



## Working with the Flash File System

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## Information About the Flash File System

The flash file system is a single flash device on which you can store files. It also provides several commands to help you manage software bundles and configuration files. The default flash file system on the device is named flash:.

As viewed from the active device, flash: refers to the local flash device, which is the device attached to the same device on which the file system is being viewed.

Only one user at a time can manage the software bundles and configuration files.

## Displaying Available File Systems

To display the available file systems on your device, use the **show file systems** privileged EXEC command as shown in this example for a standalone device:

```
Device# show file systems
Size(b) Free(b) Type Flags Prefixes
- - opaque rw system:
- - opaque rw tmpsys:
1651314688 1559785472 disk rw crashinfo:
* 11353194496 9693396992 disk rw flash:
8049967104 7959392256 disk ro webui:
- - opaque rw null:
```

```

- - opaque ro tar:
- - network rw tftp:
2097152 2080848 nvram rw nvram:
- - opaque wo syslog:
- - network rw rcp:
- - network rw http:
- - network rw ftp:
- - network rw scp:
- - network rw https:
- - opaque ro cns:

Device# show file systems
File Systems:
Size(b) Free(b) Type Flags Prefixes
- - opaque rw system:
- - opaque rw tmpsys:
1651314688 1467920384 disk rw crashinfo:
* 11353194496 6942072832 disk rw flash:
7723847680 7646384128 disk ro webui:
- - opaque rw null:
- - opaque ro tar:
- - network rw tftp:
2097152 2089932 nvram rw nvram:
- - network rw rcp:
- - network rw http:
- - network rw ftp:
- - network rw scp:
- - network rw https:
- - opaque ro cns:
118014062592 111933124608 disk rw usbflash1:

```

```

Device# show file systems
File Systems:

      Size(b)      Free(b)      Type  Flags  Prefixes
      -          -          opaque  rw     system:
      -          -          opaque  rw     tmpsys:
* 11250098176  9694093312  disk    rw     bootflash: flash:
    1651314688  1232220160  disk    rw     crashinfo:
118148280320  112084115456  disk    rw     disk0:
    189628416   145387520   disk    rw     usbflash0:
    7763918848  7696850944  disk    ro     webui:
      -          -          opaque  rw     null:
      -          -          opaque  ro     tar:
      -          -          network  rw     tftp:
    33554432    33532852    nvram   rw     nvram:
      -          -          opaque  wo     syslog:
      -          -          network  rw     rcp:
      -          -          network  rw     http:
      -          -          network  rw     ftp:
      -          -          network  rw     scp:
      -          -          network  rw     https:
      -          -          opaque  ro     cns:

```

This example displays the usbflash1 filesystem format.

```

Device#show usbflash1: filesys
Filesystem: usbflash1

```

```
Filesystem Path: /vol/usb1
Filesystem Type: ext4
Mounted: Read/Write
```

This example shows a device stack. In this example, the active device is stack member 2; the file system on stack member 1 is displayed as flash-1; the file system on stack member 2 is displayed as flash-2; the file system on stack member 3 is displayed as flash-3; and so on up to . The example also shows the crashinfo directories and a USB flash drive plugged into the active device:

```
Device# show file systems
File Systems:

      Size(b)      Free(b)      Type  Flags  Prefixes
      -          -          opaque  rw    system:
      -          -          opaque  rw    tmpsys:
1651314688      1565089792      disk    rw    crashinfo: crashinfo-2:
1651507200      1560281088      disk    rw    crashinfo-1:
1651507200      1562378240      disk    rw    crashinfo-3: stby-crashinfo:
* 11353194496    10735611904     disk    rw    flash: flash-2:
11353980928    10152312832     disk    rw    flash-1:
11353980928    2161115136      disk    rw    flash-3: stby-flash:
15243046912    14423638016     disk    rw    usbflash0: usbflash0-2:
      520093696      520093696      disk    rw    usbflash0-1:
      3497074688    3417554944      disk    ro    webui:
      -          -          opaque  rw    null:
      -          -          opaque  ro    tar:
      -          -          network  rw    tftp:
      2097152      2085334          nvr    rw    nvr    nvr    :
      -          -          network  rw    rcp:
      -          -          network  rw    http:
      -          -          network  rw    ftp:
      -          -          network  rw    scp:
      -          -          network  rw    https:
      -          -          opaque  ro    cns:
      21003628544    19867037696     disk    rw    usbflash1: usbflash1-2:
118014083072    111933390848     disk    rw    usbflash1-3: stby-usbflash1:
      2097152      2085334          nvr    rw    stby-nvr    :
      -          -          nvr    rw    stby-r    sf:
      -          -          opaque  rw    revr    sf:
```

