



Licensing Storage Expansion for Cisco 2800 and Cisco 3800 Series Routers

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At present, the Cisco 2800 and Cisco 3800 series platforms are running out of licensing storage to support current and potential Cisco Software Licensing (CSL) 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 9.

Use Cisco Feature Navigator to find information about platform support and Cisco IOS and Catalyst OS 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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Information About License Storage

To configure the Licensing Storage Expansion feature for Cisco 2800 and Cisco 3800 series routers, you should understand the following concepts:

- [License Storage, page 2](#)
- [Downgrading to an Image That Does Not Support License Storage Expansion, page 2](#)

License Storage

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 the user may store in NVRAM). The reconfiguration of NVRAM will reduce the amount of space available for configuration and block files. In Cisco 2800 series routers, this space will be reduced from 240 KB to 192 KB. In Cisco 3800 series routers, this space will be reduced from 480 KB to 448 KB.

When the License Storage Expansion feature is run, configuration files are retained in the resized NVRAM. Block files will also be retained, if possible. However, it may 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 the user must reboot the router for the change to take effect.

When to Use License Storage Expansion

When you try to install a license, but there is not enough room for it in license storage, you get 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 License Storage Expansion” section on page 3](#).

Downgrading to an Image That Does Not Support License Storage Expansion

If a user downgrades to a Cisco IOS image that does not support the `license expand nvram` command, all licenses stored in NVRAM will be lost. This will happen even if the image stores licenses in NVRAM. Users are advised to save all their licenses before downgrading.

How to Configure License Storage Expansion

To perform license storage expansion, perform the following tasks:

- [Expanding License Storage, page 3](#)
- [Compressing NVRAM, page 4](#)

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. [Table 11](#) gives the NVRAM allocations for license and configuration storage before and after license storage expansion.

Table 11 **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, a message is sent telling the user to compress the files. To compress the files, use the **service compress-config** command described in the “[Compressing NVRAM](#)” section on page 4.

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, the user must back them up by manually removing them and storing them elsewhere. Block files are not compressed.

Upon successful completion of license storage expansion, the router must be rebooted for the expansion to take effect.

To expand license storage in NVRAM, perform the steps in this section. This section contains the following subsections:

- [Prerequisites, page 3](#)
- [SUMMARY STEPS, page 4](#)
- [DETAILED STEPS, page 4](#)
- [Examples, page 4](#)
- [What to Do Next, page 4](#)

Prerequisites

Back up your Cisco IOS configuration before performing this procedure.

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	

Examples**What to Do Next**

If NVRAM does not have sufficient space to expand license storage, continue with the [“Compressing NVRAM”](#) section on page 4.

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

Compressing 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	<code>configure terminal</code> Example: Router# <code>configure terminal</code>	Enters global configuration mode.
Step 2	<code>service compress-config</code> Example: Router(config)# <code>service compress-config</code>	Activates compression of configuration files whenever configuration is saved to startup configuration in NVRAM.
Step 3	<code>end</code> Example: Router(config)# <code>end</code>	Exits global configuration mode.
Step 4	<code>copy system:running-config nvram:startup-config</code> Example: Router# <code>copy system:running-config nvram:startup-config</code>	Saves running configuration to startup configuration in NVRAM. Running configuration is compressed during the copy operation because service compress-config (Step 2) is activated.

Configuration Examples for Licensing Storage Expansion

This section provides the following configuration examples:

- [Expanding License Storage:Example, page 5](#)
- [Compressing NVRAM:Example, page 6](#)

Expanding License Storage:Example

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, the following 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, the following 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, the following 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, the following 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, the following message is sent:

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

Compressing NVRAM:Example

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]
```

What to Do Next

Repeat the steps in the [“Expanding License Storage”](#) section on page 3.

Additional References

The following sections provide references related to the Licensing Storage Expansion feature.

Related Documents

Related Topic	Document Title
Cisco IOS Software Activation	<ul style="list-style-type: none">• Cisco IOS Software Activation Overview• Cisco IOS Software Activation Tasks and Commands

Standards

Standard	Title
No new or modified standards are supported, and support for existing standards has not been modified.	—

MIBs

MIB	MIBs Link
No new or modified MIBs are supported, and support for existing MIBs has not been modified.	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
No new or modified RFCs are supported, and support for existing RFCs has not been modified.	—

Technical Assistance

Description	Link
<p>The Cisco Support website provides extensive online resources, including documentation and tools for troubleshooting and resolving technical issues with Cisco products and technologies.</p> <p>To receive security and technical information about your products, you can subscribe to various services, such as the Product Alert Tool (accessed from Field Notices), the Cisco Technical Services Newsletter, and Really Simple Syndication (RSS) Feeds.</p> <p>Access to most tools on the Cisco Support website requires a Cisco.com user ID and password.</p>	<p>http://www.cisco.com/techsupport</p>

Feature Information for Licensing Storage Expansion

Table 12 lists the release history for this feature.

Not all commands may be available in your Cisco IOS software release. For release information about a specific command, see the command reference documentation.

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Note

Table 12 lists only the Cisco IOS software release that introduced support for a given feature in a given Cisco IOS software release train. Unless noted otherwise, subsequent releases of that Cisco IOS software release train also support that feature.

Table 12 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

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