Configuring Licensing Storage Expansion for Cisco 2800 and Cisco 3800 Series Routers

First Published: July 11, 2008
Last Updated: October 2, 2009

At present, the Cisco 2800 and Cisco 3800 series platforms are running out of licensing storage to support current and potential Cisco Software Licensing projects on Cisco 2800 and Cisco 3800 series platforms, Cisco software licenses are stored in a section of NVRAM. The Licensing Storage Expansion feature reconfigures the NVRAM to provide additional license storage when the default license storage allocation is used up.

Finding Feature Information in This Module

Your software release may not support all the features documented in this module. For the latest feature information and caveats, see the release notes for your platform and software release. To find information about the features documented in this module, and to see a list of the releases in which each feature is supported, see the "Feature Information for Licensing Storage Expansion" section on page 8.

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

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License Storage and Memory Allocation

Software licenses for Cisco 2800 and Cisco 3800 series routers are stored in NVRAM. The Cisco 2800 series routers have 16 KB of NVRAM allocated for license storage, and the Cisco 3800 series routers have 32 KB allocated. With the introduction of more licensed Cisco software products, the amount of space allocated for license storage will not be adequate. The License Storage Expansion feature reconfigures NVRAM to provide 64 KB of space for license storage in both the Cisco 2800 and Cisco 3800 series routers.

NVRAM stores two types of files that are not licenses: configuration files (startup-config and user-specific configuration files), and block files (non-configuration files that you can store in NVRAM). The reconfiguration of NVRAM reduces the amount of space available for configuration and block files. In Cisco 2800 series routers, this space is reduced from 240 KB to 192 KB. In Cisco 3800 series routers, this space is reduced from 480 KB to 448 KB.

Table 1 gives the NVRAM allocations for license and configuration storage before and after license storage expansion.

Table 1   Memory Allocation in NVRAM

Router Series	Default License Storage	Default Configuration Storage	Expanded License Storage	Resized Configuration Storage
2800	16 KB	240 KB	64 KB	192 KB
3800	32 KB	480 KB	64 KB	448 KB

If the configuration files in NVRAM are larger than the allocation for resized storage, you receive a message telling you to compress the files. To compress the files, use the **service compress-config** command described in the "Compressing the Configuration Files in NVRAM" section on page 4.

When the License Storage Expansion feature is run, configuration files are retained in the resized NVRAM. Block files are also retained, if possible. However, it might be necessary to store block files outside NVRAM, in other memory. If the configuration files are too big for the resized NVRAM, they will be compressed and rewritten into NVRAM. Block files will not be compressed.

When NVRAM is successfully resized, a message is sent to the console to indicate that you must reboot the router for the change to take effect.

When to Use Licensing Storage Expansion

When you try to install a license, but there is not enough room for it in license storage, you receive an error message "License store is full." The following example illustrates this condition:

```
Router# license install flash:gk7.lic
Installing licenses from "flash:gk7.lic"
Installing...Feature gatekeeper...Failed
%Error: Error[137]: License store is full.
0/1 licenses were successfully installed
0/1 licenses were existing licenses
1/1 licenses failed to install
```

When you receive this error message, you must expand the license storage. See the "How to Configure Licensing Storage Expansion" section on page 3.

Downgrading to an Image That Does Not Support Licensing Storage Expansion

If you downgrade to a Cisco IOS image that does not support the **license expand nvram** command, all licenses stored in NVRAM are lost. This happens even if the image stores licenses in NVRAM. We recommend that you to save all your licenses before downgrading.

How to Configure Licensing Storage Expansion

Expanding License Storage

Perform this task to reconfigure the NVRAM to store more Cisco software licenses by expanding the memory allocated for license storage. As a result, the memory allocated for configuration files is reduced.

Prerequisites

Back up your Cisco IOS configuration before performing this procedure.

If NVRAM holds block files (files used for things other than configuration), some of these files will be lost when NVRAM is reconfigured when there is insufficient space for them in resized storage. To avoid the loss of block files, you must back them up by manually removing them and storing them elsewhere. Block files are not compressed.

