



# Disk Configuration and Maintenance

This chapter explains how to maintain hard disk drives and update the storage capacity on your Content Engines. This chapter contains the following sections:

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## Disk Storage Overview

Disk space in ACNS software is allocated on a per-file system basis instead of on a per-disk basis. You can configure your overall disk storage allocations according to the kinds of client protocols you expect to use and the amount of storage that you need to provide for each of the functions described in [Table 11-1](#).

ACNS software uses four types of disk storage, each with an associated function, as described in [Table 11-1](#).

**Table 11-1** Cisco ACNS Software Disk Storage

Disk Storage Type	Function
sysfs (system file system)	Stores log files, including transaction logs, syslog, and internal debugging logs. Also stores ACNS software files, configuration files, and Websense-related files.
cfs (cache file system)	Caches HTTP and FTP objects.
mediafs (media file system)	Caches content from streaming proxy servers, such as WMT and RealProxy.
cdnfs (ACNS network [formerly known as CDN] file system)	Stores all pre-positioned content.

Disk storage can be configured and viewed by using the commands listed in [Table 11-2](#).

**Table 11-2** *Disk-Related Commands*

Command	Syntax	Description
disk	<pre>disk add diskname {cdnfs {remaining   disk-space}[[cfs   mediafs   sysfs]{remaining   disk-space}]   cfs {remaining   disk-space}[[cdnfs   mediafs   sysfs]{remaining   disk-space}]   mediafs {remaining   disk-space}[[cdnfs   cfs   sysfs]{remaining   disk-space}]   sysfs {remaining   disk-space}[[cdnfs   cfs   mediafs]{remaining   disk-space}}] disk cancel-config disk config sysfs {remaining   disk-space} [[cdnfs   cfs]{remaining   disk-space}]   [mediafs {from-unused-cdnfs   remaining   disk-space}] disk delete-partitions diskname disk error-handling {reload   remap   threshold number} disk mark diskname {good   bad}<sup>1</sup> disk raid-array add-array disk raid-array repair diskname disk recover disk reformat diskname disk scan-errors diskname disk unuse diskname</pre>	Configures the disk resources for Content Engines, Content Routers, and Content Distribution Managers. (The <b>disk raid-array</b> commands are for the CDM-4650 only.)
show disks	<pre>show disks configured show disks current show disks details show disks raid-info show disks storage-array show disks storage-array [detail]</pre>	Displays information about the disk configurations.

1. The **disk mark** command has no effect on marking RAID disks in the Content Distribution Manager 4650 (CDM-4650). See [Note](#).



**Note**

Normally, when a disk is marked “bad,” after you reload the device, the marked disk will not be used. On a CDM-4650 when you use the **disk mark** command, the command executes properly; however, after you reload the device, there is no change in the disk configuration, and all the disks are used. This problem is caused by a hardware limitation of the CDM-4650 RAID disks.

## Disk Space-Allocation Guidelines

This section describes the disk-related commands and provides guidelines for allocating disk space on the different types of hardware configurations that use ACNS software.

To display the current disk space configuration, use the **show disks current** EXEC command.

```
ContentEngine# show disks current
Local disks:
  SYSFS           1.0GB      7.2%
  CFS              0.0GB      0.0%
  MEDIAFS         0.0GB      0.0% (from-unused-cdnfs)
  CDNFS           12.4GB    89.8%
  FREE            0.0GB      0.1%
Network-attached disks: NONE
```

CDNFS and MEDIAFS amounts are reported in terms of actual usable amounts of storage for applications. Due to internal file system overhead of approximately 3 percent, the reported amounts may be smaller than what you configured. CDNFS space is allocated with higher priority than MEDIAFS, so if you configured MEDIAFS and CDNFS, then MEDIAFS will be reduced by the amount of the total CDNFS and MEDIAFS overhead. If you have not configured MEDIAFS, then CDNFS will be reduced by the amount of the overhead.



#### Note

The **show disks details** command shows the amount of disk space that is allocated to system use. For example, the CE-7325 and CE-7305 each use 10.5 GB, the CE-565 uses 8.2 GB, and the CE-510 uses 6 GB. On legacy devices, system usage space is 3 to 4 GB. This detail is not shown by using the **show disks current** command.

To configure the disk allocations, use the **disk config** EXEC command. This command requires file system type and size as parameters. Size can be designated in megabytes, gigabytes, or as a percentage of the system total storage, or can be designated as **remaining** to use the remaining available disk space. Mediafs can be designated as **from-unused-cdnfs** to give the cdnfs most of the storage space and give mediafs the remaining unused cdnfs storage space.

The following requirements apply to disk configuration:

- You must configure at least 1 GB of sysfs.  
For the sysfs, we recommend allocating no more than 10 percent of the total disk space.
- You may configure 0 or 1 file system types as **remaining**.
- The amount of the cdnfs specified must be at least as large as the sum of the disk quotas of the subscribed channels. (When configuring a Content Engine for the first time, you do not have any subscribed channels.)
- You need to reboot the system for the **disk config** command to take effect.

In general, if you are allocating disk space for an ACNS network device, you should probably give greater allocation to the cdnfs than to other file system types. For the cfs and mediafs, the content is demand-loaded, and older content is automatically removed to make room for new content, so smaller amounts of disk space typically provide reasonably good performance. However, if you allocate insufficient storage space to the cdnfs, you will not be able to acquire or distribute pre-positioned content without removing existing content or increasing the cdnfs (by entering the **disk config** command or GUI equivalent) and rebooting the device.



#### Caution

Using the **disk config** command deletes all existing sysfs, mediafs, and cfs content when the disk configuration takes effect during reboot. Content in the cdnfs, however, is preserved. Use this command with care.

For a Content Engine in an edge or branch office environment, and in the absence of other more specific requirements, the following disk configuration can be safely used as a default configuration:

```
Content Engine# disk config sysfs 5% cfs 25% cdnfs remaining
```

In this configuration, 5 percent of the total storage is allocated to the sysfs, 25 percent is allocated to the cfs, and the remaining disk space is allocated to the cdnfs.

The disk configuration does not take effect until after the next reboot. To view what the configuration is going to be after the next reboot, use the **show disks configured** command.

```
ContentEngine# show disks configured
SYSFS          5%
CFS            25%
MEDIAFS        0%
CDNFS          remaining
```

To cancel the disk configuration, use the **disk cancel-config** command.

```
ContentEngine# disk cancel-config
Disk configuration canceled successfully
```

**Note**

The **disk cancel-config** command is effective only before a reboot. After a reboot, the allocation has already taken effect and can only be changed by entering another **disk config** command.

