_performance     (ISR_4431_BOOST)                 1 IN USE
  appxk9                  (ISR_4400_Application)           1 IN USE
  uck9                    (ISR_4400_UnifiedCommun...)      1 IN USE
```

Example 4: Configuing a Technology Package, Followed By the Corresponding Suite

The following example shows you how the system behaves when you configure a technology package, followed by the suite, which the technology package belongs to.

In this example, the software version running on the device is Cisco IOS XE Cupertino 17.9.1a and there is no existing boot license configuration on the device. Here we configure technology package appxk9, and then the corresponding suite FoundationSuiteK9, followed by another technology package which is not part of configured suite (uck9 is part of AdvUCSuiteK9 and not FoundationSuiteK9).

Even though the system saves the configuration as displayed in the output of the **show running-config** command before reload, after reload, appxk9 is removed from configuration and only FoundationSuiteK9 is retained. The uck9 technology package is not part of FoundationSuiteK9, so this configuration is retained after reload.

Note There is a difference in the system's behavior before and after 17.9.1 for this scenario. In releases prior to 17.9.1, appxk9 and FoundationSuiteK9 are retained even after reload.

Configuring a technology package *and* the suite it belongs to, is not recommended in any release.

```
Device# show running-config | include boot
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Device(config)# license boot level appxk9
% use 'write' command to make license boot config take effect on next boot
Device(config)# license boot suite FoundationSuiteK9
% use 'write' command to make license boot config take effect on next boot
Device(config)# license boot level uck9
% use 'write' command to make license boot config take effect on next boot

Device(config)# exit
Device# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Device# show running-config | include boot
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot suite FoundationSuiteK9
license boot level appxk9
license boot level uck9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# reload
Proceed with reload? [confirm]
*May 27 16:39:43.657: %SYS-5-RELOAD: Reload requested by test on console. Reload Reason:
Reload Command.
*May 27 16:39:55.969: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: process
exit with reload chassis code
<output truncated>

Device# show running-config | include boot
```

```
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot suite FoundationSuiteK9
license boot level uck9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail
```

Output of the **show version** and **show romvar** privileged EXEC commands after the *first* reload:

```
Device# show version
Cisco IOS XE Software, Version 17.09.01a
Cisco IOS Software [Cupertino], ISR Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version
17.9.1, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2022 by Cisco Systems, Inc.
Compiled Mon 07-Mar-22 01:36 by mcpre
.
.
.
Suite License Information for Module:'esg'

--------------------------------------------------------------------------------
Suite                 Suite Current         Type           Suite Next reboot
--------------------------------------------------------------------------------
FoundationSuiteK9     FoundationSuiteK9     Smart License  FoundationSuiteK9
securityk9
appxk9

AdvUCSuiteK9          None                  Smart License  None
uck9
cme-srst
cube


Technology Package License Information:

------------------------------------------------------------------
Technology    Technology-package           Technology-package
              Current       Type           Next reboot
------------------------------------------------------------------
appxk9           appxk9           Smart License    appxk9
uck9             uck9             Smart License    uck9
securityk9       None             Smart License    None
ipbase           ipbasek9         Smart License    ipbasek9

<output truncated>

Device# show romvar | include BOOT
 FACTORY_BOOT_LEVEL =
 BOOT = bootflash:isr4400-universalk9.17.09.01a.SPA.bin;
 LICENSE_BOOT_LEVEL = appxk9,appxk9:esg;uck9,uck9:esg;
```

Saving configuration, a second time:

```
Device# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Device# show romvar | include BOOT
 FACTORY_BOOT_LEVEL =
 BOOT = bootflash:isr4400-universalk9.17.09.01a.SPA.bin,1;
 LICENSE_BOOT_LEVEL = uck9,uck9:esg;
```

Reloading, a second time:

```
Device# reload
Proceed with reload? [confirm]

*May 27 17:56:31.606: %SYS-5-RELOAD: Reload requested by test on console. Reload Reason:
Reload Command.
May 27 17:56:43.839: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: process
exit with reload chassis code

Initializing Hardware ...
```

All **show** command outputs are synchronized after saving configuration *and* reloading a second time:

```
Device# show version
Cisco IOS XE Software, Version 17.09.01a
Cisco IOS Software [Cupertino], ISR Software (X86_64_LINUX_IOSD-UNIVERSALK9-M), Version
17.9.1, RELEASE SOFTWARE (fc1)
Copyright (c) 1986-2022 by Cisco Systems, Inc.
Compiled Mon 07-Mar-22 01:36 by mcpre
.
.
.
Suite License Information for Module:'esg'

--------------------------------------------------------------------------------
Suite                 Suite Current         Type           Suite Next reboot
--------------------------------------------------------------------------------
FoundationSuiteK9     FoundationSuiteK9     Smart License  FoundationSuiteK9
securityk9
appxk9

AdvUCSuiteK9          None                  Smart License  None
uck9
cme-srst
cube


Technology Package License Information:

------------------------------------------------------------------
Technology    Technology-package           Technology-package
              Current       Type           Next reboot
------------------------------------------------------------------
appxk9           None             Smart License    None
uck9             uck9             Smart License    uck9
securityk9       None             Smart License    None
ipbase           ipbasek9         Smart License    ipbasek9

Device# show license summary
Account Information:
  Smart Account: Eg-SA  As of May 20 18:53:04 2022 UTC
  Virtual Account: Eg-VA

License Usage:
  License                 Entitlement Tag               Count Status
  -----------------------------------------------------------------------------
  booster_performance     (ISR_4431_BOOST)                1 IN USE
  uck9                    (ISR_4400_UnifiedCommun...)     1 IN USE
  FoundationSuiteK9       (ISR_4400_FoundationSuite)      1 IN USE
```

Example 5: Configuring the No Form of the Command

The following example shows you how the system behaves when you configure the **no** form of the command.

In this example, the FoundationSuiteK9 suite and the uck9 technology package are already configured on the device. The **no** form of the command is used to remove only uck9. After saving the configuration change and reloading the device, FoundationSuiteK9 is the only boot license configuration remaining on the device.

If FoundationSuiteK9 configuration is also removed, then the device will revert to default.

```
Device# show running-config | include boot
boot-start-markerb
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot suite FoundationSuiteK9
license boot level uck9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# configure terminal
Enter configuration commands, one per line.  End with CNTL/Z.
Device(config)# no license boot level uck9
% use 'write' command to make license boot config take effect on next boot

Device(config)# exit
Device# copy running-config startup-config
Destination filename [startup-config]?
Building configuration...
[OK]

Device# show running-config | include boot
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot suite FoundationSuiteK9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail

Device# reload
Proceed with reload? [confirm]
*May 31 05:37:52.350: %SYS-5-RELOAD: Reload requested by test on console. Reload Reason:
Reload Command.
May 31 05:38:04.863: %PMAN-5-EXITACTION: R0/0: pvp: Process manager is exiting: process
exit with reload chassis code

Initializing Hardware ...
<output truncated>

Device# show running-config | include boot
boot-start-marker
boot system flash bootflash:isr4400-universalk9.17.09.01a.SPA.bin
boot-end-marker
license boot suite FoundationSuiteK9
diagnostic bootup level minimal
snmp-server enable traps entity-diag boot-up-fail hm-test-recover hm-thresh-reached
scheduled-test-fail
```

license boot level

To boot a new software license on switching platforms, use the **license boot level** command in global configuration mode. To return to the previously configured license level, use the **no** form of this command.

Cisco ASR 903 Router
license boot level *license-level*
no license boot level *license-level*

Cisco ASR 1000 Router
license boot level *license-level*
no license boot level *license-level*

Cisco CSR 1000V Router
license boot level *license-level*
no license boot level *license-level*

Cisco Catalyst 3560-E Switch Platforms
license boot level *license-level*
no license boot level *license-level*

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license boot level *license-level* [**switch** *switch-num*]
no license boot level *license-level* [**switch** *switch-num*]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license boot level *license-level* **switch** *switch-num*
no license boot level *license-level* **switch** *switch-num*

Cisco Catalyst 4500E Series Switch Platforms
license boot level *license-level*

Syntax Description

license-level	Level at which the switch is booted (for example, ipservices). The license levels available in a universal/universalk9 image are: • entservices • ipbase • lanbase The license levels available in a universal-lite/universal-litek9 image are: • ipbase • lanbase The license levels available for the Cisco ASR 903 router are: • metroaggrservices • metroipservices • metroservices The license levels available for the Cisco ASR 1000 router are: • adventerprise • advipservices • ipbase The license levels available for the Cisco CSR 1000V router in Cisco IOS XE 3.12S and earlier are: • standard • advanced • premium The license levels available for the Cisco CSR 1000V router in Cisco IOS XE 3.13S and later are: • ipbase • security • AX • APPX
switch *switch-num*	Switch or slot ID in a stackable environment.

Command Default

The switch boots the configured image.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.1.0SG	This command was integrated into Cisco IOS XE Release 3.1.0SG on Catalyst 4500E series switches.
Cisco IOS XE Release 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.
Cisco IOS XE Release 3.10S	This command was integrated into Cisco IOS XE Release 3.10S and implemented on the Cisco CSR 1000V router.

Usage Guidelines

Use the **license boot level** command for these purposes:

- Downgrade or upgrade licenses
- Enable or disable an evaluation or extension license
- Clear an upgrade license

This command forces the licensing infrastructure to boot the configured license level instead of the license hierarchy maintained by the licensing infrastructure for a given module.

- When the switch reloads, the licensing infrastructure checks the configuration in the startup configuration for any licenses. If there is a license in the configuration, the switch boots with that license. If there is no license, the licensing infrastructure follows the image hierarchy to check for licenses.
- If the forced boot evaluation license expires, the licensing infrastructure follows the regular hierarchy to check for licenses.
- If the configured boot license is already expired, the licensing infrastructure follows the hierarchy to check for licenses.

This command takes effect at the next reboot of any of the supervisors (Act or stby). This configuration must be saved to the startup configuration for it to be effective. After you configure the level, the next time the standby supervisor boots up, this configuration is applied to it.

To boot the standby supervisor to a different level than active, configure that level by using this command and then bring up the standby.

If the **show license all** command displays the license as "Active, Not in Use, EULA not accepted," you can use the **license boot level** command to enable the license and accept the end-user license agreement (EULA).

Examples

The following example shows how to activate the *ipbase* license on the switch upon the next reload:

```
Switch(config)# license boot level ipbase
```

Related Commands

Command	Description
license install	Installs a stored license file.

Command	Description
license save	Saves a copy of a permanent license to a specified license file.
show license all	Shows information about all licenses in the system.

license boot module

To boot a new software license on routing platforms, use the **license boot module** command in global configuration mode. Use the **no** form of this command to return to the default setting.

Cisco ASR 1001 Router Platforms
license boot module *module-name* **group** {**all** | **feature**} **level** *license-level*
no license boot module

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license boot module *module-name* **level** *license-level*
no license boot module *module-name* **level** *license-level*

Cisco uBR10012 Universal Broadband Routers
license boot module *module-name* **technology-package** *package-name* [**disable**]
no license boot module *module-name* **technology-package** *package-name* [**disable**]

Syntax Description

module-name	Router or module to be configured (for example: c880-data or c3900).
group	Selects a specific group that contains the image and feature licenses for the device.
all	Groups by all features.
feature	Groups by feature.
level *license-level*	Boots the device or module at the specified level (for example, advipservices).
technology-package	Upgrades or downgrades a software license, or enables or disables an evaluation license.
package-name	Package or feature set the given module should boot (for example, data).
disable	(Optional) Disables the package or the feature set.

Command Default

The router boots the configured image.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
15.0(1)M	This command was modified. The **technology-package** keyword was added for the Cisco 1900, 2900, and on the 3900 series integrated services router platforms.
Cisco IOS XE Release 3.2S	This command was modified. The **group**, **all**, **feature**, and **level** keywords were added for the Cisco ASR 1001 router.

Usage Guidelines

Use the **license boot module** command for these purposes:

- Downgrade or upgrade licenses
- Enable or disable an evaluation or extension license
- Clear an upgrade license

This command forces the licensing infrastructure to boot the configured license level instead of the license hierarchy maintained by the licensing infrastructure for a given module.

- When the router reboots, the licensing infrastructure checks the configuration in the startup configuration/rommon for any licenses. If there is a license in the configuration, the router boots with that license. If there is no license, the licensing infrastructure follows the image hierarchy to check for licenses.
- If the forced boot evaluation license expires, the licensing infrastructure follows the regular hierarchy to check for licenses.
- If the configured boot license is already expired, the licensing infrastructure follows the hierarchy to check for licenses.

To make the evaluation license inactive, use the **no license boot module technology-package** command. To re-activate the evaluation license, use the **license boot module technology-package** command.

If the **show license all** command displays the license as "Active, Not in Use, EULA not accepted," you can use the **license boot module** command to enable the license and accept the EULA. Do not confuse the **license boot module** global configuration command with a similarly named command available in privileged EXEC mode.

Examples

The following example shows how to activate the *ipbase* image license that is part of the group *all* on the ASR 1001 module at the next reboot:

```
Router(config)# license boot module asr1001 group all level ipbase
```

The following example shows how to activate the *advipservices* license on the c880-data module at the next reboot:

```
Router(config)# license boot module c880-data level advipservices
```

The following example shows how to enable an evaluation license:

```
Router(config)# license boot module c3900 technology-package data
```

The following example shows how to make an evaluation license inactive:

```
Router(config)# no license boot module c3900 technology-package data
```

Related Commands

Command	Description
license install	Installs a stored license file.
license save	Saves a copy of a permanent license to a specified license file.

Command	Description
show license all	Shows information about all licenses in the system.

license call-home install pak

To install a license by using a product authorization key (PAK) and the Cisco License Call Home feature, use the **license call-home install pak** command in privileged EXEC mode.

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license call-home install pak *pak-id*

Cisco Catalyst 3560-E Switch Platforms
license call-home install pak *pak-id*

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license call-home install pak *pak-id* [**switch** *switch-num*]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license call-home install pak *pak-id* **switch** *switch-num*

Cisco Catalyst 4500E Series Switch Platforms
license call-home install pak *pak-id*

Syntax Description

pak-id	A product authorization key sent through e-mail or through regular mail by manufacturing to authorize software upgrades.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The switch number range is 1 to 9.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG and implemented on the Cisco Catalyst 4500E series switch.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG and implemented on the Cisco Catalyst 4500E series switch.

Usage Guidelines

The Cisco License Call Home feature allows a Cisco router to communicate with the Cisco licensing infrastructure through the Internet and retrieve licensing information. This command requires that the router be connected to the Internet.

This command requires the following:

- The router or switch must have an Internet connection and use HTTPS to connect to the Cisco licensing infrastructure. To set up a secure HTTP connection, see the HTTP 1.1 Web Server and Client module in the *Cisco IOS Network Management Configuration Guide*.
- Only certain platforms support the Cisco License Call Home feature, and those devices must be running a Cisco IOS crypto K9 image.
- You must obtain the device certificate from the Cisco licensing infrastructure.
- You must have a Cisco.com user login account.

The PAK is a unique token supplied to allow partial fulfillment of licenses. A PAK is not tied to any particular device, but rather to a product identifier (PID).

When you issue the **license call-home install pak** command, these events occur:

1. Information about the stock keeping unit (SKU) is displayed. SKUs map to one or more Cisco software features.
2. You receive prompts at the command line for required fields such as an e-mail address, username, and password to access the Cisco website and SKU quantities.
3. The user-entered data is validated and processed, and then the license is installed on the router. If data is not validated, warning messages are displayed.

Examples

The following example shows the commands, prompts, and responses required to install a license by using a PAK and the Cisco License Call Home feature. Use the **show license clear** command to verify the installation.