**Table 1: show file systems Field Descriptions**

Field	Value
Size(b)	Amount of memory in the file system in bytes.
Free(b)	Amount of free memory in the file system in bytes.

Field	Value
Type	<p>Type of file system.</p> <p><b>disk</b>—The file system is for a flash memory device, USB flash, and crashinfo file.</p> <p><b>network</b>—The file system for network devices; for example, an FTP server or and HTTP server.</p> <p><b>nvr</b><b>am</b>—The file system is for a NVRAM device.</p> <p><b>opaque</b>—The file system is a locally generated pseudo file system (for example, the system) or a download interface, such as brimux.</p> <p><b>unknown</b>—The file system is an unknown type.</p>
Flags	<p>Permission for file system.</p> <p><b>ro</b>—read-only.</p> <p><b>rw</b>—read/write.</p> <p><b>wo</b>—write-only.</p>
Prefixes	<p>Alias for file system.</p> <p><b>crashinfo</b>:—Crashinfo file.</p> <p><b>flash</b>:—Flash file system.</p> <p><b>ftp</b>:—FTP server.</p> <p><b>http</b>:—HTTP server.</p> <p><b>https</b>:—Secure HTTP server.</p> <p><b>nvr</b><b>am</b>:—NVRAM.</p> <p><b>null</b>:—Null destination for copies. You can copy a remote file to null to find its size.</p> <p><b>r</b><b>cp</b>:—Remote Copy Protocol (RCP) server.</p> <p><b>s</b><b>cp</b>:—Session Control Protocol (SCP) server.</p> <p><b>system</b>:—Contains the system memory, including the running configuration.</p> <p><b>t</b><b>ftp</b>:—TFTP network server.</p> <p><b>usbflash0</b>:—USB flash memory.</p> <p><b>usbflash1</b>:—External USB flash memory.</p> <p><b>y</b><b>modem</b>:—Obtain the file from a network machine by using the Ymodem protocol.</p>

## Setting the Default File System

You can specify the file system or directory that the system uses as the default file system by using the **cd** *filesystem:* privileged EXEC command. You can set the default file system to omit the *filesystem:* argument from related commands. For example, for all privileged EXEC commands that have the optional *filesystem:* argument, the system uses the file system specified by the **cd** command.

By default, the default file system is *flash:*.

You can display the current default file system as specified by the **cd** command by using the **pwd** privileged EXEC command.

## Displaying Information About Files on a File System

You can view a list of the contents of a file system before manipulating its contents. For example, before copying a new configuration file to flash memory, you might want to verify that the file system does not already contain a configuration file with the same name. Similarly, before copying a flash configuration file to another location, you might want to verify its filename for use in another command. To display information about files on a file system, use one of the privileged EXEC commands listed in the following table.

**Table 2: Commands for Displaying Information About Files**

Command	Description
<b>dir</b> [/all] [filesystem:filename]	Displays a list of files on a file system.
<b>show file systems</b>	Displays more information about each of the files on a file system.
<b>show file information</b> file-url	Displays information about a specific file.
<b>show file descriptors</b>	Displays a list of open file descriptors. File descriptors are the internal representations of open files. You can use this command to see if another user has a file open.