To view disk details, use the **show disks details** command.

```
ContentEngine# show disks details
disk00: Normal          (h00 c00 i00 100 - Int DAS-SCSI) 17499MB( 17.1GB)
      disk00/04: PHYS-FS      12730MB( 12.4GB) mounted internally
      disk00/04: CDNFS       12730MB( 12.4GB) mounted internally
      disk00/05: SYSFS       1023MB( 1.0GB) mounted at /local1
      System use:           3316MB( 3.2GB)
      FREE:                 16MB( 0.0GB)
disk01: Not present or not responding
No NAS share is attached to this device.
ContentEngine#
```

**Note**

The **show disks details** command shows that there is 3 to 4 GB of disk space allocated to system use. This detail is not shown by using the **show disks current** command.

To show the space allocation in each individual file system type, use the appropriate **show** command. For example:

```
ContentEngine# show statistics cdnfs

CDNFS Statistics:
-----
Volume on disk00/04:
  size of physical filesystem:      13152364 KB
  space assigned for CDNFS purposes: 13152364 KB
  number of CDNFS entries:          3 entries
  space reserved for CDNFS entries: 122664 KB
  available space for new entries:   13029700 KB
  ACNS 4.x legacy ECDN files:       0 KB
  physical filesystem space in use:  113976 KB
  physical filesystem space free:    13038388 KB
  physical filesystem percentage in use: 1 %
```

```

Volume on disk01/00:
  size of physical filesystem:          17358696 KB
  space assigned for CDNFS purposes:    17358696 KB
  number of CDNFS entries:              7659 entries
  space reserved for CDNFS entries:     1000784 KB
  available space for new entries:      16357912 KB
  ACNS 4.x legacy ECDN files:           0 KB
  physical filesystem space in use:      1001524 KB
  physical filesystem space free:        16357172 KB
  physical filesystem percentage in use: 6 %

```

## Disk Space-Allocation Guidelines for Content Engines

Content Engine models such as the Content Engine 500 series and the Content Engine 7300 series that are used as general-purpose Content Engines can be configured for the type of traffic you have on your network.

Lower-end models, especially those models with AV output, are often deployed in branch offices to store pre-positioned content. These models could be configured as follows:

```
ContentEngine# disk config sysfs 10% cfs 10% mediafs 0% cdnfs 80%
```



### Note

Because of memory restrictions in the CE-507, the maximum disk storage allocation for the cfs is 6 GB. For example, you might adjust the disk storage allocations for the CE-507 as follows:

```
CE-507# disk config sysfs 2GB cfs 6GB mediafs 2GB cdnfs remaining
```

The 6-GB limit for the cfs does not apply if the Content Engine is being used only for HTTP caching.

If RealProxy or WMT caching is being used, allocate mediafs storage from unused cdnfs storage space and adjust the cfs and cdnfs storage, as follows:

```
ContentEngine# disk config sysfs 5% cfs 25% cdnfs 70% mediafs from-unused-cdnfs
```

The cdnfs is provided with most of the storage space, and the mediafs is allocated dynamically from the remaining unused cdnfs storage space. This example intentionally gives the cfs a low amount of storage space based on the assumption that most Content Engines deployed in a typical branch office or retail outlet are not serving thousands of distinct users.

The mediafs storage can also be configured statically. For example:

```
ContentEngine# disk config sysfs 10% cfs 10% mediafs 10% cdnfs 70%
```



### Note

The mediafs storage space should only be configured if RealProxy or WMT files are being cached.

For higher-end models such as the 7300 series that might be used as a dedicated HTTP cache or RealProxy cache, either cfs storage or mediafs storage could be given more disk space. For example:

```
ContentEngine# disk config sysfs 10% cfs 80% mediafs 10% cdnfs 0%
```

```
ContentEngine# disk config sysfs 10% cfs 10% mediafs 80% cdnfs 0%
```

**Note**

Because of memory restrictions in the WAE, the maximum disk storage allocation for the cfs is 64 GB per disk. This limitation affects all WAE devices. To configure more than 64 GB of disk storage for the cfs, you must have more than one disk drive in your device.

The first example might depict an ISP deployment or enterprise data center deployment that serves a large number of users per Content Engine (over 200), where cfs storage space should be higher. In these types of deployments, the additional cfs storage space helps improve HTTP caching. Moreover, where the Content Engine is not deployed as part of an ACNS network (formerly known as a CDN), there is no need to configure any cdnfs storage.

If both RealProxy or WMT caching and HTTP caching are important, disk space could be evenly split between cfs storage and mediafs storage. For example:

```
ContentEngine# disk config sysfs 10% cfs 45% mediafs 45% cdnfs 0%
```

**Note**

The mediafs storage must be configured and RealProxy Real-Time Streaming Protocol (RTSP) proxy service must be enabled before any RealProxy files can be cached in the mediafs storage space. For information on how to enable RealProxy, see the *Cisco ACNS Software Configuration Guide for Centrally Managed Deployments* publication.

When you configure disk space allocations from the Content Distribution Manager GUI, dynamic allocation of mediafs storage space from unused cdnfs storage space is the default configuration. You can change the default to statically configure the mediafs by checking a check box in the File System Configuration window. (From the Content Distribution Manager GUI, choose **Devices > Devices > General Settings > Storage > File System.**)

When you upgrade, your disk space allocation remains the same as previously configured. If you want to configure the mediafs to use unused cdnfs storage space, you must configure this option either through the CLI or the Content Distribution Manager GUI and then reload the software for the change to take effect.

## Disk Space-Allocation Guidelines for Content Routers

In ACNS 5.x software, Content Routers are used as DNS servers for the delegated DNS zone used in Simplified Hybrid Routing. They do not store any content, nor do they participate in acquisition or distribution of pre-positioned content. The only disk space that needs to be configured on the Content Router is the sysfs.

```
CR4430# disk config sysfs 100% cfs 0% mediafs 0% cdnfs 0%
```

## Disk Space-Allocation Guidelines for Content Distribution Managers

Content Distribution Managers are used to manage content distribution for ACNS networks. Because the Content Distribution Manager does not store content, the only file system that needs to be configured is the sysfs. For example:

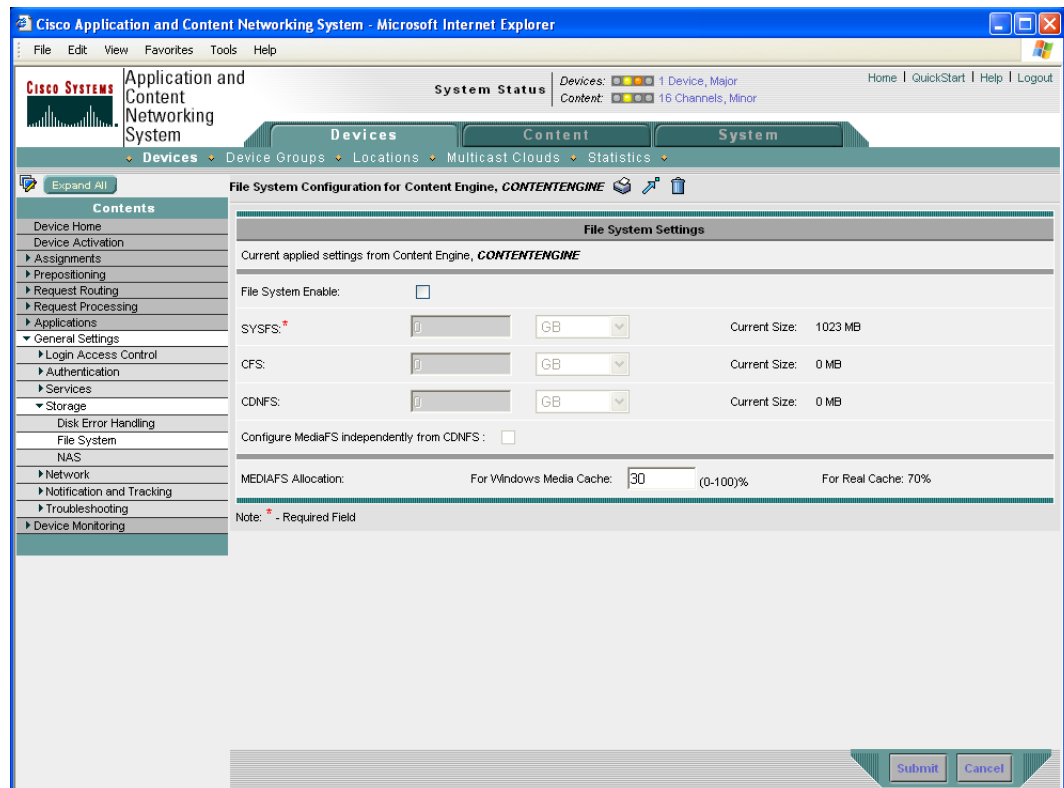
```
CDM4630# disk config sysfs 5GB
```

# Configuring Disk File Systems Using the Content Distribution Manager GUI

This section describes the configuration options in the ACNS 5.3 Content Distribution Manager GUI. To configure the Content Engine disk file systems using the Content Distribution Manager GUI, follow these steps:

- Step 1** From the Content Distribution Manager GUI, choose **Devices > Devices** (or **Device Groups**).
- Step 2** Click the **Edit** icon next to the Content Engine (or device group) that you want to configure.
- Step 3** In the Contents Pane, choose **General Settings > Storage > File System**. The File System Configuration window appears. (See [Figure 11-1](#).)

**Figure 11-1** File System Configuration Window—ACNS 5.3 Content Distribution Manager GUI Shown



- Step 4** To enable the GUI fields for configuration, check the **File System Enable** check box.
- Step 5** To configure the file systems, enter a value in the SYSFS, CFS, and CDNFS fields, and choose a unit of measure (% , MB, GB, or Remaining) from the drop-down list.

ACNS software allows you to configure the mediafs disk space using unused cdnfs disk space. One file system per disk drive stores both pre-positioned and streaming media content. Applications that need to write data to the mediafs or cdnfs share the single combined file system.

- Step 6** To configure the mediafs disk space separately from the cdnfs, check the **Configure MediaFS independently from CDNFS** check box. enter a value in the MEDIAFS field, and choose a unit of measure (% , MB, GB, or Remaining) from the drop-down list.
- This check box is unchecked by default. The MEDIAFS field appears only if you check this check box. Otherwise, the combined disk space configuration for the cdnfs and the mediafs (shown in the CDNFS field) is used, and the MEDIAFS field does not appear.
- Step 7** To configure a percentage of mediafs for Windows Media cache and a percentage for Real Proxy cache, enter a value in the MEDIAFS Allocation For Windows Media Cache field. The remaining space will be allocated to the Real Proxy cache in the mediafs space.
- This field corresponds to the **mediafs-division wmt-cache-space percent\_space real-cache-space percent\_space** global configuration command.
- Step 8** To save the configuration, click **Submit**. The configuration changes take effect after you reboot the device (or devices).
- For additional information, see the [“Updating Storage Capacity Through the Content Distribution Manager GUI” section on page 11-13.](#)

## Commands Related to Disk File Systems

This section lists the commands related to viewing, manipulating, and maintaining the four different disk storage areas.

### sysfs-Related Commands

The system file system (sysfs) storage space stores system image files. At least 1 GB of storage must be allocated to the sysfs; however, you can allocate more storage to the sysfs depending on your network requirements. The content of sysfs storage can be viewed or manipulated with the commands listed in [Table 11-3.](#)

**Table 11-3** *sysfs-Related Commands*

sysfs-Related Command	Syntax	Description
<b>cd</b>	<b>cd</b> <i>directoryname</i>	Changes the current directory.
<b>copy</b>	<b>copy cdrom install</b> <i>filedir filename</i> <b>copy compactflash install</b> <i>filename</i> <b>copy disk ftp</b> { <i>hostname</i>   <i>ipaddress</i> } <i>remotefiledir remotefilename localfilename</i> <b>copy disk startup-config</b> <i>filename</i> <b>copy ftp disk</b> { <i>hostname</i>   <i>ipaddress</i> } <i>remotefiledir remotefilename localfilename</i> <b>copy ftp install</b> { <i>hostname</i>   <i>ipaddress</i> } <i>remotefiledir remotefilename</i> <b>copy running-config disk</b> <i>filename</i>	Copies configuration or image files to disk, flash memory, or remote server.

