Contents

Managing file systems

This chapter describes how to manage file systems.

About file system management

Storage media and file systems

The device supports both fixed (the flash memory) and hot swappable (USB disk) storage media.

- The fixed storage medium has one file system.
- The hot swappable storage media can be partitioned. Each unpartitioned storage medium has one file system. On a partitioned storage medium, each partition has one file system.

Storage medium and file system naming conventions

The file system on the flash memory has the same name as the flash memory. The name has the following parts:

- Storage medium type **flash**.
- Colon (:).

A USB disk name and the file system names share the following parts:

- Storage medium type **usb**.
- Sequence number, a lower-case English letter such as a, b, or c.
- Partition number, a digit that starts at 0 and increments by 1. If the storage medium is not partitioned, the system determines that the storage medium has one partition. (The storage medium name does not contain a partition number.)
- Colon (:).

For example, the first USB disk is named **usba:**, and the file system on the first partition of the first USB disk is named **usba0:**.

> ⓘ **IMPORTANT:**
> File system names are case sensitive and must be entered in lower case.

File system location

To identify a file system on the master device, you do not need to specify the file system location. To identify a file system on a subordinate member device, you must specify the file system location in the **slot*n#*** format. The *n* argument represents the IRF member ID of the member device. For example, the location is **slot2#** for a file system that resides on member device 2.

> ⓘ **IMPORTANT:**
> The file system location string is case sensitive and must be entered in lower case.

Default file system

You are working with the default file system by default after you log in. To specify a file or directory on the default file system, you do not need to specify the file system name. For example, you do not need to specify any location information if you want to save the running configuration to the root directory of the default file system.

To change the default file system, use the Boot ROM menu. For more information, see the software release notes.

Directories

Directories in a file system are structured in a tree form.

Root directory

The root directory is represented by a forwarding slash (/). For example, **flash:/** represents the root directory of the flash memory.

Working directory

The working directory is also called the current directory.

Directory naming conventions

When you specify a name for a directory, follow these conventions:

- A directory name can contain letters, digits, and special characters except for asterisks (*), vertical bars (|), forward slashes (/), backward slashes (\), question marks (?), left angle brackets (<), right angle brackets (>), quotation marks ("), and colons (:).
- A directory whose name starts with a dot character (.) is a hidden directory. To prevent the system from hiding a directory, make sure the directory name does not start with a dot character.

Commonly used directories

The device has some factory-default directories. The system automatically creates directories during operation. These directories include:

- **diagfile**—Stores diagnostic information files.
- **license**—Stores license files.
- **logfile**—Stores log files.
- **seclog**—Stores security log files.
- **versionInfo**—Stores software version information files.

Files

File naming conventions

When you specify a name for a file, follow these conventions:

- A file name can contain letters, digits, and special characters except for asterisks (*), vertical bars (|), forward slashes (/), backward slashes (\), question marks (?), left angle brackets (<), right angle brackets (>), quotation marks ("), and colons (:).
- A file whose name starts with a dot character (.) is a hidden file. To prevent the system from hiding a file, make sure the file name does not start with a dot character.

Common file types

The device has some factory-default files and might create some files automatically during operation. The types of these files include:

- **.ipe file**—Compressed software image package file.
- **.bin file**—Software image file.
- **.cfg file**—Configuration file.
- **.mdb file**—Binary configuration file.
- **.log file**—Log file.

Specifying a directory name or file name

Specifying a directory name

To specify a directory, you can use the absolute path or a relative path. For example, the working directory is **flash:/**. To specify the **test2** directory in Figure 1, you can use the following methods:

- **flash:/test/test1/test2** (absolute path)
- **flash:/test/test1/test2/** (absolute path)
- **test/test1/test2** (relative path)
- **test/test1/test2/** (relative path)

Figure 1 Sample directory hierarchy

```
flash:.
    └──test
        └──test1
            └──test2
```
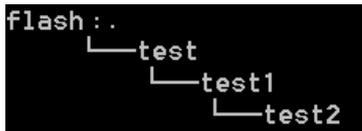
Specifying a file name

To specify a file, use the following methods:

- Enter the absolute path of the file and the file name in the format of *filesystem*/*directory1*/*directory2*/…/*directoryn*/*filename*, where *directoryn* is the directory in which the file resides.
- Enter the relative path of the file and the file name.