```
Router# license call-home install pak 3XPXR9E7D30
CCO User name: User1
CCO password : ************
Pak Number          : 3XPXR9E7D30
Pak Fulfillment type: SINGLE
     1. SKU Name           : Gatekeeper
        SKU Type           : Product
        Description        : Gatekeeper
        Ordered Qty        : 1
        Available Qty      : 1
        Feature List       :
            Feature name:         gatekeeper Count: Uncounted
        Platform Supported : N/A
                             5400
                             5350
                             2800
                             3800
Do you want to install the above listed SKU(s)? [yes/no]: yes
Please enter the user's detail:
First Name : First-name
Last Name : Last-name
Title : Software Engineer
Company Name : Cisco Systems
Address1 : 510 McCarthy Blvd.
Address2  [Optional]:
City : Milpitas
State : CA
Province  [Optional]:
Zipcode : 95134
```

```
Country : USA
Phone : 408 526-4000
Fax  [Optional]:
Email : User1@cisco.com
Installing...Feature:gatekeeper...Successful
```

Related Commands

Command	Description
license call-home resend	Restores a lost license by using the Cisco License Call Home feature.
license call-home revoke	Rehosts (revokes and transfers) a license by using the Cisco License Call Home feature.
show license call-home	Displays the SKU list and features available in a PAK by using the Cisco License Call Home feature.
show license feature	Shows a list of licensed features available in an image.

license call-home resend

To request a license be re-sent by using the Cisco License Call Home feature, use the **license call-home resend** command in privileged EXEC mode.

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license call-home resend *dest-lic-location*

Cisco Catalyst 3560-E Switch Platforms
license call-home resend *dest-lic-location*

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license call-home resend *dest-lic-location* [**switch** *switch-num*]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license call-home resend *dest-lic-location* **switch** *switch-num*

Cisco Catalyst 4500E Series Switch Platforms
license call-home resend *dest-lic-location*

Syntax Description

dest-lic-location	The location where the Cisco IOS software license is to be stored. Valid location file systems are **archive**, **bs**, **flash**, **flash** *n*, **ftp**, **http**, **https**, **null**, **nvram**, **pram**, **rcp**, **scp**, **syslog**, **system**, **tftp**, **tmpsys**, **vb**. The license location can also be a directory. • The **bs://**, **null://**, and **vb://** file systems do not accept filenames. • The **bs** file system is available only on mixed Cisco 3750-E switch stacks. • The **archive**, **pram** **scp**, and **syslog** file systems are available only on router platforms. • The **flash** *n* file system, where *r,* is an integer in the range from 1 to 9, is available only on Cisco 3750-E switches and stacks. • The **https** file system is not available on mixed Cisco 3750-E switch stacks and the Cisco 3560-E switch.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The switch number range is 1 to 9.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Release	Modification
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG and implemented on the Cisco Catalyst 4500E series switch.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG and implemented on the Cisco Catalyst 4500E series switch.

Usage Guidelines

The Cisco License Call Home feature allows a Cisco router to communicate with the Cisco licensing infrastructure through the Internet and retrieve licensing information. This command requires that the router be connected to the Internet.

This command contacts the Cisco licensing back-end fulfillment system and obtains licenses that are valid for a specified unique device identifier (UDI). The **license call-home resend** command also stores the received license lines in the specified destination URL.

This command requires the following:

- The router or switch must have an Internet connection and use HTTPS to connect to the Cisco licensing infrastructure. To set up a secure HTTP connection, see the HTTP 1.1 Web Server and Client module in the *Cisco IOS Network Management Configuration Guide*.
- Only certain platforms support the Cisco License Call Home feature, and those devices must be running a Cisco IOS crypto K9 image.
- You must obtain the device certificate from the Cisco licensing infrastructure before starting.
- You must have a Cisco.com user login account.

This command initiates these actions:

1. The device credential is retrieved from the device and sent to the Cisco licensing infrastructure.
2. This command invokes the Cisco licensing infrastructure to request all licenses with the device credential information be sent to the device. The Cisco licensing infrastructure provides all purchased licenses for the given UDI.
3. This command stores all licenses in the destination URL (filesystem).

Examples

The following example shows the commands, prompts, and responses required to request a license to be sent from the Cisco licensing infrastructure and to be stored in the requested destination file system:

```
Router# license call-home resend flash:licenseresend.xml
CCO User name: User1
CCO password : ************
Email Address: User1@cisco.com
Alternate Email Address: User1@cisco.com
Getting Licenses from SWIFT ..........
Saving it to flash:licenseresend.xml.....Done
```

Related Commands

Command	Description
license call-home install	Installs a license by using the Cisco License Call Home feature.

Command	Description
license call-home revoke	Rehosts (revokes and transfers) a license by using the Cisco License Call Home feature.
show license call-home	Displays the SKU list and features available in a PAK by using the Cisco License Call Home feature.

license call-home revoke

To rehost (revoke and transfer) a license by using unique device identifiers (UDIs) and the Cisco License Call Home feature, use the **license call-home revoke** command in privileged EXEC mode.

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license call-home revoke [**udi** *target-udi*] *output-of-rehosted-license-url* [**permission-ticket** *permission-ticket-url*] [**rehost-ticket** *rehost-ticket-url*]

Cisco Catalyst 3560-E Switch Platforms
license call-home revoke [**udi** *target-udi*] *output-of-rehosted-license-url* [**permission-ticket** *permission-ticket-url*] [**rehost-ticket** *rehost-ticket-url*]

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license call-home revoke [**udi** *target-udi*] *output-of-rehosted-license-url* [**permission-ticket** *permission-ticket-url*] [**rehost-ticket** *rehost-ticket-url*] [**switch** *switch-num*]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license call-home revoke [**udi** *target-udi*] *output-of-rehosted-license-url* [**permission-ticket** *permission-ticket-url*] [**rehost-ticket** *rehost-ticket-url*] **switch** *switch-num*

Cisco Catalyst 4500E Series Switch Platforms
license call-home revoke [**udi** *target-udi*] *output-of-rehosted-license-url* [**permission-ticket** *permission-ticket-url*] [**rehost-ticket** *rehost-ticket-url*]

Syntax Description

udi *target-udi*	(Optional) Revokes license information for this target UDI.
output-of-rehosted-license-url	(Optional) Output received from the rehosted process, which saves the rehost ticket or the license file in the specified file system.
permission-ticket *permission-ticket-url*	(Optional) Revokes license information by using the permission ticket in the specified URL.
rehost-ticket *rehost-ticket-url*	(Optional) Revokes license information by using the rehost ticket in the specified URL.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The switch number range is 1 to 9.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG and implemented on the Cisco Catalyst 4500E series switch.

Release	Modification
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1) SG and implemented on the Cisco Catalyst 4500E series switch.

Usage Guidelines

The Cisco License Call Home feature allows a Cisco router to communicate with the Cisco licensing infrastructure through the Internet and retrieve licensing information. This command requires that the router be connected to the Internet.

If you do not specify a target UDI, the rehost ticket is stored in the specified URL. If you do specify a target UDI, this command sends the rehost ticket to the Cisco licensing infrastructure with the target UDI, converts it to a license file, and stores it in the specified URL. If one of the operations fails in the call-home revoke operations, the intermediate results are stored at the specified URL and a message explaining what to do next is displayed.

This command requires the following:

- The router or switch must have an Internet connection and use HTTPS to connect to the Cisco licensing infrastructure. To set up a secure HTTP connection, see the HTTP 1.1 Web Server and Client module in the *Cisco IOS Network Management Configuration Guide*.
- Only certain platforms support the Cisco License Call Home feature, and those devices must be running a Cisco IOS crypto K9 image.
- You must obtain the device certificate from the Cisco licensing infrastructure.
- You must have a Cisco.com user login account.

The **license call-home revoke** EXEC command performs this sequence of operations:

1. The Cisco licensing module establishes communication with the Cisco licensing infrastructure to start the rehost operation.
2. The Cisco licensing infrastructure sends a signed request to obtain the SKU details for this UDI from the Cisco licensing portal. The request contains the source UDI.
3. The Cisco licensing portal responds that either the target UDI is not correct or lists the stock keeping units (SKUs) available on the device for rehosting.
4. The Cisco licensing infrastructure requests the permission ticket from the licensing portal by providing the SKU and the e-mail address of the user.
5. The Cisco licensing portal provides the permission file to the Cisco licensing infrastructure.
6. The software uses this permission ticket file to generate the rehost ticket.
7. This rehost ticket is sent to the licensing back end along with the target UDI and optional e-mail address.
8. The Cisco licensing back end generates a new license file and sends it by using the e-mail address collected in the prompts.

Examples

The following example shows how to use the **license call-home revoke** command to revoke a license on the device with the specified UDI. In the display, the user selects the SKU called SL-LWAPP= to revoke the license for the *lwapp* feature. This command sends the rehost ticket to the Cisco licensing

infrastructure with the target UDI, converts it to a license file, and stores it in the specified URL (flash: REHOSTED_LICENSE):.

```
Router# license call-home revoke udi CISCO887W:FHH1124P02Y flash:REHOSTED_LICENSE

CCO User name : xxxxx
CCO password  :
Retrieving the sku from swift ..........!.....................
1. SKU Name           : SA-LWAPP
        SKU Type           : Product
        Description        : For Internal purposes only
        Ordered Qty        : 1
        Available Qty      : 1
        Feature List       :
            Feature name:              lwapp Count: Uncounted
        Platform Supported : N/A
2. SKU Name           : SA880-AIS
        SKU Type           : Product
        Description        : For Internal purposes only
        Ordered Qty        : 1
        Available Qty      : 1
        Feature List       :
            Feature name:      advipservices Count: Uncounted
        Platform Supported : N/A
3. SKU Name           : SL-LWAPP=
        SKU Type           : Product
        Description        : For Internal purposes only
        Ordered Qty        : 1
        Available Qty      : 1
        Feature List       :
            Feature name:              lwapp Count: Uncounted
        Platform Supported : N/A
4. SKU Name           : SL-AV
        SKU Type           : Product
        Description        : For Internal purposes only
        Ordered Qty        : 1
        Available Qty      : 1
        Feature List       :
            Feature name:        advsecurity Count: Uncounted
        Platform Supported : N/A
5. All of the above
Please select the sku number you want to revoke : 3
Retrieving the permission ticket from swift ..........!... Output file saved ..... to flash:
 REHOSTED_LICENSE
Retrieving the rehost ticket from the device .....................!.
Following Permanent license(s) will be revoked from this device
        Feature Name: lwapp
Following Extension license(s) will be installed on this device
        Feature Name: lwapp
PLEASE  READ THE  FOLLOWING TERMS  CAREFULLY. INSTALLING THE LICENSE OR
LICENSE  KEY  PROVIDED FOR  ANY CISCO  PRODUCT  FEATURE  OR  USING SUCH
PRODUCT  FEATURE  CONSTITUTES  YOUR  FULL ACCEPTANCE  OF  THE FOLLOWING
TERMS. YOU MUST NOT PROCEED FURTHER IF YOU ARE NOT WILLING TO  BE BOUND
BOUND BY ALL THE TERMS SET FORTH HEREIN.
You hereby  acknowledge  and  agree that  the  product feature  license
is terminable and that the product  feature  enabled  by  such  license
may  be  shut  down or  terminated by  Cisco  after  expiration of  the
applicable  term  of  the license  (e.g., 30-day  trial  period). Cisco
reserves the  right to terminate or shut down  any such product feature
electronically  or by  any other  means available. While alerts or such
messages  may  be provided, it is  your sole  responsibility to monitor
your terminable  usage of any  product  feature enabled by  the license
and to ensure that your systems and  networks are prepared for the shut
```

```
down of the product feature. You acknowledge  and agree that Cisco will
not have any liability  whatsoever for  any damages, including, but not
limited to, direct, indirect, special, or consequential damages related
to any product  feature  being shutdown or terminated. By clicking  the
"accept" button  or typing "yes" you are  indicating  you have read and
agree to be bound by all the terms provided herein.
ACCEPT? [yes/no]: yes
Output file saved ..... to flash: REHOSTED_LICENSE
Retrieving the revoked license line from the swift ..........Output file saved ..... to
flash: REHOSTED_LICENSE
```

Related Commands

Command	Description
license call-home install	Installs a license by using the Cisco License Call Home feature.
license call-home resend	Restores a lost license by using the Cisco License Call Home feature.
show license call-home	Displays the SKU list and features available in a PAK by using the Cisco License Call Home feature.

license call-home url

To configure a new URL for accessing the Cisco licensing infrastructure, use the **license call-home url** command in global configuration mode. To change the URL, use the **no** form of this command.

license call-home url *licensing-infrastructure-url*
no license call-home url

Syntax Description

licensing-infrastructure-url	The HTTP address where the Cisco licensing infrastructure can be accessed.

Command Default

The default URL is https://tools.cisco.com/SWIFT/licensing.

Command Modes

Global configuration (config)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG and implemented on the Cisco Catalyst 4500E series switch.
15.1(1)SG	This command was integrated into Cisco IOS Release 15.1(1)SG and implemented on the Cisco Catalyst 4500E series switch.

Usage Guidelines

Use this command to configure a new URL for accessing the Cisco licensing infrastructure.

This feature requires that:

- The router or switch must have an Internet connection and use HTTPS to connect to the Cisco licensing infrastructure. To set up a secure HTTP connection, see the HTTP 1.1 Web Server and Client module in the *Cisco IOS Network Management Configuration Guide*.
- Only certain platforms support the Cisco License Call Home feature, and those devices must be running a Cisco IOS crypto K9 image.
- You must obtain the device certificate from the Cisco licensing infrastructure.
- You must have a Cisco.com user login account.

Examples

The following example shows how to change the URL to http://cisco.com/newserver:

```
Router(config)# license call-home url http://cisco.com/newserver
```

Related Commands

Command	Description
license call-home install	Installs a license by using the Cisco License Call Home feature.

Command	Description
license call-home resend	Restores a lost license by using the Cisco License Call Home feature.
license call-home revoke	Rehosts (revokes and transfers) a license by using the Cisco License Call Home feature.
show license call-home	Displays the SKU list and features available in a PAK by using the Cisco License Call Home feature.
show license status	Displays license status information.

license clear

To remove a license entry from license storage, use the **license clear** command in privileged EXEC mode.

Cisco ASR 903 Routers
license clear *feature-name*
standby

Cisco ASR 1001 Routers, Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license clear *feature-name*

Cisco Catalyst 3560-E Switch Platforms
license clear *feature-name*

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license clear *feature-name* [{**switch** *switch-num*}]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license clear *feature-name* **switch** *switch-num*

Syntax Description

feature-name	Name of the feature to be removed.
standby	(Optional) Clears license information on the standby processor.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The switch number range is 1 to 9.

Command Default

Licenses are not removed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.2S	This command was integrated into Cisco IOS XE Release 3.2S on the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

For the ASR 1001 router, the **license clear** command clears only image-level licenses that are not in-use. Once the throughput feature license is in-use, it cannot be cleared.

The **license clear** command clears all licenses, but some licenses, such as built-in licenses, cannot be cleared.

If a license is not in-use, the **license clear** command displays all the licenses related to this feature and prompts you to make a selection. Different prompts are displayed, depending upon whether single or multiple licenses are available in the device. The selected licenses are removed from the router or switch.

If a license is in-use, the **license clear** command might fail. However, depending on the application policy using the license, some licenses might be cleared.

For some devices, the **license clear** command verifies that the license line is valid and explicitly installed. Only licenses that have been added using the **license install** command are removed. Evaluation licenses are not removed.

When a switch is specified, the **license clear** command is executed only on that switch. When a mixed stack platform is used, the primary switch has installed the minimum licensing feature required to support the licensing operations of the secondary switches. The **license clear** command clears a license from license storage, which a primary switch does not have. When the command is issued from the primary switch, the switch number is required to clear a license on a specific switch.

Examples

The following example shows how to display the installed licenses on an ASR 1001 router and how to clear the throughput license. Note that active, in-use licenses cannot be cleared:

```
Router# show license all
License Store: Primary License Storage
StoreIndex:  0  Feature: throughput                       Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period:  4 weeks  2 days
            Evaluation period left:  0 minute   0 second
        License Count: Non-Counted
        License Priority: Low
Router# license clear throughput
Feature: throughput
     1  License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period:  4 weeks  2 days
            Evaluation period left:  0 minute   0 second
        License Addition: Additive
        License Count: Non-Counted
        Comment:
        Store Name: Primary License Storage
Are you sure you want to clear? (yes/[no]): yes
Router#
```

The following example shows how to clear a license associated with the advsecurity feature:

```
Router# license clear advsecurity
Feature: advsecurity
    1   License Type: Permanent
        License State: Active, In Use
        License Addition: Exclusive
        Comment: Permanent License
        Store Index: 0
        Store Name: Primary License Storage
    2   License Type: Evaluation
        License State: Inactive
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
        License Addition: Additive
        Comment:
        Store Index: 1
```

```
        Store Name: Primary License Storage
Select Index to Clear [1-2]: 2
Are you sure you want to clear? (yes/[no]): yes
```

Related Commands

Command	Description
license install	Installs a stored license file.
license save	Saves a copy of a permanent license to a specified license file.
show license file	Displays information in a Cisco IOS software license file.

license comment

To add or remove a comment about a feature license, use the **license comment** command in privileged EXEC mode.

Cisco ASR 903 Routers
license comment {**add** *feature-name comment* | **delete** *feature-name*}[{**standby**}]

Cisco ASR 1001 Router Platforms
license comment {**add feature** *feature-name comment* | **delete feature** *feature-name*}

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license comment {**add** *feature-name comment* | **delete** *feature-name*}

Cisco Catalyst 3560-E Switch Platforms
license comment {**add** *feature-name comment* | **delete** *feature-name*}

Cisco Catalyst 3750-E Switch Platforms
license comment {**add** *feature-name comment* | **delete** *feature-name*} [{**switch** *switch-num*}]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license comment {**add** *feature-name comment* | **delete** *feature-name*} **switch** *switch-num*

Syntax Description

add	Adds a comment about a feature license.
feature	Specifies the feature name.
feature-name	Name of the licensed feature.
comment	String of a maximum of 99 characters, including special characters.
delete	Deletes a comment about a licensed feature.
standby	(Optional) Specifies license information on the standby processor.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The switch number range is 1 to 9.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Release	Modification
Cisco IOS XE Release 3.2S	This command was modified. The **feature** keyword was added for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

This command is useful for tracking a license when multiple licenses are stored on a device, and for adding or deleting information about a specific license. You can also use the **license comment** command to verify that a license associated with the specified feature is present in license storage.

Use the **show license file** command to display comments added to the license file.

The **license comment** command performs these operations:

- Verifies that the license associated with the specified feature is present in the license storage.
- If there are multiple license lines, the command prompts for license line selection.
- If a comment exists in the license line, the command displays the comment first before prompting for a new comment. Up to 99 characters are stored in license storage.
- If a switch number is specified, this command is executed on the specified switch.

Examples

The following example shows how to add a comment to a license file on the Cisco ASR 1001 router by using the **license comment** command and by verifying it with the **show license file** command:

```
Router# license comment add feature throughput newest
Feature: throughput
     1  License Type: Permanent
        License State: Active, In Use
        License Addition: Exclusive
        License Count: Non-Counted
        Comment: --
        Store Name: Primary License Storage
% Success: Updating comment "--" with "newest" succeeded
Router# show license file
License Store: Primary License Storage
  Store Index: 0
    License: 11 throughput 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS INFIN
             ITE_KEYS NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *12MDFXFBE6TEQR54
             00 NiL NiL NiL 5_MINS <UDI><PID>ASR1001</PID><SN>JAE14020AT5</SN>
             </UDI> :0oy5aopCvhfLBBk3:l0fBb4Kr3EwMLaYAHDV93ClpLXhJGOUE1ZuBusC,
             0B2QIQLvo6eUrKn27faF3zOYTTyjLRCGA8UMkemMyqmvjcg0Jhfm$<WLC>AQEBIQA
             B//8szae77QGOnFBXBoP02Obx6Fq2XtGPUJnh5pGplTkDzw9J5aqkkUjTNkuO4sv4
             FYORqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21MNUjVb
             hoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko8XC
             Y=</WLC>
    Comment: newest
       Hash: ZJJz5MveEOPePQA3ATs6+OxF4bw=
```

The following example shows how to add a comment to a license file. You are prompted to select the index number of the license to add the comment to.