Table 11-3 *sysfs-Related Commands (continued)*

<b>sysfs-Related Command</b>	<b>Syntax</b>	<b>Description</b>
<b>copy</b>	<b>copy running-config startup-config</b> <b>copy running-config tftp</b> {hostname   ipaddress} <i>remotefilename</i> <b>copy startup-config disk</b> <i>filename</i> <b>copy startup-config tftp</b> {hostname   ipaddress} <i>remotefilename</i> <b>copy system-status disk</b> <i>filename</i> <b>copy tech-support disk</b> <i>filename</i> <b>copy tech-support tftp</b> {hostname   ipaddress} <i>remotefilename</i> <b>copy tftp disk</b> {hostname   ipaddress} <i>remotefilename localfilename</i>	Copies configuration or image files to disk, flash memory, or remote server.
<b>cpfile</b>	<b>cpfile</b> <i>sourcefile destinationfile</i>	Copies files.
<b>delfile</b>	<b>del</b> <i>filename</i>	Removes a file.
<b>deltree</b>	<b>deltree</b> <i>directory</i>	Removes a directory and all subdirectories.
<b>dir</b>	<b>dir</b> [ <i>directory</i> ]	Displays long list of files in a directory.
<b>find-pattern</b>	<b>find-pattern</b> { <b>binary</b> <i>reg-express filename</i>   <b>case</b> { <b>binary</b> <i>reg-express filename</i>   <b>count</b> <i>reg-express filename</i>   <b>lineno</b> <i>reg-express filename</i>   <b>match</b> <i>reg-express filename</i>   <b>nomatch</b> <i>reg-express filename</i>   <b>recursive</b> <i>reg-express filename</i> }   <b>count</b> <i>reg-express filename</i>   <b>lineno</b> <i>reg-express filename</i>   <b>match</b> <i>reg-express filename</i>   <b>nomatch</b> <i>reg-express filename</i>   <b>recursive</b> <i>reg-express filename</i> }	Searches for a particular pattern in a file.
<b>install</b>	<b>install</b> <i>imagefilename</i>	Installs an image file.
<b>lls</b>	<b>lls</b> [ <i>directory</i> ]	Displays directory files in long list format.
<b>logging</b>	<b>logging console enable</b> <b>logging console priority</b> <i>loglevel</i> <b>logging disk</b> { <b>enable</b>   <b>filename</b> <i>filename</i>   <b>priority</b> <i>loglevels</i>   <b>recycle</b> <i>size</i> } <b>logging facility</b> <i>facility</i> <b>logging host</b> { <i>hostname</i>   <i>ipaddress</i>   <b>priority</b> <i>loglevel</i> }	Configures system logging (syslog). Log files are written to the first mounted sysfs volume, /local1. The default filename is /local1/syslog.txt. The default filename can be overwritten using the <b>filename</b> option.
<b>ls</b>	<b>ls</b> [ <i>directory</i> ]	Displays a list of files or subdirectory names within a directory.
<b>mkdir</b>	<b>mkdir</b> <i>directory</i>	Makes a directory.
<b>mkfile</b>	<b>mkfile</b> <i>filename</i>	Makes a new 0-byte file (for testing).
<b>pwd</b>	<b>pwd</b>	Displays path name of present working directory.
<b>rename</b>	<b>rename</b> <i>oldfilename newfilename</i>	Renames a file.

Table 11-3 *sysfs-Related Commands (continued)*

sysfs-Related Command	Syntax	Description
<b>rmdir</b>	<b>rmdir</b> <i>directory</i>	Removes a directory.
<b>show statistics</b>	<b>show statistics http usage</b> <b>show statistics transaction-logs</b>	Displays statistics relevant to sysfs storage.
<b>transaction-log force</b>	<b>transaction-log force</b> { <b>archive</b>   <b>export</b> }	Forces archive of the working log file to make a transaction log file.
<b>transaction-logs</b>	<b>transaction-logs archive interval every-day</b> { <b>at</b> <i>hour:minute</i>   <b>every</b> <i>hour</i> } <b>transaction-logs archive interval every-hour</b> { <b>at</b> <i>minute</i>   <b>every</b> <i>minute</i> } <b>transaction-logs archive interval every-week</b> [ <b>on</b> <i>weekdays</i> <b>at</b> <i>hour:minute</i> ] <b>transaction-logs archive max-file-size</b> <i>filesize</i> <b>transaction-logs enable</b> <b>transaction-logs export enable</b> <b>transaction-logs export ftp-server</b> { <i>hostname</i>   <i>servipaddr</i> } <i>login passw directory</i> <b>transaction-logs file-marker</b> <b>transaction-logs format</b> { <b>apache</b>   <b>custom</b>   <b>extended-squid</b>   <b>squid</b> } <b>transaction-logs sanitize</b>	Configures transaction logging.
<b>type</b>	<b>type</b> <i>filename</i>	Displays a file.

## cfs-Related Commands

The cache file system (cfs) storage space caches HTTP and FTP objects. The contents of cfs storage cannot be examined or modified. Commands related to maintaining cfs storage are listed in [Table 11-4](#).



### Note

You do not need to use these cfs-related commands in the course of normal operations.

Table 11-4 *cfs-Related Commands*

<b>cfs-Related Command</b>	<b>Syntax</b>	<b>Description</b>
<b>cfs</b>	<b>cfs clear</b> <i>partition</i> [ <b>force</b> ] <b>cfs format</b> <i>partition</i> <b>cfs mount</b> <i>partition</i> <b>cfs reset</b> <i>partition</i> <b>cfs sync</b> <i>partition</i> <b>cfs unmount</b> <i>partition</i>	Manipulates the Content Engine cfs.
<b>show cfs</b>	<b>show cfs</b> { <b>statistics</b>   <b>volumes</b> }	Displays cfs status.
<b>show statistics</b>	<b>show statistics cfs</b> <b>show statistics http usage</b>	Displays cfs-related statistics.

## mediafs-Related Commands

ACNS software caches RealProxy files in the media file system (mediafs) storage space. The content in the mediafs storage space cannot be examined. Commands related to maintaining mediafs storage are listed in [Table 11-5](#).

Table 11-5 *mediafs-Related Commands*

<b>mediafs-Related Command</b>	<b>Syntax</b>	<b>Description</b>
<b>mediafs-division</b>	<b>mediafs</b>   <b>mediafs-division</b> { <b>wmt-cache-space</b> <i>percent_space</i> <b>real-cache-space</b> <i>percent_space</i> }	Divides the mediafs space percentage between the WMT cache and the RealProxy cache.
<b>show mediafs</b>	<b>show mediafs volumes</b>	Displays media file system volumes.
<b>show statistics</b>	<b>show statistics mediafs</b>	Displays mediafs-related statistics.

## cdnfs-Related Commands

The ACNS network (formerly known as the content delivery network) file system (cdnfs) storage space is used to store pre-positioned streaming media content. Commands related to maintaining cdnfs storage are listed in [Table 11-6](#).

Table 11-6 *cdnfs-Related Commands*

<b>cdnfs-Related Command</b>	<b>Syntax</b>	<b>Description</b>
<b>cdnfs browse</b>	<b>cdnfs browse</b>	Browses through pre-positioned files and directories.
<b>cdnfs cleanup</b>	<b>cdnfs cleanup</b> { <b>info</b>   <b>start</b>   <b>stop</b> }	Cleans up orphan content of deleted channels from the cdnfs.
<b>cdnfs delete-unused-ecdns-files</b>	<b>cdnfs delete-unused-ecdns-files</b>	Deletes legacy E-CDN application data files (data files <i>only</i> ).

Table 11-6 *cdnfs-Related Commands*

cdnfs-Related Command	Syntax	Description
cdnfs lookup	cdnfs lookup <i>URL</i>	Looks up the specified URL in the cdnfs and displays information about the file, if the file is present.
copy cdnfs	copy cdnfs disk { <i>url sysfs-filename</i> }	Copies data files out of the cdnfs to the sysfs.
show cdnfs	show cdnfs volumes	Displays information for cdnfs volumes.
show statistics	show statistics cdnfs	Displays cdnfs-related statistics.