For example, the working directory is **flash:/**. The **samplefile.cfg** file is in the **test2** directory shown in Figure 1. To specify the file, you can use the following methods:

- **flash:/test/test1/test2/samplefile.cfg**
- **test/test1/test2/samplefile.cfg**

FIPS compliance

The device supports the FIPS mode that complies with NIST FIPS 140-2 requirements. Support for features, commands, and parameters might differ in FIPS mode and non-FIPS mode. For more information about FIPS mode, see *Security Configuration Guide*.

Restrictions and guidelines: File system management

To avoid file system corruption, do not perform the following tasks during file system management:

- Install or remove storage media.
- Perform a master/subordinate switchover.

If you remove a storage medium while a directory or file on the medium is being accessed, the device might not recognize the medium when you reinstall it. To reinstall this kind of storage medium, perform one of the following tasks:

- If you were accessing a directory on the storage medium, change the working directory.
- If you were accessing a file on the storage medium, close the file.
- If another administrator was accessing the storage medium, unmount all partitions on the storage medium.

Make sure a USB disk is not write protected before an operation that requires the write right on the disk.

You cannot access a storage medium that is being partitioned, or a file system that is being formatted or repaired.

Before managing file systems, directories, and files, make sure you know the possible impact.

Managing storage media and file systems

Partitioning a storage medium

About partitioning a storage medium

A storage medium can be divided into logical devices called partitions. Operations on one partition do not affect the other partitions.

Restrictions and guidelines

> ! **IMPORTANT:**
> Partitioning a storage medium clears all data on the medium.

The flash memory does not support partitioning.

Before partitioning a storage medium, perform the following tasks:

- Make sure no other users are accessing the medium.
- To partition a USB disk, make sure the disk is not write protected. If the disk is write protected, the partition operation will fail. To restore access to the USB disk, you must reinstall the disk or remount the file systems on the disk.

A partition must have a minimum of 32 MB of storage space.

The actual partition size and the specified partition size might have a difference of less than 5% of the storage medium's total size.

Prerequisites

Back up the files in the storage medium.

Procedure

To partition a storage medium, execute the following command in user view:

fdisk *medium* [*partition-number*]

To partition a storage medium evenly, specify the *partition-number* argument. To customize the sizes of partitions, do not specify the *partition-number* argument. The command will require you to specify a size for each partition.

Mounting or unmounting a file system

Restrictions and guidelines

You can mount or unmount only a file system that is on a hot-swappable storage medium.

You can unmount a file system only when no other users are accessing the file system.

To prevent a USB disk and the USB interface from being damaged, make sure the following requirements are met before unmounting file systems on the USB disk:

- The system has recognized the USB disk.
- The USB disk LED is not blinking.

Mounting a file system

To mount a file system, execute the following command in user view:

mount *filesystem*

File systems on a hot-swappable storage medium are automatically mounted when the storage medium is connected to the device. If the system cannot recognize a file system, you must mount the file system before you can access it.

Unmounting a file system

To unmount a file system, execute the following command in user view:

umount *filesystem*

To remove a hot-swappable storage medium from the device, you must first unmount all file systems on the storage medium to disconnect the medium from the device. Removing a connected hot-swappable storage medium might damage files on the storage medium or even the storage medium itself.

Formatting a file system

Restrictions and guidelines

Formatting a file system permanently deletes all files and directories in the file system. You cannot restore the deleted files or directories.

You can format a file system only when no other users are accessing the file system.

Procedure

To format a file system, execute the following command in user view:

format *filesystem*

Repairing a file system

Restrictions and guidelines

If part of a file system is inaccessible, use this task to examine and repair the file system.

You can repair a file system only when no other users are accessing the file system.

Procedure

To repair a file system, execute the following command in user view:

fixdisk *filesystem*

Managing files and directories

Setting the operation mode for files and directories

About file and directory operation modes

The device supports the following operation modes:

- **alert**—The system prompts for confirmation when your operation might cause problems such as file corruption or data loss. This mode provides an opportunity for you to cancel a disruptive operation.
- **quiet**—The system does not prompt for confirmation.

Procedure

1. Enter system view.

   system-view
2. Set the operation mode for files and directories.

   file prompt { **alert** | **quiet** }

   The default mode is alert.