SUMMARY STEPS

1. **enable**
2. **license expand nvram**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`enable`
	
	Example:
	`Router> enable`
		Enables privileged EXEC mode. Enter your password if prompted.

Step 2	`license expand nvram`
	
	Example:
	`Router# license expand nvram`
		Initiates reconfiguration of NVRAM to expand license storage to 64 KB.

What to Do Next

If NVRAM does not have sufficient space to expand license storage, continue with the "Compressing the Configuration Files in NVRAM" section on page 4.

If License Storage Expansion is successful, reboot the router so that the change can take effect.

Compressing the Configuration Files in NVRAM

Perform this task to compress the configuration files in NVRAM:

SUMMARY STEPS

1. **configure terminal**
2. **service compress-config**
3. **end**
4. **copy system:running-config nvram:startup-config**

DETAILED STEPS

	Command or Action	Purpose

Step 1	`configure terminal`
	
	Example:
	`Router# configure terminal`
		Enters global configuration mode.

Step 2	`service compress-config`
	
	Example:
	`Router(config)# service compress-config`
		Activates compression of configuration files whenever the configuration is saved to startup configuration in NVRAM.

	Command or Action	Purpose

Step 3	`end`
	
	Example:
	`Router(config)# end`
		Exits global configuration mode.

Step 4	`copy system:running-config nvram:startup-config`
	
	Example:
	`Router# copy system:running-config nvram:startup-config`
		Saves the running configuration to the startup configuration in NVRAM.
		
		• The running configuration is compressed during the copy operation because **service compress-config** (Step 2) is activated.

Configuration Examples for Licensing Storage Expansion

Example: Expanding License Storage

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

```
Router> enable
Password:
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
```

When you enter *y*, NVRAM is checked to make sure that it has enough space for your files and the expanded licensing storage. If there is enough space for your files in the resized NVRAM, this message is sent to the console:

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

If there is not enough space for your configuration files, this message is sent to the console:

```
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".
```

If, after compression, the startup configuration file is still too large for the resized NVRAM, this message is sent:

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

If expansion cannot take place because the block files are too large, this message is sent to the console:

```
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".
```

If the **license expand nvram** command is issued on an already expanded NVRAM, this message is sent to the console:

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

Example: Compressing the Configuration Files in NVRAM

The following example shows how to compress configuration files for a Cisco 2800 series router that are larger than 192 KB.

```
Router# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
Router(config)# service compress-config
Router(config)# end
Router#
%SYS-5-CONFIG_I: Configured from console by console
Router# copy system:running-config nvram:startup-config
Building configuration...
Compressing configuration from 201179 bytes to 152674 bytes
[OK]
```

Additional References

Related Documents

Related Topic	Document Title
Cisco IOS Software Activation	• Cisco IOS Software Activation Conceptual Overview • Configuring the Cisco IOS Software Activation Feature
Cisco IOS Software Activation Command Reference	*Cisco IOS Software Activation Command Reference*
Cisco IOS commands	*Cisco IOS Master Commands List, All Releases*

Standards

Standard	Title
None	—

MIBs

MIB	MIBs Link
None	To locate and download MIBs for selected platforms, Cisco IOS releases, and feature sets, use Cisco MIB Locator found at the following URL: http://www.cisco.com/go/mibs

RFCs

RFC	Title
None	—

Technical Assistance

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

Feature Information for Licensing Storage Expansion

Table 2 lists the features in this module and provides links to specific configuration information.

Use Cisco Feature Navigator to find information about platform support and software image support. Cisco Feature Navigator enables you to determine which Cisco software images support a specific software release, feature set, or platform. To access Cisco Feature Navigator, go to http://www.cisco.com/go/cfn. An account on Cisco.com is not required.

Note Table 2 lists only the software release that introduced support for a given feature in a given software release train. Unless noted otherwise, subsequent releases of that software release train also support that feature.

***Table 2** Feature Information for Licensing Storage Expansion*

Feature Name	Releases	Feature Information
Licensing Storage Expansion	12.4(20)T 15.0(1)M	Reconfigures NVRAM in Cisco 2800 and Cisco 3800 series routers to expand storage for software licenses to 64 KB. The following command was introduced: **license expand nvram**