For example, to display a list of all files in a file system, use the **dir** privileged EXEC command:

```
Device# dir flash:
Directory of bootflash:/

616513  drwx           4096  Jul 15 2015 07:11:35 +00:00  .installer
608402  -rw-          33818  Sep 25 2015 11:41:35 +00:00  bootloader_evt_handle.log
608403  drwx           4096  Feb 27 2017 13:56:47 +00:00  .ssh
608410  -rw-             0   Jun 5 2015 10:16:17 +00:00  dc_stats.txt
608411  drwx          20480  Sep 23 2015 11:50:13 +00:00  core
624625  drwx           4096  Sep 23 2015 12:29:27 +00:00  .prst_sync
640849  drwx           4096  Feb 27 2017 13:57:30 +00:00  .rollback_timer
608412  drwx           4096  Jun 17 2015 18:12:47 +00:00  orch_test_logs
608413  -rw-      33554432  Sep 25 2015 11:43:15 +00:00  nvram_config
608417  -rw-             35  Sep 25 2015 20:17:42 +00:00  pnp-tech-time
608439  -rw-        214054  Sep 25 2015 20:17:48 +00:00  pnp-tech-discovery-summary
608419  drwx           4096  Jul 23 2015 07:50:25 +00:00  util
```

```

616514 drwx          4096 Mar 18 2015 11:09:04 +00:00 onep
608442 -rw-           556 Mar 18 2015 11:19:34 +00:00 vlan.dat
608448 -rw-      1131779 Mar 28 2015 13:13:48 +00:00 log.txt
616516 drwx          4096 Apr 1 2015 09:34:56 +00:00 gs_script
616517 drwx          4096 Apr 6 2015 09:42:38 +00:00 tools
608440 -rw-           252 Sep 25 2015 11:41:52 +00:00 boothelper.log
624626 drwx          4096 Apr 17 2015 06:10:55 +00:00 SD_AVC_AUTO_CONFIG
608488 -rw-      98869 Sep 25 2015 11:42:15 +00:00 memleak.tcl
608437 -rwx       17866 Jul 16 2015 04:01:10 +00:00 ardbeg_x86
632745 drwx          4096 Aug 20 2015 11:35:09 +00:00 CRDU
632746 drwx          4096 Sep 16 2015 08:57:44 +00:00 ardmore
608418 -rw-     1595361 Jul 8 2015 11:18:33 +00:00
system-report_RP_0_20150708-111832-UTC.tar.gz
608491 -rw-     67587176 Aug 12 2015 05:30:35 +00:00 mcln_x86_kernel_20170628.SSA
608492 -rwx     74880100 Aug 12 2015 05:30:57 +00:00 stardust.x86.idprom.0718B

11250098176 bytes total (9128050688 bytes free)
Device#

```

## Changing Directories and Displaying the Working Directory

Follow these steps to change directories and to display the working directory:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>enable</b> <b>Example:</b> Device> <b>enable</b>	Enables privileged EXEC mode. <ul style="list-style-type: none"> <li>• Enter your password if prompted.</li> </ul>
<b>Step 2</b>	<b>dir filesystem:</b> <b>Example:</b> Device# dir flash:	Displays the directories on the specified file system. For <i>filesystem:</i> , use flash: for the system board flash device.
<b>Step 3</b>	<b>cd directory_name</b> <b>Example:</b> Device# cd new_configs	Navigates to the specified directory. The command example shows how to navigate to the directory named <i>new_configs</i> .
<b>Step 4</b>	<b>pwd</b> <b>Example:</b> Device# pwd	Displays the working directory.
<b>Step 5</b>	<b>cd</b> <b>Example:</b> Device# cd	Navigates to the default directory.

# Creating Directories

Beginning in privileged EXEC mode, follow these steps to create a directory:

## Procedure

	Command or Action	Purpose
<b>Step 1</b>	<b>dir</b> <i>filesystem:</i> <b>Example:</b> Device# dir flash:	Displays the directories on the specified file system.  For <i>filesystem:</i> , use flash: for the system board flash device.
<b>Step 2</b>	<b>mkdir</b> <i>directory_name</i> <b>Example:</b> Device# mkdir new_configs	Creates a new directory. Directory names are case sensitive and are limited to 45 characters between the slashes (/); the name cannot contain control characters, spaces, slashes, quotes, semicolons, or colons.
<b>Step 3</b>	<b>dir</b> <i>filesystem:</i> <b>Example:</b> Device# dir flash:	Verifies your entry.