```
Router# license comment add advsecurity "Permanent License"
Feature: advsecurity
```

```
    1   License Type: Permanent
        License State: Active, In Use
        License Addition: Exclusive
        Comment:
        Store Index: 0
        Store Name: Primary License Storage
    2   License Type: Evaluation
        License State: Inactive
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
        License Addition: Additive
        Comment:
        Store Index: 1
        Store Name: Primary License Storage
Select Index to Add Comment [1-2]: 1
% Success: Adding comment "Permanent License" succeeded
```

The following example shows the output from **show license file** command for verification purposes:

```
Router# show license file
License Store: Primary License Storage
  Store Index: 0
    License: 11 advsecurity 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS INFI
             NITE_KEYS NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *1F8CTTRHMU8DBMZ
             400 NiL NiL NiL 5_MINS <UDI><PID>CISCO861W</PID><SN>FHH112400KA</
             SN></UDI> DjRM8tEsBrR7ayv1U6CWL7JIe1Nmu60biRNQuFWM8sV2dUQhQSS,iB4
             WgUgos4KILZJ,4xrseQQCwOQeASIi:SVNCL1Cdffc,OpH8TQkzxbX3q$<WLC>AQEB
             IQAB//9fp/DSeV2xPKc+d4T/DiUhG8UQwBA786dE+HuT2GMU3uDvMbIOdbpmBQ00Q
             tQTGTKRqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21MNU
             jVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko
             8XCY=</WLC>
    Comment: Permanent License
       Hash: Mx0Sy+VmbfaB7uRctuPLsblzpBU=
```

Related Commands

Command	Description
license clear	Removes a license entry from a permanent license file.
license install	Installs a stored license file.
license save	Saves a copy of a permanent license to a specified license file.
show license file	Displays information in a Cisco IOS software license file.

license expand nvram

To expand the memory allocation for license storage in NVRAM for Cisco 2800 and Cisco 3800 series integrated services router platforms, use the **license expand nvram** command in privileged EXEC mode.

license expand nvram

Syntax Description

This command has no arguments or keywords.

Command Default

No license storage expansion is configured.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(20)T	This command was introduced for the Cisco 2800 and Cisco 3800 series integrated services router platforms

Usage Guidelines

License storage expansion reduces the amount of NVRAM available for configuration file storage. If the configuration files are too large to fit into the reduced NVRAM, you must run file compression on the configuration files by using the **service compress-config** command.

Examples

The following example shows how to expand the allocation for license storage in NVRAM:

```
Router# license expand nvram
Caution: IOS configuration space will be re-partitioned in NVRAM.
You must back up your IOS configuration before running this command.
Do you wish to continue NVRAM re-partition?[confirm]
Router# y
```

The following response indicates that the operation was successful:

```
License storage expanded successfully.
IOS must be restarted for changes to take effect.
```

The following response shows that the existing configuration files need compression before the licensing file system can be expanded:

```
Error: startup-config is too large.  Compress the config with "service compress-config"
followed by "copy system:running-config nvram:startup-config" and rerun "licence expand
nvram".
```

The following response shows that a configuration file is still too large for the resized NVRAM:

```
Error: cannot expand the license storage. Insufficient NVRAM to store compressed
configuration.
```

The following response shows that expansion cannot take place because the size of the block files is too large:

```
Error: cannot expand the license storage. Existing block files are too large.  Back up
existing block files, delete them from nvram and reissue “license expand nvram”.
```

The following response indicates that this command is being issued on an already expanded NVRAM:

```
Error: license storage already expanded to maximum size.
```

Related Commands

Command	Description
service compress-config	Compresses startup configuration files.

license feature

To activate the specified license feature, use the **license feature** command in global configuration mode. To deactivate the specified license feature, use the **no** form of this command.

license feature *feature-name*
no license feature *feature-name*

Syntax Description

feature-name	Software feature name.

Command Default

The license feature is not activated.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced for the Cisco 1905 integrated services router platform.
XE 3.5S	This command was integrated into Cisco IOS XE Release 3.5S and implemented on the Cisco ASR 903 router.

Usage Guidelines

Use the **license feature** command to activate the specified license feature.

Examples

The following example shows how to activate the memory license feature on the Cisco 1905 router:

```
Router(config)# license feature MEM-1900-256U512MB
         Feature Name:MEM-1900-256U512MB
PLEASE  READ THE  FOLLOWING TERMS  CAREFULLY. INSTALLING THE LICENSE OR
LICENSE  KEY  PROVIDED FOR  ANY CISCO  PRODUCT  FEATURE  OR  USING SUCH
PRODUCT  FEATURE  CONSTITUTES  YOUR  FULL ACCEPTANCE  OF  THE FOLLOWING
TERMS. YOU MUST NOT PROCEED FURTHER IF YOU ARE NOT WILLING TO  BE BOUND
BY ALL THE TERMS SET FORTH HEREIN.
You hereby  acknowledge  and  agree that  the  product feature  license
is terminable and that the product  feature  enabled  by  such  license
may  be  shut  down or  terminated by  Cisco  after  expiration of  the
applicable  term  of  the license  (e.g., 30-day  trial  period). Cisco
reserves the  right to terminate or shut down  any such product feature
electronically  or by  any other  means available. While alerts or such
messages  may  be provided, it is  your sole  responsibility to monitor
your terminable  usage of any  product  feature enabled by  the license
and to ensure that your systems and  networks are prepared for the shut
down of the product feature. You acknowledge  and agree that Cisco will
not have any liability  whatsoever for  any damages, including, but not
limited to, direct, indirect, special, or consequential damages related
to any product  feature  being shutdown or terminated. By clicking  the
"accept" button  or typing "yes" you are  indicating  you have read and
agree to be bound by all the terms provided herein.
ACCEPT? [yes/no]: yes
Router(config)#
*Nov 17 23:48:18.891: %XFR_EXT_MEMORY_LICENSING-6-LICENSE_NOT_ACTIVATED: License
MEM-1900-256U512MB will take effect af reboot.
*Nov 17 23:48:19.779: %LICENSE-6-EULA_ACCEPTED: EULA for feature MEM-1900-256U512MB 1.0 has
 been accepted. UDI=CISCO1920B; StoreIndex=3:Evaluation License Storage
```

```
Router# license install tftp://223.255.254.254/FCW1345000B_20091118190946245.lic
Installing licenses from "tftp://223.255.254.254/FCW1345000B_20091118190946245.lic"
Loading colbywen/FCW1345000B_20091118190946245.lic from 223.255.254.254 (via
GigabitEthernet0/0): !
[OK - 1171 bytes]
Installing...Feature:MEM-1900-256U512MB...Successful:Supported
1/1 licenses were successfully installed
0/1 licenses were existing licenses
0/1 licenses were failed to install
Router#
*Nov 19 00:14:48.603: %XFR_EXT_MEMORY_LICENSING-6-LICENSE_NOT_ACTIVATED: License
MEM-1900-256U512MB will take effect after the system reboot.
*Nov 19 00:14:48.607: %LICENSE-6-INSTALL: Feature MEM-1900-256U512MB 1.0 was installed in
this device. UDI=CISCO1921/K9:FCW1345000B; StoreIndex=0:Primary License Storage
```

Related Commands

Command	Description
license install	Installs a stored license file.
license revoke	Revokes a software license from one device and transfers it to another.

license feature snasw

To activate the SNA Switching (SNASw) feature license, use the **license feature snasw** command in global configuration mode. To deactivate the SNAsw feature license, use the **no** form of this command.

license feature snasw
no license feature snasw

Syntax Description

This command has no arguments or keywords.

Command Default

The SNASw feature license is not activated.

Command Modes

Global configuration (config)

Command History

Release	Modification
15.0(1)M	This command was introduced for the Cisco 3900, 2900, and the 1900 series integrated services router platforms.

Usage Guidelines

The **license feature snasw** command is used to activate the SNASw feature license.

Examples

The following example shows how to enable the SNASw feature license:

```
Router(config)# license feature snasw
```

Related Commands

Command	Description
license install	Installs a stored license file.

license install

To install a stored license file, use the **license install** command in privileged EXEC mode.

license install *stored-location-url*

ASR 1001 Router Platforms
license install file *stored-location-url*

Cisco Catalyst 4500E Series Switch Platforms
license install *stored-location-url*
standby

Syntax Description

stored-location-url	The location within a device where Cisco IOS software licenses are stored. Depending on the hardware platform, valid URL location file systems might be: **archive**, **bootflash**, **bs**, **flash**, **flash** *n*, **ftp**, **http**, **https**, **null**, **nvram**, **pram**, **rcp**, **scp**, **syslog**, **system**, **tftp**, **tmpsys**, **usb0**, **vb**. • The **bs://**, **null://**, and **vb://** file systems do not accept filenames. • The **bs** file system is available only on mixed Cisco 3750-E switch stacks. • The **archive**, **pram** **scp**, and **syslog** file systems are available only on router platforms. • The **flash** *n* file system, where *r*, is an integer in the range from 1 to 9, is available only on Cisco 3750-E switches and stacks. • The **https** file system is not available on mixed Cisco 3750-E switch stacks and the Cisco 3560-E switch.
file	Installs a license file.
standby	(Optional) Specifies that the installation occurs on the standby device only.

Command Default

A license is not installed.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.1.0.SG	This command was modified. The **standby** keyword was added for the Cisco Catalyst 4500E series switches.

Release	Modification
Cisco IOS XE Release 3.2S	This command was modified. The **file** keyword was added for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was implemented on the Cisco ASR 903 router.

Usage Guidelines

You must have already purchased the license and obtained the license file from either the Cisco licensing portal or by using the **license save** EXEC command.

For Cisco Catalyst 6500 series switches, the active supervisor allows the license to be installed on both the active and the standby supervisors. The license keys are stored in NVRAM for both the active and standby supervisors. Each supervisor requires a separate license key.

When the **license install** command is issued, these actions are initiated:

- The license module parses the license file and retrieves the unique device identifier (UDI), license line, and license comments.
- If the UDI in the license file is not local, this command passes the license line and user comments to the specified switch where the information is provided to the license security application.
- If the license is a trial license, this command initiates an end-user license agreement prompting you to accept it. If you do not accept the end-user license agreement, the license line installation is stopped.
- Upon successful completion, the application notifies you about the installation of the license.
- The command displays an information message stating that the license installation is successful and whether the licensed feature is present in the current image.

The installation process does not install duplicate licenses. This message appears when duplicate licenses are detected:

```
Installing...Feature:xxx-xxx-xxx...Skipped:Duplicate
```

On some hardware platforms, you must reload (or reboot) the device to make a newly installed license active.

When the **standby** keyword is specified, the license is available only on the standby device. The active supervisor is not able to use it.

Examples

The following example shows how to install a license from the bootflash system on the Cisco ASR 1001 router. The license is a duplicate and is not installed as shown in the display:

```
Router# license install file bootflash:1ru_bu2-throughtput-license
Installing...Feature:throughput...Skipped:Duplicate
0/1 licenses were successfully installed
1/1 licenses were existing licenses
0/1 licenses failed to install
```

The following example shows how to install a license saved in TFTP. You might need to read and accept an end-user license agreement during the installation. The following output has been truncated for easier readability.

```
Router# license install tftp://infra-sun/rifu/2800/normal_better_2.lic00
Installing licenses from "tftp://infra-sun/rifu/2800/normal_better_2.lic00"
Loading rifu/2800/normal_better_2.lic00 from 172.19.211.47 (via GigabitEthernet0/0): !
```

```
[OK - 2361 bytes]
Expiring licenses are being installed in the device with
UDI "CISCO2851:FTX1018A21R" for the following features:
        Feature Name: ios-ips-update
        Start Date:         N/A, End Date: Oct 01 2009
        Feature Name: ios-ips-update
        Start Date:         N/A, End Date: Oct 01 2008
PLEASE  READ THE  FOLLOWING TERMS  CAREFULLY. INSTALLING THE LICENSE OR
LICENSE  KEY  PROVIDED FOR  ANY CISCO  PRODUCT  FEATURE  OR  USING SUCH
PRODUCT  FEATURE  CONSTITUTES  YOUR  FULL ACCEPTANCE  OF  THE FOLLOWING
TERMS. YOU MUST NOT PROCEED FURTHER IF YOU ARE NOT WILLING TO  BE BOUND
BY ALL THE TERMS SET FORTH HEREIN.
You hereby  acknowledge  and  agree that  the  product feature  license
is terminable and that the product  feature  enabled  by  such  license
may  be  shut  down or  terminated by  Cisco  after  expiration of  the
applicable  term  of  the license  (e.g., 30-day  trial  period). Cisco
reserves the  right to terminate or shut down  any such product feature
electronically  or by  any other  means available. While alerts or such
messages  may  be provided, it is  your sole  responsibility to monitor
your terminable  usage of any  product  feature enabled by  the license
and to ensure that your systems and  networks are prepared for the shut
down of the product feature. You acknowledge  and agree that Cisco will
not have any liability  whatsoever for  any damages, including, but not
limited to, direct, indirect, special, or consequential damages related
to any product  feature  being shutdown or terminated. By clicking  the
"accept" button  or typing "yes" you are  indicating  you have read and
agree to be bound by all the terms provided herein.
ACCEPT? [yes/no]: yes
Installing...Feature:ios-ips-update...Successful:Supported
Installing...Feature:ios-ips-update...Failed:
% Error: Better license exists
1/2 licenses were successfully installed
0/2 licenses were existing licenses
1/2 licenses were failed to install
Router#
Apr 22 23:24:45.727: %LICENSE-6-EULA_ACCEPTED: EULA for feature ios-ips-update 1.0 has been
 accepted. UDI=CISCO2851:FTX1018A21R; StoreIndex=2:Primary License Storage
Apr 22 23:24:46.263: %LICENSE-6-EULA_ACCEPTED: EULA for feature ios-ips-update 1.0 has been
 accepted. UDI=CISCO2851:FTX1018A21R; StoreIndex=-1:UNKNOWN License Store
Apr 22 23:24:46.267: %LICENSE-6-INSTALL: Feature ios-ips-update 1.0 was installed in this
device. UDI=CISCO2851:FTX1018A21R; StoreIndex=2:Primary License Storage
```

The following example shows how to initiate license installation from a flash file system on a Cisco switch:

```
Switch# license install flash:flash//test.lic
```

Related Commands

Command	Description
license clear	Removes a license entry from a permanent license file.
license comment	Adds or removes a comment about a feature license.
license save	Saves a copy of a permanent license to a specified license file.
license save credential	Saves license identity information associated with a device to a specified URL.
show license	Displays information about a Cisco IOS software license.

license modify priority

To modify a license priority, use the **license modify priority** command in privileged EXEC mode.

license modify priority *feature-name* {**high** | **low**}

Cisco ASR 903 Routers
license modify priority *feature-name* {**high** | **low**} [{**standby**}]

Syntax Description

feature-name	Name of the feature whose priority you want to modify.
high	Changes priority to high.
low	Changes priority to low.
standby	(Optional) Applies the priority change to the license on the standby processor.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(24)T	This command was introduced.
Cisco IOS XE Release 3.2S	This command was integrated into Cisco IOS XE Release 3.2S for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

This command adjusts the priority of a license. This command generates a list of metered licenses available for a feature and prompts you to select one from the list. If only one license is present, it is automatically selected. If the selected license is an evaluation license and the feature has not been activated, the end-user license agreement (EULA) is shown, and you are prompted to accept or reject the agreement. If you accept the EULA, the priority of the selected license to the permanent license increases or decreases, and the selected license becomes the active license.

Examples

The following example shows how the **license modify priority** command is used to modify the priority of a license:

```
Router# license modify priority lcabcv10 high
Feature: lcabcv10
Index:  1       License type    : Evaluation
        Lock type       : Locked
        License Count   : 10
        License Priority: None
Index:  2       License type    : Evaluation
        Lock type       : Locked
        License Count   : 5
        License Priority: None
Select Index to Adjust [1-2]2
Are you sure you want to modify priority? (yes/[no]): yes
```