Displaying file and directory information

To display file and directory information, execute the following command in user view:

dir [**/all**] [*file* | *directory* | **/all-filesystems**]

If multiple users perform file operations (for example, creating or deleting files or directories) at the same time, the output from this command might be incorrect.

Displaying the contents of a text file

To display the contents of a text file, execute the following command in user view:

more *file*

Displaying the working directory

To display the working directory, execute the following command in user view:

pwd

Changing the working directory

About changing the working directory

The default working directory is the root directory of the default file system on the master device.

Procedure

To change the working directory, execute the following command in user view:

cd { *directory* | **..** }

Creating a directory

To create a directory, execute the following command in user view:

mkdir *directory*

Renaming a file or directory

To rename a file or directory, execute the following command in user view:

rename { *source-file* | *source-directory* } { *dest-file* | *dest-directory* }

Copying a file

To copy a file, execute the command in user view.

6

In non-FIPS mode:

```
copy source-file { dest-file | dest-directory } [ vpn-instance
vpn-instance-name ] [ source interface interface-type interface-number ]
```

In FIPS mode:

```
copy source-file { dest-file | dest-directory }
```

Moving a file

To move a file, execute the following command in user view:

```
move source-file { dest-file | dest-directory }
```

Deleting and restoring files

About deleting and restoring a file

You can delete a file permanently or move it to the recycle bin of the file system. A file moved to the recycle bin can be restored, but a permanently deleted file cannot.

Each file system has a recycle bin. A recycle bin is a directory named **.trash** in the root directory of the file system.

Restrictions and guidelines

Files in the recycle bin occupy storage space. To release the occupied storage space, delete files from the recycle bin.

To delete files from the recycle bin, use the **reset recycle-bin** command. If you use the **delete** command, the recycle bin might not be able to operate correctly.

To display files in a recycle bin, use one of the following methods:

- Access the root directory of the file system and execute the **dir /all .trash** command.
- Access the recycle bin directory of the file system and execute the **dir** command.

Deleting a file

To delete a file, execute one of the following commands in user view:

- Delete a file by moving it to the recycle bin.

  delete *file*

- Delete a file permanently.

  delete /unreserved *file*

- Delete files from the recycle bin.

  reset recycle-bin [**/force**]

Restoring a file

To restore a file from the recycle bin, execute the following command in user view:

undelete *file*

Deleting a directory

Restrictions and guidelines

To delete a directory, you must delete all files and subdirectories in the directory.

Deleting a directory permanently deletes all its files in the recycle bin, if any.

Procedure

To delete a directory, execute the following command in user view:

rmdir *directory*

Archiving files and directories

About archiving files and directories

You can archive files and directories to a single file for purposes such as file backup. The original files and directories still exist.

When you archive files and directories, you can choose to compress the archive files so the archive files use less storage space.

Procedure

To archive files and directories, execute the following command in user view:

tar create [**gz**] **archive-file** *dest-file* [**verbose**] **source** { *source-file* | *source-directory* }&<1-5>

Extracting files and directories

About extracting files and directories

Use this feature to extract files and directories from archive files.

Procedure

To extract files and directories, execute the following commands in user view:

1. (Optional.) Display archived files and directories.

   tar list archive-file *file*
2. Extract files and directories.

   tar extract archive-file *file* [**verbose**] [**screen** | **to** *directory*]

Compressing a file

To compress a file, execute the following command in user view:

gzip *file*

Decompressing a file

To decompress a file, execute the following command in user view:

gunzip *file*

Calculating the file digest

About file digests

File digests are used to verify file integrity.

Procedure

To calculate the digest of a file, execute one of the following commands in user view:

- Use the SHA-256 algorithm.

```
      sha256sum file
```
● Use the MD5 algorithm.
```
   md5sum file
```

Executing a batch file

About batch file and batch file execution

A batch file contains a set of commands. Executing a batch file executes the commands in the file one by one.

When executing an interactive command in a batch file, the system uses the default inputs.

Restrictions and guidelines

To execute a batch file on the device, create a batch file on a PC and load the batch file to the device.

As a best practice, try every command on the device to make sure the command line can be executed correctly before adding the command to a batch file. If a command is invalid or a condition for executing the command is not met, the command fails and the system continues to execute the next command.

Procedure

1. Enter system view.
```
   system-view
```
2. Execute a batch file.
```
   execute filename
```