**Note**

On upgrading from ACNS 4.2 software to ACNS 5.0 software, any ecdnfs file systems are automatically changed to cdnfs file systems. Files are not deleted unless the administrator specifically deletes them. To delete unused ecdnfs files, use the **cdnfs delete-unused-ecdnfs-files** command.

## Updating Storage Capacity on Your Content Engines

If you have added or removed hard disk drives, added or removed an external storage device, such as a Cisco Storage Array, or if your storage configuration requirements have changed, you must update your file system configuration.

**Note**

For information on how to install or uninstall a Storage Array, refer to the hardware installation guide that shipped with your storage device.

## Using a Fibre Channel Storage Array

Some hardware models have a Fibre Channel interface and support a Fibre Channel Storage Array. After attaching a Fibre Channel Storage Array, you must assign Fibre Channel storage through the Fibre Channel Storage Array GUI. (Refer to the documentation from your Fibre Channel Storage Array vendor.)

After you assign Fibre Channel storage through the Storage Array GUI, you must reload the Content Engine for the Fibre Channel storage assignment to be recognized. You must reload the Content Engine *before* assigning storage to the different file systems, if you choose to do so, and then you must reload the Content Engine a second time for the file system disk configuration to take effect.

Do not attempt to assign the Fibre Channel storage to the Content Engine and configure the file systems with a single reload of the Content Engine. If you do, the Fibre Channel storage assignment is recognized, but the disk configuration is not applied. An error message appears at bootup, similar to the following:

```
-----
ruby_disk:physical disk setup appears to have changed
ruby_disk:not applying 'disk config' changes. Please re-enter via CLI.
-----
```

If you encounter this error message, reenter your disk configuration and reload the Content Engine for the disk configuration to be applied.

## Updating Storage Capacity Through the Content Distribution Manager GUI

After you have changed the storage capacity of a Content Engine by adding or deleting hard disks, or by adding or deleting a Storage Array from your hardware, you must update the system to recognize the new storage capacity.

To update your system with new storage capacity information, follow these steps:

- 
- Step 1** In the Content Distribution Manager GUI, choose **Devices > Devices**.
  - Step 2** Click the **Edit** icon next to the name of the Content Engine that you want to update.
  - Step 3** Verify the current disk configuration, which is displayed in the Device Home window.
  - Step 4** Calculate the storage you had available before you added or deleted hard disks or a Storage Array by using the following equation:

Prior available storage = Total storage capacity of device before addition or deletion – Total storage reserved for channels



**Note** The documentation for your Content Distribution Manager or Content Engine should tell you how much storage capacity the device has at the time of manufacture. This should give you the value for the total storage capacity of the device before addition or deletion.

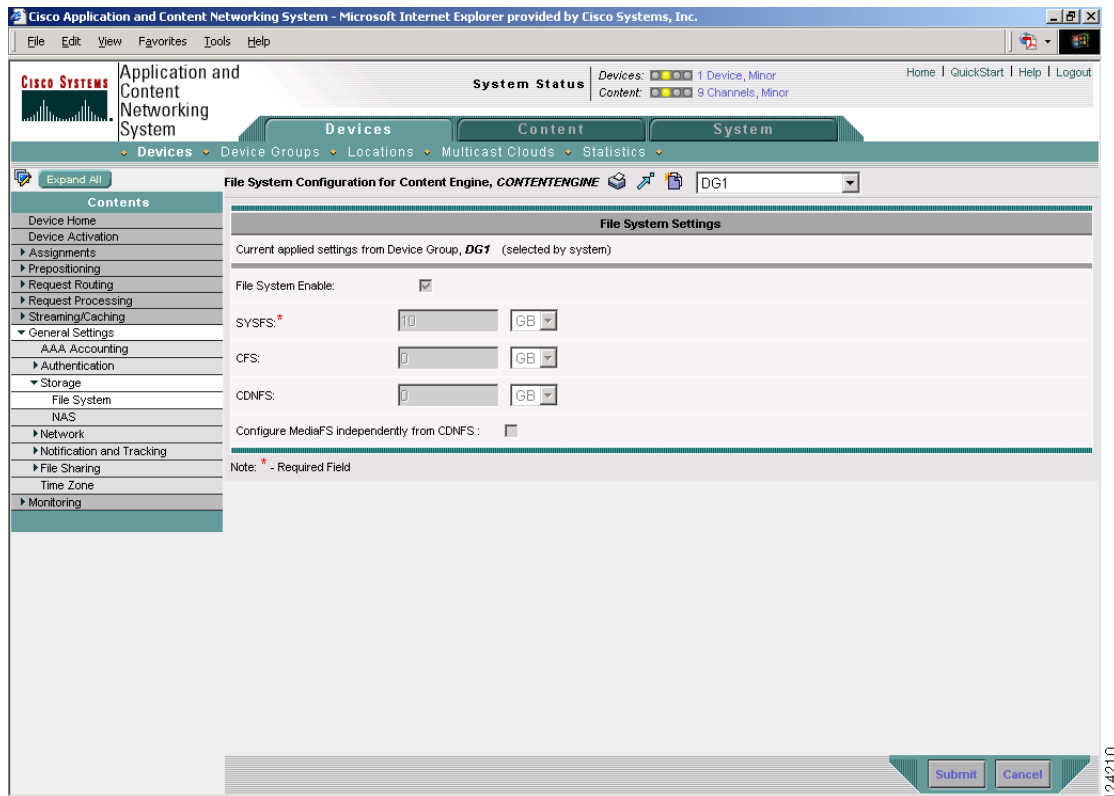
The total storage reserved for channels can be determined by adding up the capacity value for all the channels to which the device is subscribed.

---

To find the total storage reserved for each channel to which the Content Engine is subscribed, follow these steps:

- a. Choose **Devices > Devices**.
  - b. Click the **Edit** Icon next to the name of the Content Engine that you want to update.
  - c. In the Contents pane, choose **Assignments > Channels**. The Channel Assignments for Content Engine window appears. The Quota column shows the total storage reserved for each channel.
  - d. Add up the disk quota for each channel.
- Step 5** In the Contents pane choose **General Settings > Storage > File System**. The File System Configuration window appears. (See [Figure 11-2](#).)

**Figure 11-2 File System Configuration Window—ACNS 5.2 Content Distribution Manager GUI Shown**



- Step 6** Enter a value in the field for each file system that you want to update.
- Step 7** Choose a unit of measure from the drop-down list.
- Step 8** Click **Submit**.
- Step 9** Reboot your Content Engine for the disk configuration to take effect:
- In the Contents pane, choose **Device Home**.
  - Click the **Reload Content Engine** icon in the taskbar. You are prompted to confirm your decision.
  - Click **OK** to begin rebooting the Content Engine.
- Step 10** Verify that the new storage capacity is recognized:
- In the Contents pane, choose **Monitoring > Show/Clear Commands > Show Commands**. The Show Commands window appears.
  - Choose **disks** from the drop-down list and enter **configured** in the Arguments field.  
Alternatively, use the **show disks** command in the device CLI.
  - Compare the new available storage value to the amount of storage you had before adding or deleting a Storage Array to verify whether or not the new storage capacity is recognized.
  - If the new available storage value does not reflect the addition or deletion of a Storage Array, go to the CLI to reenter the **add** or **delete disk** command, and then repeat the procedure to reinitialize the update.