```
Increase Precedence of Evaluation License
PLEASE READ THE FOLLOWING TERMS CAREFULLY. INSTALLING THE LICENSE OR LICENSE KEY PROVIDED
FOR ANY CISCO PRODUCT FEATURE OR USING SUCH PRODUCT FEATURE CONSTITUTES YOUR FULL ACCEPTANCE
 OF THE FOLLOWING TERMS. YOU MUST NOT PROCEED FURTHER IF YOU ARE NOT WILLING TO BE BOUND
BY ALL THE TERMS SET FORTH HEREIN.
You hereby acknowledge and agree that the product feature license is terminable and that
the product feature enabled by such license may be shut down or terminated by Cisco after
expiration of the applicable term of the license (e.g., 30-day trial period). Cisco reserves
 the right to terminate or shut down any such product feature electronically or by any other
 means available. While alerts or such messages may be provided, it is your sole
responsibility to monitor your terminable usage of any product feature enabled by the license
 and to ensure that your systems and networks are prepared for the shut down of the product
 feature. You acknowledge and agree that Cisco will not have any liability whatsoever for
any damages, including, but not limited to, direct, indirect, special, or consequential
damages related to any product feature being shutdown or terminated. By clicking the "accept"
 button or typing "yes" you are indicating you have read and agree to be bound by all the
terms provided herein.
ACCEPT? [y/n]: y
```

Related Commands

Command	Description
show license	Displays information about a Cisco IOS software license.

license purge

To purge unneeded licenses (licenses that are not associated with the current chassis unique device identifier [UDI]), use the **license purge** command in privileged EXEC mode.

license purge

Cisco ASR 903 Routers
license purge
standby

Syntax Description

standby	(Optional) Purges license information on the standby processor.

Command Default

Licenses are retained.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
Cisco IOS XE Release 3.1.0SG	This command was introduced for the Cisco Catalyst 4500E series switches.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

Use this command to remove licenses that are not associated with the current chassis UDI. Removing these licenses frees up additional space.

When supervisors are moved from one chassis to another, the licenses that were installed on the supervisor might be tied to the old chassis. These license are not usable when the supervisor is present on the new chassis. This command removes licenses from storage that do not belong to the current chassis.

Examples

The following example shows how to purge unneeded licenses:

```
Switch# license purge
Are you sure you want to purge licenses? [y] y
```

Related Commands

Command	Description
license install	Installs a stored license file.
license save credential	Saves the identity information associated with a license to a specified URL.

license revoke

To revoke a software license from one device and transfer it to another, use the **license revoke** command in privileged EXEC mode.

license revoke *permission-file-url output-rehost-ticket-url*

Syntax Description

permission-file-url	URL of the location to get to the permission ticket.
output-rehost-ticket-url	URL of the location to save the rehost ticket.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.2S	This command was integrated into Cisco IOS XE Release 3.2S for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was implemented on the Cisco ASR 903 router.

Usage Guidelines

The **license revoke** command removes the original, permanent license from the device and provides a license for the new device by accomplishing these operations:

- Obtains a permission ticket from the Cisco licensing infrastructure portal that allows the license to be moved.
- Parses the permission ticket file to extract data related to generating the rehosting ticket.
- Uploads the rehost ticket to the Cisco licensing infrastructure portal so you can obtain the final license.
- The license security application processes the data and offers a grace-period license.
- Once you accept the end-user license agreement, the licensing infrastructure processes the permission ticket and generates the rehost ticket.

Note Cisco IOS licensing requires that the license files generated by the Cisco licensing back end for its devices be secure and tamper-resistant. Security features are in place to authenticate a license by means of encrypted license credentials. Rehosting requires a permission ticket. To generate the permission ticket, the Cisco licensing back end requires the device credential information. Use the **license save credential** command to save device credential information to a specified file system.

Examples

The following example shows how to revoke a license stored in TFTP and how to transfer it to a license stored in flash memory. You might need to read and accept the terms and conditions of the license type being transferred. The following example is truncated for readability:

```
Router# license revoke tftp://infra-sun/ramanp/pt.lic flash:rt.lic
Following Permanent license(s) will be revoked from this device
 Feature Name: gsmamrnb-codec-pack
Following Extension license(s) will be installed on this device
 Feature Name: gsmamrnb-codec-pack
PLEASE  READ THE  FOLLOWING TERMS  CAREFULLY. . .
ACCEPT? [yes/no]: yes
Issue 'license feature gsmamrnb-codec-pack' command to enable the license
Rehost ticket saved ..... to flash:rt.lic
```

Related Commands

Command	Description
license install	Installs a stored license file.
license save	Saves a copy of a permanent license to a specified license file.

license right-to-use activate

To display information about right-to-use licenses and their states on a switch, use the **show license right-to-use** command in privileged EXEC mode.

Cisco Catalyst 3560-E Switch and Switch Stack Platforms

Cisco Catalyst 3750-E Switch Platforms

show license right-to-use [**switch** *switch-num*]

Syntax Description

switch	
switch-num	(Optional) Specifies a switch in a switch stack or in a mixed switch stack. The range is 1 to 9.

Command Default

Command Modes

Command History

Release	Modification

Usage Guidelines

Examples

Related Commands

Command	Description

license right-to-use deactivate

Syntax Description

Command Default

Command Modes

Command History

Release	Modification

Usage Guidelines

Examples

Related Commands

Command	Description

license save

To save a copy of a permanent license in a Cisco IOS device to a specified license file, use the **license save** command in privileged EXEC mode.

Cisco ASR 903 Router
license save *file-sys:filename* [{**standby**}]

Cisco ASR 1001 Router Platforms
license save **file** *file-sys:filename*

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license save **file** *file-sys//lic-location*

Cisco Catalyst 3560-E Switch Platforms
license save **file** *file-sys//lic-location*

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license save **file** *file-sys//lic-location* [{**switch** *switch-num*}]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license save **file** *file-sys//lic-location* **switch** *switch-num*

Syntax Description

file	Saves a license file.
file-sys:filename	The location and filename within a device where Cisco IOS software licenses are stored. For Cisco ASR 1001 routers, valid file systems are **bootflash** and **usb0**.
file-sys://lic-location	The location within a device where Cisco IOS software licenses are stored. Depending on the hardware platform, valid file system values might be: **archive**, **bootflash**, **bs**, **flash**, **flash** *n*, **http**, **https**, **null**, **nvram**, **pram**, **rcp**, **scp**, **syslog**, **system**, **tftp**, **tmpsys**, **vb**. The license location can also be a directory with these restrictions: • The **bs://**, **null://**, and **vb://** URLs do not accept filenames. • The **bs** file system is available only on mixed Cisco 3750-E switch stacks. • The **archive**, **pram**, **scp**, and **syslog** file systems are available only on router platforms. • The **flash** *n* file system, where *r*, is an integer in the range of 1 to 9, is available only on Cisco 3750-E switches and stacks. • The **https** file system is not available on Cisco 3750-E switch mixed stacks or on the Cisco 3560-E switch.
standby	(Optional) Saves license information to the standby processor.

switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The switch number range is 1 to 9.

Command Default

Licenses are not saved.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.2S	This command was modified. The **file** *file-sys:filename* keyword and argument were added for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

Issuing this command stores the license line and comment in XML format as required by the command. Issuing this command saves copies of all permanent licenses.

Saved licenses can be restored by using the **license install** command.

Examples

The following example shows how to save a license named throughput-license to the bootflash on the Cisco ASR 1001 router:

```
Router# license save file bootflash:throughput-license
license lines saved ..... to bootflash/throughput-license
```

The following example shows how to save a license named feat1.lic in the FTP file system:

```
Router# license save ftp:feat1.lic
license lines saved ..... to ftp:feat1.lic
```

Related Commands

Command	Description
license install	Installs a stored license file.
license save credential	Saves the identity information associated with a license to a specified URL.

license save credential

To save the identity information associated with a device to a specified URL, use the **license save credential** command in privileged EXEC mode.

Cisco ASR 903 Routers
license save credential *file-sys:filename*
standby

Cisco ASR 1001 Routers
license save credential file *file-sys:filename*

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
license save credential file *file-sys//lic-location*

Cisco Catalyst 3560-E Switch Platforms
license save credential file *file-sys//lic-location*

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
license save credential file *file-sys//lic-location* [{**switch** *switch-num*}]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
license save credential file *file-sys//lic-location* **switch** *switch-num*

Syntax Description

file	Saves a license credential file.
file-sys:filename	The location and filename within a device where Cisco IOS software licenses are stored. For Cisco ASR 1001 routers, valid file systems are **bootflash** and **usb0**.
file-sys://lic-location	The location within a device where Cisco IOS software license credentials are stored. Depending on the hardware platform, valid file system values might be: **archive**, **bootflash**, **bs**, **flash**, **flash** *n*, **ftp**, **http**, **https**, **null**, **nvram**, **pram**, **rcp**, **scp**, **syslog**, **system**, **tftp**, **tmpsys**, **vb**. • The **bs://**, **null://**, and **vb://** URLs do not accept filenames. • The **bs** file system is available only on mixed Cisco 3750-E switch stacks. • The **archive**, **pram**, **scp**, and **syslog** file systems are available only on router platforms. • The **flash** *n* file system, where *r*, is an a number from 1 to 9, is available only on Cisco 3750-E switches and stacks. • The **https** file system is not available on Cisco 3750-E switch mixed stacks or on the Cisco 3560-E switch.
standby	(Optional) Saves identity information to the standby processor.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The range is 1 to 9.

Command Default

License credentials are not saved.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(15)XZ	This command was integrated into Cisco IOS Release 12.4(15)XZ.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
Cisco IOS XE Release 3.2S	This command was modified. The **file** *file-sys:filename* keyword and argument were added for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

Use this command to save credential information about a device.

Examples

The following example shows how to save identity information about a license named tput-license to the bootflash system on the Cisco ASR 1001 router:

```
Router# license save credential file bootflash:tput-license
Device credential saved ..... to /bootflash/tput-license
```

The following example shows how to save identity information about a license named feat1.lic in the http file system:

```
Switch# license save credential http:feat1.lic
Device credential saved ..... to http:feat1.lic
```

The following example shows how to save identity information about a license named feat2.lic in the scp file system:

```
Router# license save credential scp:feat2.lic
Device credential saved ..... to scp:feat2.lic
```

Related Commands

Command	Description
license install	Installs a stored license file.
license save	Saves a copy of a permanent license to a specified license file.

platform enable controller

To enable the ports on the interface module, use the **platform enable controller** command in global configuration mode. To disable the ports, use the **no** form of this command.

platform enable controller *controller-type slot/subslot/port*
no platform enable controller *controller-type slot/subslot/port*

Syntax Description

controller-type	Type of controller.
slot/subslot/port	Specifies the location of the interface.

Command Default

This command is disabled by default.

Command Modes

Global Configuration (config)

Command History

Release	Modification
Cisco IOS XE Release 3.9S	This command is introduced.

Usage Guidelines

Use the **platform enable controller sonet** command before performing an ISSU upgrade from the Cisco IOS XE Release 3.9S to Cisco IOS XE Release 3.10S.

Use the **platform enable controller sonet** command to enable the ports after the license is installed on the router.

Note The slot number for the **controller sonet** is always zero on the Cisco ASR 903 Router.

Example:

Example

This example shows how to enable the controller sonet on the router.

```
Router# configure terminal
Router(config)# platform enable controller sonet 0/1/2
```

Related Commands

Command	Description
license install	Installs the license on the router.
controller sonet	Selects the controller to configure and enters the controller configuration mode.
show license detail	Displays detailed license information.

request license new-udi

To request that the Cisco CSR 1000V feature license be mapped to a new virtual unique device identifier (UDI), use the **request license new-udi** command in privileged EXEC mode.

request license new-udi

Command Modes

Privileged EXEC

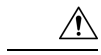
Command History

Release	Modification
Cisco IOS XE Release 3.8S controlled availability release	This command was introduced on the Cisco CSR 1000V.

Usage Guidelines

A virtual UDI (vUDI) is generated when the Cisco CSR 1000V is first booted. The vUDI contains the format ProductID:SerialNumber.

If you plan to clone the VM, you must also request a new virtual UDI on the cloned VM; if a new virtual UDI is not requested, you have two Cisco CSR 1000V VM instances using the same vUDI and license in both VMs, violating the terms of the Cisco EULA.



Caution If the Cisco CSR 1000V software is copied illegally to another physical host, then the vUDI becomes invalid and the license is invalidated. You will receive a notice about the pending expiration of the license.

Example

The following example requests that a new vUDI be assigned to the Cisco CSR 1000V license:

```
se-10-0-0-0# request license new-udi

Executing this command will invalidate the existing license,
proceed with generating new-udi?[confirm]

New udi CSR1000V:9MF19951DMU
Router#
*Aug 21 11:24:27.275:  found an eval license info: csr1kv_medium
*Aug 21 11:24:27.276:  Step 3. deletion of NOT-in-use licenses
*Aug 21 11:24:27.276:  Step 4. deletion of in-use licenses
*Aug 21 11:24:27.440: %LICENSE-2-UDI_CHANGED: UDI of this instance changed from OLD:
CSR1000V:9YA3086B993 to New: CSR1000V:9MF19951DMU
```

Related Commands

Command	Description
show license	

show license through snmp-server host

show license

To display information about a Cisco IOS software license, use the **show license** command in privileged EXEC mode.

Cisco ASR 903 Routers
show license [{**agent** {**counters** | **session**} | **all** | **detail** [*feature-name*] | **feature** | **file** | **handle** | **image levels** | **statistics** | **status** | **udi**}]

Cisco ASR 1001 Routers
show license [{**EULA** | **agent** | **all** | **call-home** | **detail** [*feature-name*] | **feature** | **file** | **right-to-use** | **statistics** | **status** | **udi**}]

Cisco 4400 Series Integrated Services Routers
show license [{**EULA** | **agent** | **all** | **call-home** | **detail** [*feature-name*] | **feature** | **file** | **right-to-use** | **statistics** | **status** | **udi**}]

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
show license [{**agent** {**counters** | **session**} | **all** | **detail** [*feature-name*] | **feature** | **file** | **statistics** | **status** | **udi** [**modules**]}]

Cisco Catalyst 3560-E and Cisco Catalyst 3750-E Switch and Switch Stack Platforms
show license [{**agent** {**counters** | **session**} | **all** | **detail** [*feature-name*] | **feature** | **file** | **image levels** | **statistics** | **status** | **udi** [**modules**] **switch** *switch-num*}]

Cisco Catalyst 3750-E Mixed Switch Stacks
show license [{**agent** {**counters** | **session**} | **detail** {*feature-name* **switch** *switch-num* | **switch** *switch-num*} | [{**all** | **feature** | **file** | **status** | **udi** [**modules**]}] **switch** *switch-num*}]

Cisco CSR 1000V Series Cloud Services Routers
show license [{**EULA** | **agent** | **all** | **call-home** | **detail** [*feature-name*] | **feature** | **file** | **handle** | **statistics** | **status** | **udi** [**history**]}]

Cisco uBR10012 Universal Broadband Routers
show license [{[**agent** {**counters** | **session**}] | **detail** {*feature-name* **subslot** *slot/subslot* | **subslot** *slot/subslot*} | **udi** [{**subslot***slot/subslot*}]}]{ **all** | **feature** | **file** | **status** | **udi** [**modules**]} **switch** *switch-num*

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers
show license [{[**agent** {**counters** | **session**}]}]
detail {*feature-name* **slot** *slot* | **slot** *slot*} | **udi** [{**slot***slot*}]
{**all** | **feature** | **file** | **status** | **udi** [**modules**]} **switch** *switch-num*

Syntax Description

agent	Shows information about a license agent.
counters	Shows statistics counters for the license agent.
session	Shows session information related to a license agent.
all	Shows information about all licenses in the system.

detail *feature-name*	Shows detailed information about a specified licensed feature or about all licenses.
EULA	Shows information about the End User License Agreement.
expiring	Shows all available expiring licenses.
feature	Shows a list of licensed features available in an image.
file	Shows license entries stored in the license file.
handle	Shows license handle information.
image levels	Shows license image levels.
image-levels	Shows license image levels.
in-use	Show all available in-use licenses.
permanent	Show all available permanent licenses.
right-to-use	Show all available right-to-use licenses.
statistics	Shows license statistics information.
status	Shows information about supported license types and license operations, and provides device status.
udi	Shows all the unique device identifier (UDI) values that can be licensed in a system.
modules	Shows the hierarchical relationship between the UDI modules.
history	Shows the UDI history.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The range is 1 to 9.
subslot	Shows the slot and subslot information of a line card.
slot	Shows the slot information of a line card.
slot /	Slot where the line card resides: • Cisco uBR7246VXR router—The range is 3 to 6. • Cisco uBR7225VXR router—The range is 1 to 2. • Cisco uBR10012 router—The range is 5 to 8.
subslot	The subslot number is 0 or 1.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.

Release	Modification
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC on the Cisco UBR-10 MC20X20V line card.
15.0(1)M	This command was modified. The **modules** keyword was added.
12.2(33)SCD	This command was modified. The **subslot** *slot* / *subslot* keyword and arguments were added for the Cisco uBR7225VXR and Cisco uBR7246VXR routers.
Cisco IOS XE Release 3.2S	This command was modified. The **expiring**, **image-levels**, **in-use**, and **permanent** keywords were added for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.3S	This command was modified. The output for the **show license feature** command now includes information about the cube_ent-100 feature license for the Cisco ASR 1001 router.
Cisco IOS XE Release 3.5S	This command was modified. The **handle** keyword was added for the Cisco ASR 903 router.
Cisco IOS XE Release 3.9S	This command was modified. The **EULA** and **UDI history** keywords were added for the Cisco CSR 1000V router. This command was implemented on Cisco 4400 Series ISRs.

Usage Guidelines

Use this command to display license information and to help with troubleshooting issues related to Cisco IOS software licenses. This command displays all the licenses in the system.

This command also displays the features that are available but not licensed to execute. Output is grouped according to how the features are stored in license storage.

If a switch number is specified, information from that switch is displayed. If a switch number is not specified, details of the local switch are displayed.

If the **show license all** command displays the license as *Active, Not in Use, EULA not accepted*, you can use the **license boot module** global configuration command to enable the license and accept the end-user license agreement (EULA). Do not confuse the **license boot module** global configuration command with a similarly named command available in privileged EXEC mode.

Cisco uBR10012 Universal Broadband Router Usage Guidelines

In a Cisco uBR10012 router, the line card is identified with a slot ID, which is a combination of the *slot* / *subslot*. Use the **subslot** keyword with the **show license** command syntax, when appropriate.

The **show license udi** command shows the UDI values for all cable interface line cards. When the command is used with the **subslot** keyword, the UDI value for the specified line card is displayed.

Keywords such as **all**, **detail**, **feature**, **file**, and **status** require the **subslot** *slot* / *subslot* keyword and arguments to execute the **show license** command.

To enable evaluation license on the Cisco uBR10012 router, use the **license modify** command.

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers Usage Guidelines

To enable evaluation license on the Cisco uBR7225VXR and Cisco uBR7246VXR routers, use the **license modify** command.

Note The **agent** keyword is not supported in Cisco IOS Release 12.2(33)SCD on the Cisco uBR7225VXR and on the Cisco uBR7246VXR routers.

Examples

The following is sample output from the **show license agent counters** command:

```
Router# show license agent counters
License Agent Counters
Request Messages Received:0: Messages with Errors:0
Request Operations Received:0: Operations with Errors:0
Notification Messages Sent:0: Transmission Errors:0: Soap Errors:0
```

The following is sample output from the **show license all** command on the Cisco ASR 1001 router:

```
Router# show license all
License Store: Primary License Storage
StoreIndex:  0  Feature: throughput                      Version: 1.0
        License Type: Permanent
        License State: Active, In Use
        License Count: Non-Counted
        License Priority: Medium
License Store: Primary License Storage
StoreIndex:  4  Feature: adventerprisek9                Version: 1.0
        License Type: Permanent
        License State: Active, In Use
        License Count: Non-Counted
        License Priority: Medium
```

The table below describes the significant fields shown in the display.

Table 1: show license Field Descriptions

Field	Description
Pak Number	Product authorization key number, which is provided to you when you order and purchase the right to use a feature set for a particular platform. The PAK serves as a receipt and is used as part of the process to obtain a license.
SKU Name	Stock keeping unit name, which maps to one or more Cisco software features.
Description	Description provided for the SKU.
Ordered Qty	Quantity ordered.
Feature List	List of features.
Platform Supported	List of Cisco device platforms supported.

The following is sample output from the **show license detail** command:

```
Router# show license detail
Index: 1        Feature: SNASw                          Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA not accepted
            Evaluation total period: 8  weeks 4  days
```

```
            Evaluation period left: 8  weeks 4  days
        Lock type: Non Node locked
        Vendor info:
        License Addition: Additive
        License Generation version: 0x8100000
        License Count: Non-Counted
        License Priority: None
        Store Index: 5
        Store Name: Evaluation License Storage
Index: 2        Feature: SSL_VPN                          Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 0  minute  0  second
        Lock type: Non Node locked
        Vendor info:
        License Addition: Additive
        License Generation version: 0x8100000
        License Count: 200/0/0  (Active/In-use/Violation)
        License Priority: Low
        Store Index: 4
        Store Name: Evaluation License Storage
Index: 3        Feature: datak9                           Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA not accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
        Lock type: Non Node locked
        Vendor info:
        License Addition: Additive
        License Generation version: 0x8100000
        License Count: Non-Counted
        License Priority: None
        Store Index: 2
        Store Name: Evaluation License Storage
Index: 4        Feature: gatekeeper                       Version: 1.0
        License Type: Evaluation
        License State: Active, Not in Use, EULA accepted
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 0  minute  0  second
        Lock type: Non Node locked
        Vendor info:
        License Addition: Additive
        License Generation version: 0x8100000
        License Count: Non-Counted
        License Priority: Low
        Store Index: 3
        Store Name: Evaluation License Storage
Index: 5        Feature: ios-ips-update                   Version: 1.0
        License Type: Paid Subscription
        Start Date:         N/A, End Date: Jun 16 2010
        License State: Active, Not in Use
        Lock type: Node locked
        Vendor info: <UDI><PID>CISCO3900-MPE140</PID><SN>FHH123000G9</SN></UDI><T>PAS</T>
        License Addition: Exclusive
        License Generation version: 0x8200000
        License Count: Non-Counted
        License Priority: Medium
        Store Index: 0
        Store Name: Primary License Storage
```

The following is sample output from the **show license feature** command on the Cisco ASR 1001 router:

```
Router# show license feature
Feature name        Enforcement   Evaluation  Clear Allowed  Enabled
adventerprisek9     yes           no          yes            yes
advipservicesk9     yes           no          yes            no
ipbasek9            no            no          yes            no
throughput          yes           no          yes            yes
```

The following is sample output from the **show license feature** command on the Cisco 4451-X Integrated Services Router:

```
Router# show license feature
Feature name Enforcement Evaluation Subscription Enabled RightToUse
appxk9       yes         yes        no           yes     yes
uck9         yes         yes        no           no      yes
securityk9   yes         yes        no           no      yes
ipbasek9     no          no         no           no      yes
```

The following is sample output from the **show license file** command:

```
Router# show license file
License Store: Primary License Storage
  Store Index: 0
    License: 11 throughput 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS INFIN
             ITE_KEYS NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *12MDFXFBE6TEQR54
             00 NiL NiL NiL 5_MINS <UDI><PID>ASR1001</PID><SN>JAE14020AT5</SN>
             </UDI> :0oy5aopCvhfLBBk3:l0fBb4Kr3EwMLaYAHDV93ClpLXhJGOUE1ZuBusC,
             0B2QIQLvo6eUrKn27faF3zOYTTyjLRCGA8UMkemMyqmvjcg0Jhfm$<WLC>AQEBIQA
             B//8szae77QGOnFBXBoP02Obx6Fq2XtGPUJnh5pGplTkDzw9J5aqkkUjTNkuO4sv4
             FYORqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21MNUjVb
             hoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko8XC
             Y=</WLC>
    Comment: --
       Hash: ZJJz5MveEOPePQA3ATs6+OxF4bw=
  Store Index: 1
    License: 11 adventerprisek9 1.0 LONG NORMAL STANDALONE EXCL INFINITE_KEYS
             INFINITE_KEYS NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *12MDFXFBE6T
             EQR5400 NiL NiL NiL 5_MINS <UDI><PID>ASR1001</PID><SN>JAE14020AT5
             </SN></UDI> dFCG4MGqCj5nRQGYuTNELNjulmgkdTIxsGBaysKmB1f8it6t76IbU
             1nDky:q5h843EeHBw9JMwZWcMfbveX8j93UWZckXYU8gSablS79TVo5Vg$<WLC>AQ
             EBIQAB///Y5fwUA9AySxZ1dkpw8MgMeMEbPYi4rEAcdDnsmUIwbp0xMUblmtUwhaC
             QMd/pCaGRqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJVlPyEvQ8H21M
             NUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ++/Vtc/q3SF/5
             Ko8XCY=</WLC>
    Comment:
       Hash: 7AlBc9W0+DqIdv/3EgOMsXW19Xs=
```

The following is sample output from the **show license image levels** command on the Catalyst 3750E switch:

```
Switch# show license image levels
Module name   Image level(s)   Priority   Configure   Valid license(s)
c3750e        ipservices       2          YES         ipservices;advipservices
              ipbase           3          NO          ipbase
```

The following is sample output from the **show license status** command:

```
Switch# show license status
                License Type Supported
        permanent  Non-expiring node locked license
        extension  Expiring node locked license
        evaluation Expiring non node locked license
```

```
        License Operation Supported
      install    Install license
      clear      Clear license
      annotate   Comment license
      save       Save license
      revoke     Revoke license
      call-home  License call-home
        Call-home Operation Supported
      show pak   Display license pak via call-home
      install    Install license via call-home
      revoke     Revoke license via call-home
      resend     Fetch license via call-home
        Device status
      Device Credential type: DEVICE
      Device Credential Verification: PASS
      Rehost Type: DC_OR_IC

SWIFT url status
      Swift URL set to default value : https://tools.cisco.com/SWIFT/Licensing
```

The following is sample output from the **show license udi modules** command:

```
Router# show license udi modules
Location        PID                  SN              UDI
-------------------------------------------------------------------------------------
Slot0           WS-C3750E-24TD-E     CAT1146R04N     WS-C3750E-24TD-E:CAT1146R04N
Slot0/1         WS-C3750E-24TD-E     CAT1146R04X     WS-C3750E-24TD-E:CAT1146R04X
Slot0/1/1       WS-C3750E-24TD-E     CAT1146R04Y     WS-C3750E-24TD-E:CAT1146R04Y
```

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers

The following is sample output from the **show license all** command, where slot 5 denotes the line card for which the license information is requested. The table below describes the fields shown in the command output.

```
Router# show license all slot 5
License Store: Primary License Storage
StoreIndex: 0   Feature: DS_License                        Version: 1.0
        License Type: Permanent
        License State: Active, In Use
        License Count: 8/8/0  (Active/In-use/Violation)
        License Priority: Medium
StoreIndex: 1   Feature: US_License                        Version: 1.0
        License Type: Permanent
        License State: Active, In Use
        License Count: 8/8/0  (Active/In-use/Violation)
        License Priority: Medium
License Store: Evaluation License Storage
StoreIndex: 0   Feature: US_License                        Version: 1.0
        License Type: Evaluation
        License State: Inactive
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
        License Count: 8/0/0  (Active/In-use/Violation)
        License Priority: None
StoreIndex: 1   Feature: DS_License                        Version: 1.0
        License Type: Evaluation
        License State: Inactive
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
```

```
        License Count: 8/0/0  (Active/In-use/Violation)
        License Priority: None
```

The following is sample output from the **show license detail** command, where slot 5 specifies the line card for which detailed feature information is requested:

```
Router# show license detail slot 5
Index: 1        Feature: DS_License                         Version: 1.0
        License Type: Permanent
        License State: Active, In Use
        License Count: 8/8/0  (Active/In-use/Violation)
        License Priority: Medium
        Store Index: 0
        Store Name: Primary License Storage
Index: 2        Feature: DS_License                         Version: 1.0
        License Type: Evaluation
        License State: Inactive
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
        License Count: 8/0/0  (Active/In-use/Violation)
        License Priority: None
        Store Index: 1
        Store Name: Evaluation License Storage
Index: 3        Feature: US_License                         Version: 1.0
        License Type: Permanent
        License State: Active, In Use
        License Count: 8/8/0  (Active/In-use/Violation)
        License Priority: Medium
        Store Index: 1
        Store Name: Primary License Storage
Index: 4        Feature: US_License                         Version: 1.0
        License Type: Evaluation
        License State: Inactive
            Evaluation total period: 8  weeks 4  days
            Evaluation period left: 8  weeks 4  days
        License Count: 8/0/0  (Active/In-use/Violation)
        License Priority: None
        Store Index: 0
        Store Name: Evaluation License Storage
```

The following is sample output from the **show license status** command, where slot 5 denotes the line card for which license information is requested:

```
Router# show license status slot 5
License Type Supported
        permanent               Non-expiring node locked license
        extension               Expiring node locked license
        evaluation              Expiring non node locked license
                License Operation Supported
        install    Install license
        clear      Clear license
        annotate   Comment license
        save       Save license
        Modify     Modify license
        revoke     Revoke license
        call-home  License call-home
                Call-home Operation Supported
        show pak   Display license pak via call-home
        install    Install license via call-home
        revoke     Revoke license via call-home
        resend     Fetch license via call-home
                Device status
        Device Credential type: DEVICE
```

```
        Device Credential Verification: PASS
        Rehost Type: DC_OR_IC
SWIFT url status
        Swift URL set to default value : https://tools.cisco.com/SWIFT/Licensing
```

The following is sample output from the **show license feature** command, for the Upstream (US) and Downstream (DS) feature:

```
Router# show license feature slot 5
Feature name             Enforcement  Evaluation  Subscription   Enabled
US_License               yes          yes         no             yes
DS_License               yes          yes         no             yes
```

The following is sample output from the **show license udi** command, where slot 5 specifies the line card for which UDI information is requested:

```
Router# show license udi slot 5
SlotID   PID                    SN                      UDI
------------------------------------------------------------------------
*5       UBR-MC88U              CSJ12514210     UBR-MC88U:CSJ12514210
```

The following is sample output from the **show license udi** command, when the **slot** keyword is not specified:

```
Router# show license udi
SlotID   PID                    SN                      UDI
------------------------------------------------------------------------
 5       UBR-MC88U              CSJ12514210     UBR-MC88U:CSJ12514210
```

The table below describes the significant fields shown in the display.

Table 2: show license udi Field Descriptions

Field	Description
SlotID	The slot number of the line card on the Cisco uBR7225VXR or Cisco uBR7246VXR router.
PID	Product identification number. The name by which the product can be ordered.
SN	Serial number. Used to identify an individual, specific instance of a product.
UDI	Unique device identifier. This information is printed on the device and stored electronically on the device to facilitate remote retrieval.

The following is sample output from the **show license file** command:

```
Router# show license file slot 5
License Store: Primary License Storage
  Store Index: 0
    License: 11 DS_License 1.0 LONG NORMAL STANDALONE EXCL 8_KEYS INFINITE_KEY
             S NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *1VDWSEZNBXMDUF6400 NiL
             NiL NiL 5_MINS <UDI><PID>UBR-MC88U</PID><SN>CSJ12514210</SN></UDI
             > dai:f7mhotuFuD:1flGnfTcbjjqZNSj4w2ZOJKrlVM3riaI6MhGUsnGkIbk83bi
             U3SpE1bzN4X1TQ8x9HRC93fVHK9eTcFaMsLX6I,G4p4wWfimLew3H0SUSfdspJvyz
             ikLZ$<WLC>AQEBIQAB///Z8GMgzMS3HccHkeioc4KXGR28VwY2ckacKin9G6PtV18
             N/XB0WKmA+Mj6R0tJ+RmRqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJ
             VlPyEvQ8H21MNUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ+
             +/Vtc/q3SF/5Ko8XCY=</WLC>
    Comment:
```

```
        Hash: rYHlS/Q7961pN+kZpf3LQ9UR+dY=
    Store Index: 1
      License: 11 US_License 1.0 LONG NORMAL STANDALONE EXCL 8_KEYS INFINITE_KEY
               S NEVER NEVER NiL SLM_CODE CL_ND_LCK NiL *1VDWSEZNBXMDUF6400 NiL
               NiL NiL 5_MINS <UDI><PID>UBR-MC88U</PID><SN>CSJ12514210</SN></UDI
               > yxU,2eYAsVZXLX1UhO:zfDWS4rE7OZr5g:cYy:rCOcVBi97MjRUZUzWb6Vi8MB2
               3VVvaGQBN4tni,0BsTsufqgLjXaryA,NexvAPypO9AJRh3soHjqW,COT2V6fbgzPt
               5u35$<WLC>AQEBIQAB//9uV7Zp1YcBuFy6gMM/gAYOXR7dm/+O06pGceLT3qUNUug
               l4skFZoucJkLd0ojdk+mRqwInXo3s+nsLU7rOtdOxoIxYZAo3LYmUJ+MFzsqlhKoJ
               VlPyEvQ8H21MNUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolVzdzfJfEPQIx6tZ+
               +/Vtc/q3SF/5Ko8XCY=</WLC>
      Comment:
        Hash: Hg6bxVO8ZZITGbFg7NoAQU/QGhs=
License Store: Evaluation License Storage
    Store Index: 0
      License: 11 US_License 1.0 LONG TRIAL DISABLED 1440 DISABLED STANDALONE AD
               D 8_KEYS INFINITE_KEYS NEVER NEVER NiL SLM_CODE DEMO NiL NiL Ni N
               iL NiL 5_MINS NiL V7kIRj,EZLjQ4gpW6nQYL40zCTx,wvk1k9buST3EOhLRys9
               slYKaMRsXbMSuz3iHfA$<WLC>AQEBIQAB///QgcWXs1rLFOkfnLaMbSpR5sFnSmYb
               dL0ZcysI1rlNaK9yrCLeW3aidzf+WNvFg86RqwInXo3s+nsLU7rOtdOxoIxYZAo3L
               YmUJ+MFzsqlhKoJVlPyEvQ8H21MNUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolV
               zdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko8XCY=</WLC>
      Comment:
        Hash: Rox9tmRbNJOygotZlWYmr0OOvY4=
    Store Index: 1
      License: 11 DS_License 1.0 LONG TRIAL DISABLED 1440 DISABLED STANDALONE AD
               D 8_KEYS INFINITE_KEYS NEVER NEVER NiL SLM_CODE DEMO NiL NiL Ni N
               iL NiL 5_MINS NiL Hp5gBr76OsVcoCNVW8Hi33rQs2xMyd5YU6sDI6oQSdVTrxI
               vaLwepwAB4GXyk1zvLP$<WLC>AQEBIQAB//8c0JDyC40fqQGUTylDKqaN/AyL43ZV
               PdJH0HolJAgOF5mjctCLuw5RaXRSPAJ09LaRqwInXo3s+nsLU7rOtdOxoIxYZAo3L
               YmUJ+MFzsqlhKoJVlPyEvQ8H21MNUjVbhoN0gyIWsyiJaM8AQIkVBQFzhr10GYolV
               zdzfJfEPQIx6tZ++/Vtc/q3SF/5Ko8XCY=</WLC>
      Comment:
        Hash: 3bm6gofelRl4J0rO/J44poj+dEY=
```

Related Commands

Command	Description
license boot module	Boots a new software license.
license call-home install	Installs a license using the Cisco License Call Home feature.
license call-home resend	Restores a lost license by using the Cisco License Call Home feature.
license call-home revoke	Revokes and transfers a license by using the Cisco License Call Home feature.
license clear	Removes a license entry from license storage.
license comment	Add or removes a comment about a feature license.
license modify priority	Modifies a license priority.
license save	Saves a copy of a permanent license to a specified license file.

show license call-home

To display the stock keeping unit (SKU) list and features available in a product authorization key (PAK), use the **show license call-home** command in privileged EXEC mode.

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
show license call-home pak *pak-id*

Cisco uBR10012 Universal Broadband Router
show license [**call-home pak** *pak-id*]

Cisco Catalyst 3560-E and Cisco Catalyst 3750-E Switch Platforms
show license call-home pak *pak-id*

Cisco Catalyst 4500E Series Switch Platforms
show license call-home pak *pak-id*

Syntax Description

pak	Shows the product authorization key.
pak-id	The product authorization key sent through e-mail or through regular mail by manufacturing to authorize software upgrades.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC on the Cisco uBR10012 universal broadband router.
Cisco IOS XE Release 3.3SG	This command was integrated into Cisco IOS XE Release 3.3SG on the Cisco Catalyst 4500E series switch.
15.1(1)SG	This command was integrated into Cisco IOS Release15.1(1)SG on the Cisco Catalyst 4500E series switch.

Usage Guidelines

The Cisco License Call Home feature allows a Cisco router to communicate with the Cisco licensing infrastructure through the Internet and retrieve licensing information. This command requires that the router be connected to the Internet.

This command requires the following:

- The router or switch must have an Internet connection and use HTTPS to connect to the Cisco licensing infrastructure. To set up a secure HTTP connection, see the HTTP 1.1 Web Server and Client module in the *Cisco IOS Network Management Configuration Guide*.

- Only certain platforms support the Cisco License Call Home feature, and those devices must be running a Cisco IOS crypto K9 image.
- You must obtain the device certificate from the Cisco licensing infrastructure.
- You need a Cisco.com user login account.

Issuing the **show license call-home** command causes these actions to occur:

- The Cisco licensing infrastructure returns parsed XML content to the command line. The parsed content contains information about SKUs and feature names. The content might also contain warning messages.
- The SKU information and any warning messages are displayed as formatted output on the router command line.

Cisco uBR10012 Universal Broadband Router

In the Cisco uBR10012 universal broadband router, the **call-home** keyword is optional in the **show license** command syntax.

Examples

The following example shows the PAKs and SKUs associated with a software license:

```
Router# show license call-home pak 3XPXR9E7D30
CCO User name : User1
CCO password  : *******
Pak Number          : 3XPXR9E7D30
Pak Fulfillment type: SINGLE
     1. SKU Name           : Gatekeeper
        SKU Type           : Product
        Description        : Gatekeeper
        Ordered Qty        : 1
        Available Qty      : 1
        Feature List       :
            Feature name:         gatekeeper Count: Uncounted
        Platform Supported : 5400
                             5350
                             2800
                             3800
```

The table below describes the significant fields shown in the display.

Table 3: show license call-home Field Descriptions

Field	Description
Pak Number	Product authorization key number, which is provided to you when you order and purchase the right to use a feature set for a particular platform. The PAK serves as a receipt and is used as part of the process to obtain a license.
SKU Name	Stock keeping unit name, which maps to one or more Cisco software features.
Description	Description provided for the SKU.
Ordered Qty	Quantity ordered.
Feature List	List of features.
Platform Supported	List of Cisco device platforms supported.

Related Commands

Command	Description
license call-home install	Installs a license by using the Cisco License Call Home feature.
license call-home resend	Restores a lost license by using the Cisco License Call Home feature.
license call-home revoke	Rehosts (revokes and transfers) a license by using the Cisco License Call Home feature.

show license right-to-use

Syntax Description

Command Default

Command Modes

Command History

Release	Modification

Usage Guidelines

Examples

Related Commands

Command	Description

show license statistics

To display license statistics information, use the **show license statistics** command in privileged EXEC mode.

Cisco 860, 880, and 890 Series Routers, and Cisco 1900, 2900, and 3900 Series Integrated Services Router Platforms
show license statistics

Cisco ASR 903 Router
show license statistics
standby

Cisco Catalyst 3560-E Switch Platforms
show license statistics

Cisco Catalyst 3750-E Switch and Switch Stack Platforms
show license statistics [{**switch** *switch-num*}]

Cisco Catalyst 3750-E Switch Mixed Stack Platforms
show license statistics switch *switch-num*

Cisco uBR10012 Universal Broadband Routers
show license {**statistics subslot** *slot*/*subslot*}

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers
show license [{**statistics slot** *slot*}]

Syntax Description

standby	(Optional) Specifies standby license information.
switch *switch-num*	Specifies a switch in a switch stack or in a mixed switch stack. The range is 1 to 9.
module	(Optional) Shows license statistics information from the specified module slot of the Catalyst 6500 series switch.
subslot	(Cisco uBR10012 universal broadband routers only) Shows the slot and subslot information of a line card.
slot	Shows the slot information of a line card.
slot	Slot where the line card resides: • Cisco uBR7246VXR router--The range is 3 to 6. • Cisco uBR7225VXR router--The range is 1 to 2. • Cisco uBR10012 router--The range is 5 to 8.
subslot	(Cisco uBR10012 universal broadband routers only) The value is 0 or 1.

Command Modes

Privileged EXEC (#)

Command History

Release	Modification
12.4(15)XZ	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.
12.2(33)SCC	This command was integrated into Cisco IOS Release 12.2(33)SCC on Cisco uBR10012 universal broadband routers.
12.2(33)SCD	This command was modified. The **slot** *slot* keyword and argument were added for the Cisco uBR7225VXR and Cisco uBR7246VXR routers.
Cisco IOS XE Release 3.5S	This command was modified. The **standby** keyword was added for the Cisco ASR 903 router.

Usage Guidelines

Cisco uBR10012 Universal Broadband Routers

The command displays statistics information of the line card in the specified *slot* / *subslot*. The **subslot** *slot/subslot* keyword and arguments were added for Cisco uBR10012 universal broadband routers.

Examples

The following is sample output from the **show license statistics** command:

```
Router# show license statistics
  Administrative statistics
 Install success count:   4
 Install failure count:   1
 Install duplicate count: 12
 Comment add count:       2
 Comment delete count:    0
 Clear count:             10
 Save count:              1
 Save cred count:         6
  Client statistics
 Request success count 0
 Request failure count 0
 Release count         0
 Global Notify count   21
  SWIFT url status
 Swift value changed by user
 Current Value : https://cisco.com/SWIFT/Licensing
 Default Value : https://cisco.com/SWIFT/Licensing
```

Cisco uBR10012 Universal Broadband Routers: Example

The following is sample output from the **show license statistics subslot 8/1** command executed on the Cisco uBR10012 router:

```
Router# show license statistics subslot 8/1
Administrative statistics
        Install success count:   0
        Install failure count:   0
        Install duplicate count: 0
        Comment add count:       0
        Comment delete count:    0
        Clear count:             0
        Save count:              0
```

```
        Save cred count:         0
                Client statistics
        Request success count:   1
        Request failure count:   1
        Release count:           0
        Global Notify count:     1
```

The table below describes the significant fields shown in the display.

Table 4: show license statistics Field Descriptions

Field	Description
Administrative statistics	• Install success count--Number of successful installations • Install failure count--Number of failed installation attempts • Install duplicate count--Number of duplicate installations • Comment add count--Number of added comments • Comment delete count--Number of deleted comments • Clear count--Number of License Clear events • Save count--Number of License Save events • Save cred count--Number of License Save Credentials
Client statistics	• Request success count--Number of successful license requests • Request failure count--Number of failed license requests • Release count--Number of released licenses • Global Notify count--Number of global notifications
SWIFT url status	• Current Value--Current SWIFT URL • Default Value--Default SWIFT URL

Cisco uBR7225VXR and Cisco uBR7246VXR Universal Broadband Routers: Example

The following is sample output from the **show license statistics slot 5** command executed on the Cisco uBR7246VXR router:

```
Router# show license statistics slot 5
                Administrative statistics
        Install success count:   0
        Install failure count:   0
        Install duplicate count: 0
        Comment add count:       0
        Comment delete count:    0
        Clear count:             0
        Save count:              0
        Save cred count:         0
```

```
        Client statistics
Request success count:   2
Request failure count:   0
Release count:           0
Global Notify count:     0
```

The table below describes the significant fields shown in the display.

Table 5: show license statistics Field Descriptions

Field	Description
Administrative statistics	• Install success count--Number of successful installations • Install failure count--Number of failed installation attempts • Install duplicate count--Number of duplicate installations • Comment add count--Number of added comments • Comment delete count--Number of deleted comments • Clear count--Number of License Clear events • Save count--Number of License Save events • Save cred count--Number of License Save Credentials
Client statistics	• Request success count--Number of successful license requests • Request failure count--Number of failed license requests • Release count--Number of released licenses • Global Notify count--Number of global notifications

Related Commands

Command	Description
debug license	Enables controlled debugging options in the Cisco software licensing module.
show license status	Displays license information to troubleshoot licensing issues.

show subsys license

To display the subsystem running for a feature set, use the **show subsys license** command in either user EXEC or privileged EXEC mode.

show subsys license *subsystem*

Syntax Description

subsystem	Name of the subsystem for a specified license.

Command Default

Subsystem information is not displayed.

Command Modes

User EXEC (>)

Privileged EXEC (#)

Command History

Release	Modification
12.2(35)SE2	This command was introduced.
12.4(20)T	This command was integrated into Cisco IOS Release 12.4(20)T.

Usage Guidelines

Use this command to display license information and to help with troubleshooting issues related to Cisco IOS software licenses.

Examples

The following is sample output that shows the subsystem running the IP base feature set:

```
Router# show subsys license ipbase
License level: ipbase
Name                                Class       Version
obfl_env_app                        Kernel      1.000.001
exception                           Kernel      1.000.001
xml_proxy_client                    Kernel      1.000.000
proto_counter                       Kernel      1.000.001
sched_ui                            Kernel      1.000.001
policy_manager                      Kernel      1.000.001
fib_table_trace                     Kernel      1.000.001
ifmibapi_access                     Kernel      1.000.000
xml_engine                          Kernel      1.000.000
fddi_mtu                            Kernel      1.000.001
fib_trace                           Kernel      1.000.001
.
.
.
qos_set                             Protocol    1.000.001
rip                                 Protocol    1.000.001
ipdiag                              Protocol    1.000.001
aaa_peruser                         Protocol    1.000.001
identity_cli                        Management  1.000.001
notification_log_mib                Management  1.000.000
pagpmib                             Management  1.000.000
ifmib                               Management  1.000.000
rtty_chain                          Management  1.000.001
cdpmib                              Management  1.000.000
```

```
vlmem                                Management  1.000.000
.
.
.
psecure_registry                     Registry    1.000.001
ip_ios_registry                      Registry    1.000.001
sys_name_registry                    Registry    1.000.001
INIT                                 SystemInit  2.000.001
parser                               EHSA        1.000.001
tmpsys_ifs                           EHSA        1.000.001
hulc_fib_rf_ehsa                     EHSA        1.000.001
regexp_ui                            EHSA        1.000.001
system_ifs                           EHSA        1.000.001
chunk_ui                             EHSA        1.000.001
rbcp                                 EHSA        1.000.000
gdb_ui                               EHSA        1.000.001
ifs_image_elf                        EHSA        1.000.001
nvram_common                         EHSA        1.000.001
ifs_image_ascii                      EHSA        1.000.001
clock_ui                             EHSA        1.000.001
nv_ifs                               EHSA        1.000.001
sff8472                              Pre-Driver  1.000.001
aggmgr                               Pre-Driver  1.000.000
ifindex_pers                         Pre-Driver  1.000.001
sff8472_fixed                        Pre-Driver  1.000.000
fib_rp_predriver                     Pre-Driver  1.000.001
system_capability                    Pre-Driver  1.000.001
fib_lc_predriver                     Pre-Driver  1.000.001
fib_ios_chain                        Pre-Driver  1.000.001
transceiver                          Pre-Driver  1.000.002
fib_ios_predriver                    Pre-Driver  1.000.001
license_client                       License     1.000.001
hulc_flash                           License     1.000.001
ios_licensing_image_application      License     1.000.001
ifs                                  License     1.000.001
sdb                                  License     1.000.001
boot_upgrade                         License     1.000.001
hulc_universal_only                  License     1.000.001
```

The table below describes the fields shown in the display.

Table 6: show subsys license Field Descriptions

Field	Description
License level	Feature set for which the license is issued; for example, Advanced IP services, IP services, or IP base.
Name	Name of the subsystem.
Class	Class of the subsystem. Possible classes include Driver, Kernel, Library, License, Management, Protocol, Registry.
Version	Version of the subsystem.

snmp-server enable traps

To enable all Simple Network Management Protocol (SNMP) notification types that are available on your system, use the **snmp-server enable traps** command in global configuration mode. To disable all available SNMP notifications, use the **no**form of this command.

snmp-server enable traps [*notification-type*] [**vrrp**]
no snmp-server enable traps [*notification-type*] [**vrrp**]

Syntax Description

notification-type	(Optional) Type of notification (trap or inform) to enable or disable. If no type is specified, all notifications available on your device are enabled or disabled (if the **no** form is used). The notification type can be one of the following keywords: **alarms** --Enables alarm filtering to limit the number of syslog messages generated. Alarms are generated for the severity configured as well as for the higher severity values. • The *severity*argument is an integer or string value that identifies the severity of an alarm. Integer values are from 1 to 4. String values are critical, major, minor, and informational. The default is 4 (informational). Severity levels are defined as follows: • 1--Critical. The condition affects service. • 2--Major. Immediate action is needed. • 3--Minor. Minor warning conditions. • 4--Informational. No action is required. This is the default.
	• **auth-framework sec-violation** --Enables the SNMP CISCO-AUTH-FRAMEWORK-MIB traps. The optional **sec-violation** keyword enables the SNMP camSecurityViolationNotif notification. [1]
	• **config** --Controls configuration notifications, as defined in the CISCO-CONFIG-MAN-MIB (enterprise 1.3.6.1.4.1.9.9.43.2). The notification type is (1) ciscoConfigManEvent.
	• **dot1x** --Enables IEEE 802.1X traps. This notification type is defined in the CISCO PAE MIB. **Catalyst 6500 Series Switches** The following keywords are available under the **dot1x** keyword: • • **auth-fail-vlan** --Enables the SNMP cpaeAuthFailVlanNotif notification. • **no-auth-fail-vlan** --Enables the SNMP cpaeNoAuthFailVlanNotif notification. • **guest-vlan** --Enables the SNMP cpaeGuestVlanNotif notification. • **no-guest-vlan** --Enables the SNMP cpaeNoGuestVlanNotif notification.

	• **ds0-busyout** --Sends notification when the busyout of a DS0 interface changes state (Cisco AS5300 platform only). This notification is defined in the CISCO-POP-MGMT-MIB (enterprise 1.3.6.1.4.1.9.10.19.2), and the notification type is (1) cpmDS0BusyoutNotification. • **ds1-loopback** --Sends notification when the DS1 interface goes into loopback mode (Cisco AS5300 platform only). This notification type is defined in the CISCO-POP-MGMT-MIB (enterprise 1.3.6.1.4.1.9.10.19.2) as (2) cpmDS1LoopbackNotification. • **dsp** --Enables SNMP digital signal processing (DSP) traps. This notification type is defined in the CISCO-DSP-MGMT-MIB. • **dsp oper-state** --Sends a DSP notification made up of both a DSP ID that indicates which DSP is affected and an operational state that indicates whether the DSP has failed or recovered.
	• **l2tc** --Enable the SNMP Layer 2 tunnel configuration traps. This notification type is defined in CISCO-L2-TUNNEL-CONFIG-MIB.[2]
	• **entity** --Controls Entity MIB modification notifications. This notification type is defined in the ENTITY-MIB (enterprise 1.3.6.1.2.1.47.2) as (1) entConfigChange.

	• **entity-diag** *type*-- Enables the SNMP CISCO-ENTITY-DIAG-MIB traps. The valid *type* values are as follows: [3]
	  • **boot-up-fail**--(Optional) Enables the SNMP ceDiagBootUpFailedNotif traps.
	  • **hm-test-recover**--(Optional) Enables the SNMP ceDiagHMTestRecoverNotif traps.
	  • **hm-thresh-reached**--(Optional) Enables the SNMP ceDiagHMThresholdReachedNotif traps.
	  • **scheduled-fail**--(Optional) Enables the SNMP ceDiagScheduledJobFailedNotif traps.

	• **hsrp** --Controls Hot Standby Routing Protocol (HSRP) notifications, as defined in the CISCO-HSRP-MIB (enterprise 1.3.6.1.4.1.9.9.106.2). The notification type is (1) cHsrpStateChange.
	• **ipmulticast** --Controls IP multicast notifications.

	• **license** --Enables licensing notifications as traps or informs. The notifications are grouped into categories that can be individually controlled by combining the keywords with the **license** keyword, or as a group by using the **license** keyword by itself.
	  • **deploy**--Controls notifications generated as a result of install, clear, or revoke license events.
	  • **error**--Controls notifications generated as a result of a problem with the license or with the usage of the license.
	  • **imagelevel**--Controls notifications related to the image level of the license.
	  • **usage**--Controls usage notifications related to the license.

	• **modem-health** --Controls modem-health notifications.
	• **module-auto-shutdown** [**status**]-- Enables the SNMP CISCO-MODULE-AUTO-SHUTDOWN-MIB traps. The optional **status** keyword enables the SNMP Module Auto Shutdown status change traps. [4]
	• **rsvp** --Controls Resource Reservation Protocol (RSVP) flow change notifications.
	• **sys-threshold** --(Optional) Enables the SNMP cltcTunnelSysDropThresholdExceeded notification. This notification type is an enhancement to the CISCO-L2-TUNNEL-CONFIG-MIB. [5]
	• **tty** --Controls TCP connection notifications.
	• **xgcp** --Sends External Media Gateway Control Protocol (XGCP) notifications. This notification is from the XGCP-MIB-V1SMI.my, and the notification is enterprise 1.3.6.1.3.90.2 (1) xgcpUpDownNotification. **Note** For additional notification types, see the Related Commands table.
vrrp	(Optional) Specifies the Virtual Router Redundancy Protocol (VRRP).

[1] Supported on the Catalyst 6500 series switches.
[2] Supported on the Catalyst 6500 series switches.
[3] Supported on the Catalyst 6500 series switches.
[4] Supported on the Catalyst 6500 series switches.
[5] Supported on the Catalyst 6500 series switches.

Command Default

No notifications controlled by this command are sent.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.3	This command was introduced.
12.0(2)T	The **rsvp** notification type was added in Cisco IOS Release 12.0(2)T.
12.0(3)T	The **hsrp** notification type was added in Cisco IOS Release 12.0(3)T.
12.0(24)S	This command was integrated into Cisco IOS Release 12.0(24)S.
12.2(14)SX	Support for this command was implemented on the Supervisor Engine 720.
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(17d)SXB	Support for this command on the Supervisor Engine 2 was integrated into Cisco IOS Release 12.2(17d)SXB.
12.3(11)T	The **vrrp**notification type was added in Cisco IOS Release 12.3(11)T.

Release	Modification
12.4(4)T	Support for the **alarms** *severity* notification type and argument was added in Cisco IOS Release 12.4(4)T. Support for the **dsp** and **dsp oper-state** notification types was added in Cisco IOS Release 12.4(4)T.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.4(11)T	The **dot1x** notification type was added in Cisco IOS Release 12.4(11)T.
12.2(33)SRB	This command was integrated into Cisco IOS Release 12.2(33)SRB.
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.
12.4(20)T	The **license** notification type keyword was added.
12.2(33)SXH	The **l2tc** keyword was added and supported on the Catalyst 6500 series switch.
12.2(33)SXI	The following keywords were added and supported on the Catalyst 6500 series switch: **auth-fail-vlan** **entity-diag** **guest-vlan** **module-auto-shutdown** **no-auth-fail-vlan** **no-guest-vlan** **sys-threshold**
Cisco IOS XE Release 2.6	This command was integrated into Cisco IOS XE Release 2.6.

Usage Guidelines

For additional notification types, see the Related Commands table for this command.

SNMP notifications can be sent as traps or inform requests. This command enables both traps and inform requests for the specified notification types. To specify whether the notifications should be sent as traps or informs, use the **snmp-server host** [**traps** | **informs**] command.

To configure the router to send these SNMP notifications, you must enter at least one **snmp-server enable traps** command. If you enter the command with no keywords, all notification types are enabled. If you enter the command with a keyword, only the notification type related to that keyword is enabled. To enable multiple types of notifications, you must issue a separate **snmp-server enable traps** command for each notification type and notification option.

Most notification types are disabled by default but some cannot be controlled with the **snmp-server enable traps** command.

The **snmp-server enable traps** command is used in conjunction with the **snmp-server host** command. Use the **snmp-server host** command to specify which host or hosts receive SNMP notifications. To send notifications, you must configure at least one **snmp-server host** command.

The following MIBs were enhanced or supported in Cisco IOS Release 12.2(33)SXI and later releases on the Catalyst 6500 series switch:

- CISCO-L2-TUNNEL-CONFIG-MIB-LLDP--Enhancement. The CISCO-L2-TUNNEL-CONFIG-MIB provides SNMP access to the Layer 2 tunneling-related configurations.
- CISCO-PAE-MIB--Enhancement for critical condition and includes traps when the port goes into the Guest Vlan or AuthFail VLAN.
- CISCO-MODULE-AUTO-SHUTDOWN-MIB--Supported. The CISCO-MODULE-AUTO-SHUTDOWN-MIB provides SNMP access to the Catalyst 6500 series switch Module Automatic Shutdown component.
- CISCO-AUTH-FRAMEWORK-MIB--Supported. The CISCO-AUTH-FRAMEWORK-MIB provides SNMP access to the Authentication Manager component.
- CISCO-ENTITY-DIAG-MIB--The CISCO-ENTITY-DIAG-MIB provides SNMP traps for generic online diagnostics (GOLD) notification enhancements.

Examples

The following example shows how to enable the router to send all traps to the host specified by the name myhost.cisco.com, using the community string defined as public:

```
Router(config)# snmp-server enable traps

Router(config)# snmp-server host myhost.cisco.com public
```

The following example shows how to configure an alarm severity threshold of 3:

```
Router# snmp-server enable traps alarms 3
```

The following example shows how to enable the generation of a DSP operational state notification from from the command-line interface (CLI):

```
Router(config)# snmp-server enable traps dsp oper-state
```

The following example shows how to enable the generation of a DSP operational state notification from a network management device:

```
setany -v2c 1.4.198.75 test cdspEnableOperStateNotification.0 -i 1
cdspEnableOperStateNotification.0=true(1)
```

The following example shows how to send no traps to any host. The Border Gateway Protocol (BGP) traps are enabled for all hosts, but the only traps enabled to be sent to a host are ISDN traps (which are not enabled in this example).

```
Router(config)#  snmp-server enable traps bgp

Router(config)# snmp-server host user1 public isdn
```

The following example shows how to enable the router to send all inform requests to the host at the address myhost.cisco.com, using the community string defined as public:

```
Router(config)# snmp-server enable traps

Router(config)# snmp-server host myhost.cisco.com informs version 2c public
```

The following example shows how to send HSRP MIB traps to the host myhost.cisco.com using the community string public:

```
Router(config)# snmp-server enable traps hsrp

Router(config)# snmp-server host myhost.cisco.com traps version 2c public hsrp
```

The following example shows that VRRP will be used as the protocol to enable the traps:

```
Router(config)# snmp-server enable traps vrrp
Router(config)# snmp-server host myhost.cisco.com traps version 2c vrrp
```

The following example shows how to send IEEE 802.1X MIB traps to the host "**myhost.example.com**" using the community string defined as public:

```
Router(config)# snmp-server enable traps dot1x
Router(config)# snmp-server host myhost.example.com traps public
```

Related Commands

Command	Description
snmp-server enable traps atm pvc	Enables ATM PVC SNMP notifications.
snmp-server enable traps atm pvc extension	Enables extended ATM PVC SNMP notifications.
snmp-server enable traps bgp	Enables BGP server state change SNMP notifications.
snmp-server enable traps calltracker	Enables Call Tracker callSetup and callTerminate SNMP notifications.
snmp-server enable traps envmon	Enables environmental monitor SNMP notifications.
snmp-server enable traps frame-relay	Enables Frame Relay DLCI link status change SNMP notifications.
snmp-server enable traps ipsec	Enables IPsec SNMP notifications.
snmp-server enable traps isakmp	Enables IPsec ISAKMP SNMP notifications.
snmp-server enable traps isdn	Enables ISDN SNMP notifications.
snmp-server enable traps memory	Enables memory pool and buffer pool SNMP notifications.
snmp-server enable traps mpls ldp	Enables MPLS LDP SNMP notifications.
snmp-server enable traps mpls traffic-eng	Enables MPLS TE tunnel state-change SNMP notifications.
snmp-server enable traps mpls vpn	Enables MPLS VPN specific SNMP notifications.
snmp-server enable traps repeater	Enables RFC 1516 hub notifications.
snmp-server enable traps snmp	Enables RFC 1157 SNMP notifications.

Command	Description
snmp-server enable traps syslog	Enables the sending of system logging messages via SNMP.
snmp-server host	Specifies whether you want the SNMP notifications sent as traps or informs, the version of SNMP to use, the security level of the notifications (for SNMPv3), and the destination host (recipient) for the notifications.
snmp-server informs	Specifies inform request options.
snmp-server trap-source	Specifies the interface (and the corresponding IP address) from which an SNMP trap should originate.
snmp-server trap illegal-address	Issues an SNMP trap when a MAC address violation is detected on an Ethernet hub port of a Cisco 2505, Cisco 2507, or Cisco 2516 router.
vrrp shutdown	Disables a VRRP group.

snmp-server host

To specify the recipient of a Simple Network Management Protocol (SNMP) notification operation, use the **snmp-server host** command in global configuration mode. To remove the specified host from the configuration, use the **no** form of this command.

snmp-server host {*hostnameip-address*} [{**vrf** *vrf-name* | **informs** | **traps** | **version** {**1** | **2c** | **3** [{**auth** | **noauth** | **priv**}]}}] *community-string* [{**udp-port** *port* [*notification-type*]*notification-type*}]
no snmp-server host {*hostnameip-address*} [{**vrf** *vrf-name* | **informs** | **traps** | **version** {**1** | **2c** | **3** [{**auth** | **noauth** | **priv**}]}}] *community-string* [{**udp-port** *port* [*notification-type*]*notification-type*}]

Command Syntax on Cisco ME 3400, ME 3400E, and Catalyst 3750 Metro Switches
snmp-server host *ip-address* {*community-string* | **informs** | **traps**} {*community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth**}}} {*community-string* | **vrf** *vrf-name* {**informs** | **traps**}} [{*notification-type*}]
no snmp-server host *ip-address* {*community-string* | **informs** | **traps**} {*community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth**}}} {*community-string* | **vrf** *vrf-name* {**informs** | **traps**}} [{*notification-type*}]

Command Syntax on Cisco 7600 Series Router
snmp-server host *ip-address* {*community-string* | {**informs** | **traps**} {*community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth** | **priv**}} *community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth** | **priv**}} *community-string* | **vrf** *vrf-name* {**informs** | **traps**} {*community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth** | **priv**}} *community-string*}}} [*notification-type*]
no snmp-server host *ip-address* {*community-string* | {**informs** | **traps**} {*community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth** | **priv**}} *community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth** | **priv**}} *community-string* | **vrf** *vrf-name* {**informs** | **traps**} {*community-string* | **version** {**1** | **2c** | **3** {**auth** | **noauth** | **priv**}} *community-string*}}} [*notification-type*]

Syntax Description

hostname	Name of the host. The SNMP notification host is typically a network management station (NMS) or SNMP manager. This host is the recipient of the SNMP traps or informs.
ip-address	IPv4 address or IPv6 address of the SNMP notification host.
vrf	(Optional) Specifies that a VPN routing and forwarding (VRF) instance should be used to send SNMP notifications. • In Cisco IOS Release 12.2(54)SE, the **vrf** keyword is required.
vrf-name	(Optional) VPN VRF instance used to send SNMP notifications. • In Cisco IOS Release 12.2(54)SE, the *vrf-name* argument is required.
informs	(Optional) Specifies that notifications should be sent as informs. • In Cisco IOS Release 12.2(54)SE, the **informs** keyword is required.
traps	(Optional) Specifies that notifications should be sent as traps. This is the default. • In Cisco IOS Release 12.2(54)SE, the **traps** keyword is required.

version	(Optional) Specifies the version of the SNMP that is used to send the traps or informs. The default is 1. • In Cisco IOS Release 12.2(54)SE, the **version** keyword is required and the **priv** keyword is not supported. If you use the **version** keyword, one of the following keywords must be specified: • **1** --SNMPv1. • **2c** --SNMPv2C. • **3** --SNMPv3. The most secure model because it allows packet encryption with the **priv** keyword. The default is **noauth**. One of the following three optional security level keywords can follow the **3** keyword: • **auth** --Enables message digest algorithm 5 (MD5) and Secure Hash Algorithm (SHA) packet authentication. • **noauth** --Specifies that the noAuthNoPriv security level applies to this host. This is the default security level for SNMPv3. • **priv** --Enables Data Encryption Standard (DES) packet encryption (also called "privacy").
community-string	Password-like community string sent with the notification operation. **Note** You can set this string using the **snmp-server host** command by itself, but Cisco recommends that you define the string using the **snmp-server community** command prior to using the **snmp-server host** command. **Note** The "at" sign (@) is used for delimiting the context information.
udp-port	(Optional) Specifies that SNMP traps or informs are to be sent to an network management system (NMS) host. • In Cisco IOS Release 12.2(54)SE, the **udp-port** keyword is not supported.
port	(Optional) User Datagram Protocol (UDP) port number of the NMS host. The default is 162. • In Cisco IOS Release 12.2(54)SE, the *port* argument is not supported.
notification-type	(Optional) Type of notification to be sent to the host. If no type is specified, all available notifications are sent. See the "Usage Guidelines" section for more information about the keywords available.

Command Default

This command behavior is disabled by default. A recipient is not specified to receive notifications.

Command Modes

Global configuration (config)

Command History

Release	Modification
10.0	This command was introduced.
12.0(3)T	This command was modified. • The **version 3** [**auth** | **noauth** | **priv**] syntax was added as part of the SNMPv3 Support feature. • The **hsrp** notification-type keyword was added. • The **voice** notification-type keyword was added.
12.1(3)T	This command was modified. The **calltracker** notification-type keyword was added for the Cisco AS5300 and AS5800 platforms.
12.2(2)T	This command was modified. • The **vrf** *vrf-name* keyword-argument pair was added. • The **ipmobile** notification-type keyword was added. • Support for the **vsimaster** notification-type keyword was added for the Cisco 7200 and Cisco 7500 series routers.
12.2(4)T	This command was modified. • The **pim** notification-type keyword was added. • The **ipsec** notification-type keyword was added.
12.2(8)T	This command was modified. • The **mpls-traffic-eng** notification-type keyword was added. • The **director** notification-type keyword was added.
12.2(13)T	This command was modified. • The **srp** notification-type keyword was added. • The **mpls-ldp** notification-type keyword was added.
12.3(2)T	This command was modified. • The **flash** notification-type keyword was added. • The **l2tun-session** notification-type keyword was added.
12.3(4)T	This command was modified. • The **cpu** notification-type keyword was added. • The **memory** notification-type keyword was added. • The **ospf notification-type** keyword was added.

Release	Modification
12.3(8)T	This command was modified. The **iplocalpool notification-type** keyword was added for the Cisco 7200 and 7301 series routers.
12.3(11)T	This command was modified. The **vrrp** keyword was added.
12.3(14)T	This command was modified. • Support for SNMP over IPv6 transport was integrated into Cisco IOS Release 12.3(14)T. Either an IP or IPv6 Internet address can be specified as the *hostname* argument. • The **eigrp** notification-type keyword was added.
12.4(20)T	This command was modified. The **license** notification-type keyword was added.
15.0(1)M	This command was modified. • The **nhrp** notification-type keyword was added. • The automatic insertion of the **snmp-server community** command into the configuration, along with the community string specified in the **snmp-server host** command, was changed. The **snmp-server community** command must be manually configured.
12.0(17)ST	This command was modified. The **mpls-traffic-eng** notification-type keyword was added.
12.0(21)ST	This command was modified. The **mpls-ldp notification-type** keyword was added.
12.0(22)S	This command was modified. • All features in Cisco IOS Release 12.0ST were integrated into Cisco IOS Release 12.0(22)S. • The **mpls-vpn** notification-type keyword was added.
12.0(23)S	This command was modified. The **l2tun-session** notification-type keyword was added.
12.0(26)S	This command was modified. The **memory** notification-type keyword was added.
12.0(27)S	This command was modified. • Support for SNMP over IPv6 transport was added. Either an IP or IPv6 Internet address can be specified as the *hostname* argument. • The **vrf** *vrf-name* keyword and argument combination was added to support multiple Lightweight Directory Protocol (LDP) contexts for VPNs.
12.0(31)S	This command was modified. The **l2tun-pseudowire-status** notification-type keyword was added.

Release	Modification
12.2(18)S	This command was integrated into Cisco IOS Release 12.2(18)S.
12.2(25)S	This command was modified. • The **cpu** notification-type keyword was added. • The **memory** notification-type keyword was added.
12.2(28)SB	This command was integrated into Cisco IOS Release 12.2(28)SB.
12.2(33)SRA	This command was integrated into Cisco IOS Release 12.2(33)SRA.
12.2(31)SB2	The **cef** notification-type keyword was added.
12.2(33)SXH	This command was integrated into Cisco IOS Release 12.2(33)SXH.
12.2(33)SB	This command was integrated into Cisco IOS Release 12.2(33)SB.
12.2(33)SXI5	This command was modified. • The **dhcp-snooping** notification-type keyword was added. • The **errdisable** notification-type keyword was added.
12.2(54)SE	This command was modified. See the SNMP server host commands for the command syntax for these switches.
12.2(33)SXJ	This command was integrated into Cisco IOS Release 12.2(33)SXJ. The **public storm-control** notification-type keyword was added.
15.0(1)S	This command was modified. The **flowmon notification-type** keyword was added.
Cisco IOS XE Release 2.1	This command was integrated into Cisco IOS XE Release 2.1.
15.2(1)S	This command was modified. The **p2mp-traffic-eng** notification-type keyword was added.
Cisco IOS XE Release 3.2SE	This command was implemented in Cisco IOS XE Release 3.2SE.
Cisco IOS XE Release 3.3SE	This command was implemented in Cisco IOS XE Release 3.3SE.

Usage Guidelines

If you enter this command with no optional keywords, the default is to send all notification-type traps to the host. No informs will be sent to the host.

The **no snmp-server host** command with no keywords disables traps, but not informs, to the host. To disable informs, use the **no snmp-server host informs** command.

Note If a community string is not defined using the **snmp-server community** command prior to using this command, the default form of the **snmp-server community** command will automatically be inserted into the configuration. The password (community string) used for this automatic configuration of the **snmp-server community** command will be the same as that specified in the **snmp-server host** command. This automatic command insertion and use of passwords is the default behavior for Cisco IOS Release 12.0(3) and later releases. However, in Cisco IOS Release 12.2(33)SRE and later releases, you must manually configure the **snmp-server community** command. That is, the **snmp-server community** command will not be seen in the configuration.

SNMP notifications can be sent as traps or inform requests. Traps are unreliable because the receiver does not send acknowledgments when it receives traps. The sender cannot determine if the traps were received. However, an SNMP entity that receives an inform request acknowledges the message with an SNMP response protocol data unit (PDU). If the sender never receives the response, the inform request can be sent again. Thus, informs are more likely to reach their intended destination than traps.

Compared to traps, informs consume more resources in the agent and in the network. Unlike a trap, which is discarded as soon as it is sent, an inform request must be held in memory until a response is received or the request times out. Also, traps are sent only once; an inform may be tried several times. The retries increase traffic and contribute to a higher overhead on the network.

If you do not enter an **snmp-server host** command, no notifications are sent. To configure the router to send SNMP notifications, you must enter at least one **snmp-server host** command. If you enter the command with no optional keywords, all trap types are enabled for the host.

To enable multiple hosts, you must issue a separate **snmp-server host** command for each host. You can specify multiple notification types in the command for each host.

When multiple **snmp-server host** commands are given for the same host and kind of notification (trap or inform), each succeeding command overwrites the previous command. Only the last **snmp-server host** command will be in effect. For example, if you enter an **snmp-server host inform** command for a host and then enter another **snmp-server host inform** command for the same host, the second command will replace the first.

The **snmp-server host** command is used in conjunction with the **snmp-server enable** command. Use the **snmp-server enable** command to specify which SNMP notifications are sent globally. For a host to receive most notifications, at least one **snmp-server enable** command and the **snmp-server host** command for that host must be enabled.

Some notification types cannot be controlled with the **snmp-server enable** command. Some notification types are always enabled, and others are enabled by a different command. For example, the **linkUpDown** notifications are controlled by the **snmp trap link-status** command. These notification types do not require an **snmp-server enable** command.

The availability of notification-type options depends on the router type and the Cisco IOS software features supported on the router. For example, the **envmon** notification type is available only if the environmental monitor is part of the system. To see what notification types are available on your system, use the command help **?** at the end of the **snmp-server host** command.

The **vrf** keyword allows you to specify the notifications being sent to a specified IP address over a specific VRF VPN. The VRF defines a VPN membership of a user so that data is stored using the VPN.

In the case of the NMS sending the query having a correct SNMP community but not having a read or a write view, the SNMP agent returns the following error values:

- For a get or a getnext query, returns GEN_ERROR for SNMPv1 and AUTHORIZATION_ERROR for SNMPv2C.
- For a set query, returns NO_ACCESS_ERROR.

Notification-Type Keywords

The notification type can be one or more of the following keywords.

Note The available notification types differ based on the platform and Cisco IOS release. For a complete list of available notification types, use the question mark (?) online help function.

- **aaa server** --Sends SNMP authentication, authorization, and accounting (AAA) traps.
- **adslline** --Sends Asymmetric Digital Subscriber Line (ADSL) LINE-MIB traps.
- **atm** --Sends ATM notifications.
- **authenticate-fail** --Sends an SNMP 802.11 Authentication Fail trap.
- **auth-framework** --Sends SNMP CISCO-AUTH-FRAMEWORK-MIB notifications.
- **bgp** --Sends Border Gateway Protocol (BGP) state change notifications.
- **bridge** --Sends SNMP STP Bridge MIB notifications.
- **bstun** --Sends Block Serial Tunneling (BSTUN) event notifications.
- **bulkstat** --Sends Data-Collection-MIB notifications.
- **c6kxbar** --Sends SNMP crossbar notifications.
- **callhome** --Sends Call Home MIB notifications.
- **calltracker** -- Sends Call Tracker call-start/call-end notifications.
- **casa** --Sends Cisco Appliances Services Architecture (CASA) event notifications.
- **ccme** --Sends SNMP Cisco netManager Event (CCME) traps.
- **cef** --Sends notifications related to Cisco Express Forwarding.
- **chassis** --Sends SNMP chassis notifications.
- **cnpd** --Sends Cisco Network-based Application Recognition (NBAR) Protocol Discovery (CNPD) traps.
- **config** --Sends configuration change notifications.
- **config-copy** --Sends SNMP config-copy notifications.
- **config-ctid** --Sends SNMP config-ctid notifications.
- **cpu** --Sends CPU-related notifications.
- **csg** --Sends SNMP Content Services Gateway (CSG) notifications.
- **deauthenticate** --Sends an SNMP 802.11 Deauthentication trap.
- **dhcp-snooping** --Sends DHCP snooping MIB notifications.

- **director** --Sends notifications related to DistributedDirector.
- **disassociate** --Sends an SNMP 802.11 Disassociation trap.
- **dlsw** --Sends data-link switching (DLSW) notifications.
- **dnis** --Sends SNMP Dialed Number Identification Service (DNIS) traps.
- **dot1x** --Sends 802.1X notifications.
- **dot11-mibs** --Sends dot11 traps.
- **dot11-qos** --Sends SNMP 802.11 QoS Change trap.
- **ds1** --Sends SNMP digital signaling 1 (DS1) notifications.
- **ds1-loopback** --Sends ds1-loopback traps.
- **dspu** --Sends downstream physical unit (DSPU) notifications.
- **eigrp** --Sends Enhanced Interior Gateway Routing Protocol (EIGRP) stuck-in-active (SIA) and neighbor authentication failure notifications.
- **energywise** --Sends SNMP energywise notifications.
- **entity** --Sends Entity MIB modification notifications.
- **entity-diag** --Sends SNMP entity diagnostic MIB notifications.
- **envmon** --Sends Cisco enterprise-specific environmental monitor notifications when an environmental threshold is exceeded.
- **errdisable** --Sends error disable notifications.
- **ethernet-cfm** --Sends SNMP Ethernet Connectivity Fault Management (CFM) notifications.
- **event-manager** --Sends SNMP Embedded Event Manager notifications.
- **firewall** --Sends SNMP Firewall traps.
- **flash** --Sends flash media insertion and removal notifications.
- **flexlinks** --Sends FLEX links notifications.
- **flowmon** --Sends flow monitoring notifications.
- **frame-relay** --Sends Frame Relay notifications.
- **fru-ctrl** --Sends entity field-replaceable unit (FRU) control notifications.
- **hsrp** --Sends Hot Standby Routing Protocol (HSRP) notifications.
- **icsudsu** --Sends SNMP ICSUDSU traps.
- **iplocalpool** --Sends IP local pool notifications.
- **ipmobile** --Sends Mobile IP notifications.
- **ipmulticast** --Sends IP multicast notifications.
- **ipsec** --Sends IP Security (IPsec) notifications.

- **isakmp** --Sends SNMP ISAKMP notifications.
- **isdn** --Sends ISDN notifications.
- **l2tc** --Sends SNMP L2 tunnel configuration notifications.
- **l2tun-pseudowire-status** --Sends pseudowire state change notifications.
- **l2tun-session** --Sends Layer 2 tunneling session notifications.
- **license** --Sends licensing notifications as traps or informs.
- **llc2** --Sends Logical Link Control, type 2 (LLC2) notifications.
- **mac-notification** --Sends SNMP MAC notifications.
- **memory** --Sends memory pool and memory buffer pool notifications.
- **module** --Sends SNMP module notifications.
- **module-auto-shutdown** --Sends SNMP module autoshutdown MIB notifications.
- **mpls-fast-reroute** --Sends SNMP Multiprotocol Label Switching (MPLS) traffic engineering fast reroute notifications.
- **mpls-ldp** --Sends MPLS Label Distribution Protocol (LDP) notifications indicating status changes in LDP sessions.
- **mpls-traffic-eng** --Sends MPLS traffic engineering notifications, indicating changes in the status of MPLS traffic engineering tunnels.
- **mpls-vpn** --Sends MPLS VPN notifications.
- **msdp** --Sends SNMP Multicast Source Discovery Protocol (MSDP) notifications.
- **mvpn** --Sends multicast VPN notifications.
- **nhrp** --Sends Next Hop Resolution Protocol (NHRP) notifications.
- **ospf** --Sends Open Shortest Path First (OSPF) sham-link notifications.
- **pim** --Sends Protocol Independent Multicast (PIM) notifications.
- **port-security** --Sends SNMP port-security notifications.
- **power-ethernet** --Sends SNMP power Ethernet notifications.
- **public storm-control** --Sends SNMP public storm-control notifications.
- **pw-vc** --Sends SNMP pseudowire virtual circuit (VC) notifications.
- **p2mp-traffic-eng**--Sends SNMP MPLS Point to Multi-Point MPLS-TE notifications.
- **repeater** --Sends standard repeater (hub) notifications.
- **resource-policy** --Sends CISCO-ERM-MIB notifications.
- **rf** --Sends SNMP RF MIB notifications.
- **rogue-ap** --Sends an SNMP 802.11 Rogue AP trap.
- **rsrb** --Sends remote source-route bridging (RSRB) notifications.

- **rsvp** --Sends Resource Reservation Protocol (RSVP) notifications.
- **rtr** --Sends Response Time Reporter (RTR) notifications.
- **sdlc** --Sends Synchronous Data Link Control (SDLC) notifications.
- **sdllc** --Sends SDLC Logical Link Control (SDLLC) notifications.
- **slb** --Sends SNMP server load balancer (SLB) notifications.
- **snmp** --Sends any enabled RFC 1157 SNMP linkUp, linkDown, authenticationFailure, warmStart, and coldStart notifications.

Note To enable RFC-2233-compliant link up/down notifications, you should use the **snmp server link trap** command.

- **sonet** --Sends SNMP SONET notifications.
- **srp** --Sends Spatial Reuse Protocol (SRP) notifications.
- **stpx** --Sends SNMP STPX MIB notifications.
- **srst** --Sends SNMP Survivable Remote Site Telephony (SRST) traps.
- **stun** --Sends serial tunnel (STUN) notifications.
- **switch-over** --Sends an SNMP 802.11 Standby Switchover trap.
- **syslog** --Sends error message notifications (Cisco Syslog MIB). Use the **logging history level** command to specify the level of messages to be sent.
- **syslog** --Sends error message notifications (Cisco Syslog MIB). Use the **logging history level** command to specify the level of messages to be sent.
- **tty** --Sends Cisco enterprise-specific notifications when a TCP connection closes.
- **udp-port** --Sends the notification host's UDP port number.
- **vlan-mac-limit** --Sends SNMP L2 control VLAN MAC limit notifications.
- **vlancreate** --Sends SNMP VLAN created notifications.
- **vlandelete** --Sends SNMP VLAN deleted notifications.
- **voice** --Sends SNMP voice traps.
- **vrrp** --Sends Virtual Router Redundancy Protocol (VRRP) notifications.
- **vsimaster** --Sends Virtual Switch Interface (VSI) notifications.
- **vswitch** --Sends SNMP virtual switch notifications.
- **vtp** --Sends SNMP VLAN Trunking Protocol (VTP) notifications.
- **wlan-wep** --Sends an SNMP 802.11 Wireless LAN (WLAN) Wired Equivalent Privacy (WEP) trap.
- **x25** --Sends X.25 event notifications.

- **xgcp** --Sends External Media Gateway Control Protocol (XGCP) traps.

SNMP-Related Notification-Type Keywords

The *notification-type* argument used in the **snmp-server host** command do not always match the keywords used in the corresponding **snmp-server enable traps** command. For example, the *notification-type* argument applicable to Multiprotocol Label Switching Protocol (MPLS) traffic engineering tunnels is specified as **mpls-traffic-eng** (containing two hyphens and no embedded spaces). The corresponding parameter in the **snmp-server enable traps** command is specified as **mpls traffic-eng** (containing an embedded space and a hyphen).

This syntax difference is necessary to ensure that the CLI interprets the *notification-type* keyword of the **snmp-server host** command as a unified, single-word construct, which preserves the capability of the **snmp-server host** command to accept multiple *notification-type* keywords in the command line. The **snmp-server enable traps** commands, however, often use two-word constructs to provide hierarchical configuration options and to maintain consistency with the command syntax of related commands. The table below maps some examples of **snmp-server enable traps** commands to the keywords used in the **snmp-server host** command.

Table 7: snmp-server enable traps Commands and Corresponding Notification Keywords

snmp-server enable traps Command	snmp-server host Command Keyword
snmp-server enable traps l2tun session	**l2tun-session**
snmp-server enable traps mpls ldp	**mpls-ldp**
snmp-server enable traps mpls traffic-eng [6]	**mpls-traffic-eng**
snmp-server enable traps mpls vpn	**mpls-vpn**
snmp-server host *host-address community-string* **udp-port** *port* **p2mp-traffic-eng**	**snmp-server enable traps mpls p2mp-traffic-eng** [**down** | **up**]

[6] See the *Cisco IOS Multiprotocol Label Switching Command Reference* for documentation of this command.

Examples

If you want to configure a unique SNMP community string for traps but prevent SNMP polling access with this string, the configuration should include an access list. The following example shows how to name a community string comaccess and number an access list 10:

```
Router(config)# snmp-server community comaccess ro 10
Router(config)# snmp-server host 10.0.0.0 comaccess
Router(config)# access-list 10 deny any
```

Note The "at" sign (@) is used as a delimiter between the community string and the context in which it is used. For example, specific VLAN information in BRIDGE-MIB may be polled using *community @VLAN-ID* (for example, public@100), where 100 is the VLAN number.

The following example shows how to send RFC 1157 SNMP traps to a specified host named myhost.cisco.com. Other traps are enabled, but only SNMP traps are sent because only **snmp** is specified in the **snmp-server host** command. The community string is defined as comaccess.

```
Router(config)# snmp-server enable traps
Router(config)# snmp-server host myhost.cisco.com comaccess snmp
```

The following example shows how to send the SNMP and Cisco environmental monitor enterprise-specific traps to address 10.0.0.0 using the community string public:

```
Router(config)# snmp-server enable traps snmp
Router(config)# snmp-server enable traps envmon
Router(config)# snmp-server host 10.0.0.0 public snmp envmon
```

The following example shows how to enable the router to send all traps to the host myhost.cisco.com using the community string public:

```
Router(config)# snmp-server enable traps
Router(config)# snmp-server host myhost.cisco.com public
```

The following example will not send traps to any host. The BGP traps are enabled for all hosts, but only the ISDN traps are enabled to be sent to a host. The community string is defined as public.

```
Router(config)# snmp-server enable traps bgp
Router(config)# snmp-server host myhost.cisco.com public isdn
```

The following example shows how to enable the router to send all inform requests to the host myhost.cisco.com using the community string public:

```
Router(config)# snmp-server enable traps
Router(config)# snmp-server host myhost.cisco.com informs version 2c public
```

The following example shows how to send HSRP MIB informs to the host specified by the name myhost.cisco.com. The community string is defined as public.

```
Router(config)# snmp-server enable traps hsrp
Router(config)# snmp-server host myhost.cisco.com informs version 2c public hsrp
```

The following example shows how to send all SNMP notifications to example.com over the VRF named trap-vrf using the community string public:

```
Router(config)# snmp-server host example.com vrf trap-vrf public
```

The following example shows how to configure an IPv6 SNMP notification server with the IPv6 address 2001:0DB8:0000:ABCD:1 using the community string public:

```
Router(config)# snmp-server host 2001:0DB8:0000:ABCD:1 version 2c public udp-port 2012
```

The following example shows how to specify VRRP as the protocol using the community string public:

```
Router(config)# snmp-server enable traps vrrp
Router(config)# snmp-server host myhost.cisco.com traps version 2c public vrrp
```

The following example shows how to send all Cisco Express Forwarding informs to the notification receiver with the IP address 10.0.1.1 using the community string public:

```
Router(config)# snmp-server enable traps cef
Router(config)# snmp-server host 10.0.1.1 informs version 2c public cef
```

The following example shows how to enable all NHRP traps, and how to send all NHRP traps to the notification receiver with the IP address 10.0.0.0 using the community string public:

```
Router(config)# snmp-server enable traps nhrp
Router(config)# snmp-server host 10.0.0.0 traps version 2c public nhrp
```

The following example shows how to enable all P2MP MPLS-TE SNMP traps, and send them to the notification receiver with the IP address 172.20.2.160 using the community string "comp2mppublic":

```
Router(config)# snmp-server enable traps mpls p2mp-traffic-eng
Router(config)# snmp-server host 172.20.2.160 comp2mppublic udp-port 162 p2mp-traffic-eng
```

Related Commands

Command	Description
show snmp host	Displays recipient details configured for SNMP notifications.
snmp-server enable peer-trap poor qov	Enables poor quality of voice notifications for applicable calls associated with a specific voice dial peer.
snmp-server enable traps	Enables SNMP notifications (traps and informs).
snmp-server enable traps nhrp	Enables SNMP notifications (traps) for NHRP.
snmp-server informs	Specifies inform request options.
snmp-server link trap	Enables linkUp/linkDown SNMP traps that are compliant with RFC 2233.
snmp-server trap-source	Specifies the interface from which an SNMP trap should originate.
snmp-server trap-timeout	Defines how often to try resending trap messages on the retransmission queue.
test snmp trap storm-control event-rev1	Tests SNMP storm-control traps.