## Removing Directories

To remove a directory with all its files and subdirectories, use the **delete /force /recursive** *filesystem:/file-url* privileged EXEC command.

Use the **/recursive** keyword to delete the named directory and all subdirectories and the files contained in it. Use the **/force** keyword to suppress the prompting that confirms a deletion of each file in the directory. You are prompted only once at the beginning of this deletion process.

For *filesystem*, use **flash:** for the system board flash device. For *file-url*, enter the name of the directory to be deleted. All of the files in the directory and the directory are removed.




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**Caution** When directories are deleted, their contents cannot be recovered.

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## Copying Files

To copy a file from a source to a destination, use the **copy** *source-url destination-url* privileged EXEC command. For the source and destination URLs, you can use **running-config** and **startup-config** keyword shortcuts. For example, the **copy running-config startup-config** command saves the currently running configuration file to the NVRAM section of flash memory to be used as the configuration during system initialization.

You can also copy from special file systems (**xmodem:**, **ymodem:**) as the source for the file from a network machine that uses the Xmodem or Ymodem protocol. SSH File Transfer Protocol (SFTP) is also another option to copy switch configuration or image files. For more information, refer the *Configuring SSH File Transfer Protocol* chapter of the *Security Configuration Guide*.

Network file system URLs include ftp:, rep:, tftp:, scp:, http:, and https: and have these syntaxes:

- FTP—ftp:[[/username [:password]@location]/directory]/filename
- RCP—rcp:[[/username@location]/directory]/filename
- TFTP—tftp:[[/location]/directory]/filename
- SCP—scp:[[/username [:password]@location]/directory]/filename
- HTTP—http:[[/username [:password]@location]/directory]/filename
- HTTPS—https:[[/username [:password]@location]/directory]/filename




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**Note** The password must not contain the special character '@'. If the character '@' is used, the copy fails to parse the IP address of the server.

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Local writable file systems include flash:.

Some invalid combinations of source and destination exist. Specifically, you cannot copy these combinations:

- From a running configuration to a running configuration
- From a startup configuration to a startup configuration
- From a device to the same device (for example, the **copy flash: flash:** command is invalid)

## Deleting Files

When you no longer need a file on a flash memory device, you can permanently delete it. To delete a file or directory from a specified flash device, use the **delete** [**/force**] [**/recursive**] [*filesystem:*]/*file-url* privileged EXEC command.

Use the **/recursive** keyword for deleting a directory and all subdirectories and the files contained in it. Use the **/force** keyword to suppress the prompting that confirms a deletion of each file in the directory. You are prompted only once at the beginning of this deletion process. Use the **/force** and **/recursive** keywords for deleting old software images that were installed by using the **archive download-sw** command but are no longer needed.

If you omit the *filesystem:* option, the device uses the default device specified by the **cd** command. For *file-url*, you specify the path (directory) and the name of the file to be deleted.

When you attempt to delete any files, the system prompts you to confirm the deletion.




---

**Caution** When files are deleted, their contents cannot be recovered.

---

This example shows how to delete the file *myconfig* from the default flash memory device:



```
Device# delete myconfig
```

## Creating, Displaying and Extracting Files

You can create a file and write files into it, list the files in a file, and extract the files from a file as described in the next sections.

Beginning in privileged EXEC mode, follow these steps to create a file, display the contents, and extract it:

### Procedure

	Command or Action	Purpose
<b>Step 1</b>	<p><b>archive tar /create <i>destination-url</i> flash: /<i>file-url</i></b></p> <p><b>Example:</b></p> <pre>Device# archive tar /create tftp:172.20.10.30/saved. flash:/new-configs</pre>	<p>Creates a file and adds files to it.</p> <p>For <i>destination-url</i>, specify the destination URL alias for the local or network file system and the name of the file to create:</p> <ul style="list-style-type: none"> <li>Local flash file system syntax: <p><b>flash:</b></p> </li> <li>FTP syntax: <p><b>ftp:</b>[[/username[:password]@location]/directory]/-filename.</p> </li> <li>RCP syntax: <p><b>rcp:</b>[[/username@location]/directory]/-filename.</p> </li> <li>TFTP syntax: <p><b>tftp:</b>[[//location]/directory]/-filename.</p> </li> </ul> <p>For <b>flash:/file-url</b>, specify the location on the local flash file system in which the new file is created. You can also specify an optional list of files or directories within the source directory to add to the new file. If none are specified, all files and directories at this level are written to the newly created file.</p>
<b>Step 2</b>	<p><b>archive tar /table <i>source-url</i></b></p> <p><b>Example:</b></p> <pre>Device# archive tar /table flash: /new_configs</pre>	<p>Displays the contents of a file.</p> <p>For <i>source-url</i>, specify the source URL alias for the local or network file system. The <i>-filename</i>. is the file to display. These options are supported:</p> <ul style="list-style-type: none"> <li>Local flash file system syntax: <p><b>flash:</b></p> </li> <li>FTP syntax: <p><b>ftp:</b>[[/username[:password]@location]/directory]/-filename.</p> </li> <li>RCP syntax: <p><b>rcp:</b>[[/username@location]/directory]/-filename.</p> </li> </ul>

	Command or Action	Purpose
		<ul style="list-style-type: none"> <li>TFTP syntax: <b>tftp</b>:<i>[[//location]/directory]/-filename.</i></li> </ul> <p>You can also limit the file displays by specifying a list of files or directories after the file. Only those files appear. If none are specified, all files and directories appear.</p>
<b>Step 3</b>	<p><b>archive tar /xtract</b> <i>source-url</i> <b>flash:</b><i>/file-url</i> [<i>dir/file...</i>]</p> <p><b>Example:</b></p> <pre>Device# archive tar /xtract tftp://172.20.10.30/saved. flash:/new-configs</pre>	<p>Extracts a file into a directory on the flash file system.</p> <p>For <i>source-url</i>, specify the source URL alias for the local file system. The <i>-filename.</i> is the file from which to extract files. These options are supported:</p> <ul style="list-style-type: none"> <li>Local flash file system syntax: <b>flash:</b></li> <li>FTP syntax: <b>ftp</b>:<i>[[//username[password]@location]/directory]/-filename.</i></li> <li>RCP syntax: <b>rcp</b>:<i>[[//username@location]/directory]/-filename.</i></li> <li>TFTP syntax: <b>tftp</b>:<i>[[//location]/directory]/-filename.</i></li> </ul> <p>For <b>flash:</b><i>/file-url</i> [<i>dir/file...</i>], specify the location on the local flash file system from which the file is extracted. Use the <i>dir/file...</i> option to specify a list of files or directories within the file to be extracted. If none are specified, all files and directories are extracted.</p>
<b>Step 4</b>	<p><b>more</b> [ <i>/ascii</i>   <i>/binary</i>   <i>/ebcdic</i> ] <i>/file-url</i></p> <p><b>Example:</b></p> <pre>Device# more flash:/new-configs</pre>	<p>Displays the contents of any readable file, including a file on a remote file system.</p>

## Additional References for Flash File System

### Related Documents

Related Topic	Document Title
Commands for managing flash: file systems	<i>Cisco IOS Configuration Fundamentals Command Reference</i>

## Feature History for Flash File System

This table provides release and related information for features explained in this module.

These features are available on all releases subsequent to the one they were introduced in, unless noted otherwise.

Release	Feature	Feature Information
Cisco IOS XE Everest 16.5.1a	Flash File System	The flash file system is a single flash device on which you can store files. It also provides several commands to help you manage software bundles and configuration files.  Support for this feature was introduced only on the C9500-12Q, C9500-16X, C9500-24Q, C9500-40X models of the Cisco Catalyst 9500 Series Switches.
Cisco IOS XE Fuji 16.8.1a	Flash File System	Support for this feature was introduced only on the C9500-32C, C9500-32QC, C9500-48Y4C, and C9500-24Y4C models of the Cisco Catalyst 9500 Series Switches.
Cisco IOS XE Cupertino 17.7.1	Flash File System	Support for this feature was introduced on the C9500X-28C8D model of the Cisco Catalyst 9500 Series Switches.

Use Cisco Feature Navigator to find information about platform and software image support. To access Cisco Feature Navigator, go to <http://www.cisco.com/go/cfn>.