## Reconfiguring Storage Capacity on a Content Engine After a Storage Capacity Update

A Content Engine cannot have a storage capacity that is less than the sum of the space required by all the channels subscribed to it. If the storage capacity of the Content Engines falls below the required size as a result of deletion, the system prompts you to remove the Content Engine for some of the channels.

To replace the content that was lost when you deleted a storage disk, the Content Engine automatically initiates content replication from its parent Content Engine. It replicates only that content which was lost.

To remove a Content Engine from a channel, follow these steps:

- 
- Step 1** From the Content Distribution Manager GUI, choose **Content > Channels**.
  - Step 2** Click the **Edit** icon next to the name of the channel that you want to change. The Modifying Channel window appears.
  - Step 3** In the Contents pane, choose **Assign Content Engines**. The Content Engine Assignment for Channel window appears.
  - Step 4** Click the **Unassign** icon (green check mark) next to the name of the Content Engine that you want to remove from this list.
  - Step 5** Click **Submit**. The browser window refreshes, listing the updated channels. The list of Content Engines in the channel shows the updated count.
- 

## Mounting a Network Attached Storage Device

ACNS software provides a Common Internet File System (CIFS) client and a Network File System (NFS) client for Content Engines to communicate with network attached storage (NAS) devices.

Content Engines can be attached to NAS devices to increase their storage space. These Content Engines function as NFS or CIFS clients while accessing the NAS servers. NAS servers include UNIX-mode NFS servers or Microsoft Windows systems for CIFS sharing.

NAS servers support the cdnfs and mediafs for Content Engines. You can choose the type of file system to be attached to the NAS depending on whether you need to store cached WMT, RealMedia, and other streaming content, or pre-positioned content.

NFS and CIFS servers either export an entire file system to a Content Engine or a specified directory on a file system. In both cases, you need to specify the amount of disk space to be assigned to the Content Engine. Different Content Engines attach different directories on an NFS or CIFS server, and sharing the same directory among multiple Content Engines is not allowed.

NFS servers support host-based authentication and UNIX file system access control. You need to specify the client IP address that matches the list of hosts that an NFS server trusts. Clients are then allowed to mount and access files based on the permissions assigned to them. In contrast, CIFS servers share files and authenticate users on the server itself, instead of exporting data to clients for authentication. CIFS servers support NTLM, plain text passwords, and LDAP authentication.

**Note**

Content Engines request NFS file access using a root identity; therefore, the NFS server must be configured to map the remote root user to a user ID with sufficient read/write privileges on the server.

You can mount NAS shares to a Content Engine through the CLI or the Content Distribution Manager GUI.

## Attaching and Detaching NAS Shares Using the Content Distribution Manager GUI

**Note**

If a share is attached to a Content Engine as network-attached storage, you should *not* modify the share content, or use the share for other purposes. For example, you should not create arbitrary subdirectories under the share and put content in them. Moreover, the subdirectories of the share should not be exported and shared either by ACNS Content Engines or by arbitrary NFS and CIFS clients; otherwise, the NAS share usage on the Content Engine could be disrupted.

Before a NAS share is attached to a Content Engine, you should remove unrelated content in that share. However, you are not required to empty the NAS before attaching to a Content Engine. To remove unrelated content from the NAS share, the NAS server administrator must log in to the NAS server and remove the files directly.

To enable the NFS client or the CIFS Windows file-sharing client, and attach the NAS shares to the Content Engine using the Content Engine GUI, follow these steps:

- Step 1** In the Content Distribution Manager GUI, choose **Devices > Devices**. The Devices window appears.
- Step 2** Click the **Edit** icon next to the Content Engine that you want to configure. The Contents pane appears on the left.
- Step 3** In the Contents pane, choose **General Settings > Storage > NAS**. The Network Attached Storage for Content Engine window appears, listing the NAS server details.
- Step 4** Click the **Create New Network Attached Storage** icon in the taskbar. The Creating New Network Attached Storage for Content Engine window appears. (See [Figure 11-3](#).)

Figure 11-3 Creating New Network Attached Storage Window (ACNS 5.2 GUI Shown)

The screenshot shows the Cisco Application and Content Networking System GUI. The main window is titled "Creating New Network Attached Storage for Content Engine, CONTENTENGINE". The "Network Attached Storage Configuration" form includes the following fields:

- Protocol: Please make a choice (dropdown)
- Remote Server Name: (text input)
- Remote Directory Path: (text input)
- Username: (text input)
- Domain: (text input)
- Password: (text input)
- Confirm Password: (text input)
- File System: Please make a choice (dropdown)
- Reserved Space: (text input) with a unit dropdown set to GB

Note: \* - Required Field

- Step 5** Choose an option from the **Protocol** drop-down list to specify whether or not you want to attach the Content Engine as an NFS or a CIFS client to the remote NAS server.
- Step 6** Enter the host name or IP address of the NFS or CIFS server in the Remote Server Name field.
- Step 7** In the Remote Directory Path field, enter a valid and complete path to the directory to be attached to the file system of the NFS or CIFS server.



**Note** Perform [Step 8](#) through [Step 11](#) only if you configure Content Engines to function as CIFS clients. If you configure NFS clients, proceed to [Step 12](#).

- Step 8** In the Username field, enter the login ID of the user to gain access to the CIFS server.
- Step 9** In the Domain field, enter the domain in which the CIFS server is located.
- Step 10** In the Password field, enter the password used to authenticate users who log in to the CIFS server.
- Step 11** In the Confirm Password field, reenter the password once again for confirmation.
- Step 12** In the File System field, choose the type of file system to be attached on the NFS or CIFS server: cdfs or mediafs.
- Step 13** In the Reserved Space field, enter the amount of disk space to be reserved for each Content Engine on the NFS or CIFS server. Choose **GB** (gigabytes) or **MB** (megabytes) as the unit of measure from the drop-down list.
- Step 14** Click **Submit** to save your settings.

To detach the NAS shares from the Content Engine, follow these steps:

- 
- Step 1** In the Content Distribution Manager GUI, choose **Devices > Devices**. The Devices window appears.
  - Step 2** Click the **Edit** icon next to the Content Engine from which you want to detach NAS shares. The Contents pane appears on the left.
  - Step 3** In the Contents pane, choose **General Settings > Storage > NAS**. The Network Attached Storage for Content Engine window appears.
  - Step 4** Click the **Edit** icon next to the NAS share that you want to delete. The Modifying Network Attached Storage window appears.
  - Step 5** Click the **Trash** icon to delete the NAS share. You are asked to confirm the action. If you are sure, click **OK**.
- 

## Attaching and Detaching NAS Shares Using the CLI

To enable the NFS client or the CIFS Windows file-sharing client and attach the NAS shares to the Content Engine, use the **network-filesystem** command in global configuration mode. The following syntax for this command is in the ACNS 5.2 release:

```
network-filesystem client nfs {hostname | ipaddress} directory [mediafs | cdnfs] reserved-disk-space reserved-disk-space
```

```
network-filesystem client cifs {hostname | ipaddress} directory [mediaf | cdnfs] reserved-disk-space reserved-disk-space username username password pswd [domain domain]
```

The attachment of a NAS share takes effect after you enter the command. Acquisition and distribution services use the newly added disk space without having to be restarted; however, streaming services are restarted in order to accept the new disk space.

Specifically, the following services are restarted if they are running when NAS mediafs shares are attached:

- WMT proxy
- RealProxy

The **no** form of the command detaches the NAS shares from a Content Engine. The detachment of the NAS share takes effect immediately after the command finishes executing, and affected applications and services are restarted.



### Note

Applications related to pre-positioning stop running if the specific NAS share they are using is detached. If they are *not* using the specific NAS share being detached, they are unaffected.

The following services are restarted when NAS mediafs shares are detached:

- WMT proxy
- RealProxy



#### Note

When you detach NAS mediafs shares, the WMT proxy and RealProxy services are restarted whether or not they are using the specific NAS share being detached.

You can move NAS shares between different Content Engines. For example, you might attach a NAS share to Content Engine A and write content to the NAS. The NAS then could be detached from Content Engine A and attached to Content Engine B. Content Engine B validates the content on the NAS, and makes use of it if possible.

The following examples show usage of the **network-filesystem** command and its syntax.

In this example, the remote directory “/pub/cemedia1” on NFS server 172.16.1.1 is attached as mediafs storage on the Content Engine.

```
CE1(config)# network-filesystem client nfs 172.16.1.1 /pub/cemedia1/ mediafs
reserved-disk-space 10.5GB
```

In this example, the directory “/pub/cemedia2” on the NFS server is attached as another mediafs storage share on the Content Engine.

```
CE2(config)# network-filesystem client nfs 172.16.1.1 /pub/cemedia2/ mediafs
reserved-disk-space 20GB
```

In this example, the directory “/pub/cecdn1” is attached as cdnfs storage on the Content Engine.

```
CE3(config)# network-filesystem client nfs 172.16.1.1 /pub/cecdn1/ cdnfs
reserved-disk-space 30GB
```

The following examples attach mediafs and cdnfs storage, respectively, from the CIFS server 172.31.255.255, with the username and password provided for authentication purposes.

```
CE4(config)# network-filesystem client cifs 172.31.255.255 /pub/cemedia/ mediafs
reserved-disk-space 40.5GB username cifs_ceusr password a#%^&* 
```

```
CE5(config)# network-filesystem client cifs 172.31.255.255 /pub/cecdn/ cdnfs
reserved-disk-space 50.5GB username cifs_ceusr password a#%^&* 
```

## Error Occurrence

An error might occur when a NAS device is removed from a Content Engine without being properly detached from it through the CLI or Content Distribution Manager GUI. Later, when the NAS device is attached to another Content Engine, the NAS attachment fails with this error message:

```
this NAS share is being used by another CE: <CE-name> from date <date>
```

You are prompted to use the **network-filesystem preempt EXEC** command before reattempting to attach the NAS.

An error might also occur if the Content Engine hardware has been replaced and the Content Engine mistakenly believes that its NAS share is being used by another Content Engine.

For error recovery from these two unusual situations, use the **network-filesystem EXEC** command **preempt** option to preempt the NAS share from the mistaken other Content Engine. The **preempt** option will not function if the Content Engine has already mounted the NAS share.

```
CE# network-filesystem client nfs 172.16.1.1 /pub/cecdn1/ preempt
```

```
CE# network-filesystem client cifs 172.16.1.2 /pub/cemedial/ username cifs_ceusr password
a#2as$ domain MYGROUP preempt
```

**Note**

Sharing a NAS among multiple Content Engines at the same time is not allowed. Therefore, if CE1 is using the NAS when CE2 preempted it, CE1 will notice this ownership change and remove the NAS.

When a directory on the NFS or CIFS server is erroneously assigned to more than one Content Engine, only the first Content Engine can use it successfully.

## Synchronizing Systems When NAS Shares Are Detached

If you detach a NAS share from a Content Engine, the acquisition and distribution subsystem needs to synchronize its database record with the pre-positioned content that is stored in the Content Engine cdnfs. When you use the **no network-filesystem** command, this synchronization should automatically happen *before* the NAS share is detached from the Content Engine. If for some reason acquisition and distribution synchronization fails to happen before the share is detached, you can manually synchronize the database record with the pre-positioned content by using the **acquisition-distribution database-cleanup** EXEC command.

The time needed for synchronization *before* detaching the NAS share is proportional to the number of pre-positioned objects in the NAS share. The time needed for synchronization *after* detaching the NAS share is proportional to the number of pre-positioned objects on local disks. A rough estimate of the speed is 1 hour per 10,000 objects. If you only need to detach a NAS share temporarily, then synchronization may not be necessary.

**Note**

Synchronization could take hours or even longer if there are thousands of pre-positioned files on the Content Engine. We recommend that you choose off-peak hours to perform synchronization. It is best to stop normal acquisition and distribution jobs during synchronization. Streaming services are not affected when this task is running.

## Handling NAS Device Failure

ACNS software uses the NAS health prober to monitor the NAS online status. If a NAS share is offline for a relatively long time (approximately 5 minutes for the cdnfs and 10 minutes for the mediafs), the NAS health prober assigns the NAS share a “failed” status, and the ACNS network stops using it. When the NAS share comes back online after a failure, the system automatically begins to use the NAS share again.

The NAS health prober also monitors whether a NAS share has been preempted by another Content Engine. If the NAS share has been preempted, the NAS health prober automatically detaches the preempted share.

## Viewing NAS Device Configuration and Statistics

The NAS device configurations are displayed in the Device Home window for each Content Engine. To view the device configuration, follow these steps:

- 
- Step 1** In the Content Distribution Manager GUI, choose **Devices > Devices**.
- Step 2** Click the **Edit** icon next to the name of the Content Engine that you want to view. The Device Home window appears, displaying the number of network attached storage disks.
- Step 3** To view the device configuration from the CLI, use the following **show** commands:
- ```
CE# show disks network-attached
CE# show network-filesystem client
CE# show disks details
```
- 

To view NAS device usage statistics, follow these steps:

- 
- Step 1** In the Content Distribution Manager GUI, choose **Devices > Devices**.
- Step 2** Click the **Edit** icon next to the name of the Content Engine that you want to view.
- Step 3** In the Contents pane, choose **Monitoring > Show/Clear Commands > Show Commands**.
- Step 4** Choose **statistics** in the Show drop-down list and enter **cdnfs** or **mediafs** in the Arguments field.
- Step 5** Click **Submit**. The information is displayed in a pop up window.
- Step 6** To view NAS device statistics from the CLI, use the following **show** commands:
- ```
CE# show statistics cdnfs
CE# show statistics mediafs
```
- 

## Removing and Replacing Hard Disk Drives

To stop all applications that use a specified disk drive and unmount the drive without rebooting the device, use the **disk unuse** command.

This command will stop and restart all applications that are currently using the specified disk drive (for example, disk02 [/local/local2] or disk03). All file systems, including cfs, cdnfs, and mediafs if applicable, will be unmounted on the specified disk.

The syntax of the command is as follows:

**disk unuse** *diskname*

*diskname* is the name of the drive to be unmounted.



### Note

The **disk unuse** command *cannot* be used with disk00 (the first disk drive) or with the drive that contains the /local/local1 directory (for example, if disk01 contains the /local/local1 directory then you cannot use the **disk unuse** command with disk01).

Following are some examples of the command and the resultant actions:

```
ce# disk unuse disk00
Disk00 can not be unuseed!

ce# disk unuse disk01
Disk01 has mounted SYSFS and can not be unused!

ce# disk unuse disk02
This will restart applications currently using disk02 and unmount all partitions on
disk02.
Do you want to continue? (yes/no) [no]no
Disk02 not unused.

ce# disk unuse disk02
This will restart applications currently using disk02 and unmount all partitions on
disk02.
Do you want to continue? (yes/no) [no]yes
Disk02 has been unused. No application is using disk02 now.

ce# disk unuse disk02 delete-partitions
This will restart applications currently using disk02 and unmount and *delete* all
partitions on disk02.
Do you want to continue? (yes/no) [no]yes
Disk02 has been unused. No application is using disk02 now.
And all partitions on disk02 are deleted.
```

## Configuring a Disk Error-Handling Method

ACNS software allows you to configure how disk errors should be handled and to define a disk device error-handling threshold.

If the bad disk drive is a critical disk drive, and the automatic reload feature (**disk error-handling reload** command) is enabled, then the ACNS software marks the disk drive “bad” and the Content Engine is automatically reloaded. After the Content Engine is reloaded, a syslog message and an SNMP trap are generated.

The disk error-handling threshold option determines how many disk errors can be detected before the disk drive is automatically marked “bad.” By default, this threshold is set to 10. To change the default threshold, use the **disk error-handling threshold** global configuration command. Specify **0** if you never want the disk drive to be marked “bad.”

In the following example, five disk drive errors for a particular disk drive (for example, disk00) will be allowed before the disk drive is automatically marked “bad”:

```
ContentEngine(config)# disk error-handling threshold 5
```

To configure a disk error-handling method using the Content Distribution Manager GUI (available as of the ACNS 5.3 release), follow these steps:

- 
- Step 1** From the Content Distribution Manager GUI, choose **Devices > Devices** (or **Devices > Device Groups**).
  - Step 2** Click the **Edit** icon next to the device (or device group) for which you want to configure the disk error handling method.
  - Step 3** In the Contents pane, choose **General Settings > Storage > Disk Error Handling**. The Disk Error Handling Settings window appears.
  - Step 4** To enable the window for configuration, check the Enable check box.

- If you want the device to reload the disk if the system file system (sysfs) (disk00) has problems, check the Enable Disk Error Handling Reload check box.
- If you want to set the disks to attempt to remap disk errors automatically, check the Enable Disk Error Handling Remap check box. This option is enabled by default.
- If you want to set the number of disk errors allowed before the disk is marked as bad, check the Enable Disk Error Handling Threshold check box and enter a number (0-100) in the Threshold field. The default threshold is 10.

**Step 5** Click **Submit** to save the settings.

---

## Disk Error-Handling Improvements

ACNS software has implemented the following enhancements to improve the availability and reliability of hard disk drives and file systems:

- System availability improvements
- Disk health monitoring
- Remapping of bad sectors on disk drives
- Filtering out multiple syslog messages for a single failed sector on disk drives

### System Availability Improvements

In ACNS software releases prior to ACNS 5.3, the amount of time required for a file system check during bootup could be relatively high if the hard disk drive had large underlying file system partitions and if the system had shut down because of an unexpected power failure or system crash. Also, if disk partitions had a large number of sector failures or errors, the file system check was further delayed, and bootup might take many hours. The underlying file system cannot be mounted until its consistency has been checked by the file system check program, and large file systems can take a long time for this checking process.

To alleviate this problem, devices manufactured with ACNS 5.3 software or later use an improved underlying file system that takes less time to perform the file system check. The new underlying file system also improves the time required for bootup after a system crash or unexpected power failure. For systems being upgraded from ACNS 5.2, 5.1, 5.0, or 4.x software, the existing file system is transitioned to the improved file system when you upgrade your system.

### Disk Health Monitoring

ACNS 5.3 software and later releases support Self Monitoring Analysis and Reporting Technology (SMART) to monitor disk health for SCSI, SATA, and IDE disk drives. SMART provides a method for collecting information about operating and environmental conditions that can indicate an impending disk failure. ACNS 5.3 software and later releases incorporate SMART attributes for monitoring and reporting impending disk failures through syslog messages, SNMP traps, and alarms. In ACNS 5.3 software, the **show disk SMART-info EXEC** command displays the disk drive operating and environmental information, as shown in the following example:

```
CONTENTENGINE# show disk SMART-info details
=== disk00 ===
Device: IBM          IC35L036UCD210-0 Version: S5BS
Serial number:      KQZ3G204
Device type: disk
Transport protocol: Fibre channel (FCP-2)
Local Time is: Tue Jan 25 01:32:39 2005 GMT/summerTimeZone
```

```

Device supports SMART and is Enabled
Temperature Warning Disabled or Not Supported
SMART Health Status: OK

Current Drive Temperature:      35 C
Drive Trip Temperature:        85 C
Manufactured in week 18 of year 2002
Current start stop count:      113 times
Recommended maximum start stop count: 10000 times

Error counter log:
      Errors Corrected    Total    Total    Correction    Gigabytes    Total
      delay:             [rereads/    errors    algorithm    processed    uncorrected
      minor | major    rewrites]  corrected  invocations  [10^9 bytes]  errors
read:           0       0           0           0           0           1708.690 0
write:          0       0           0           0           0           1067.430 0

Non-medium error count:           0

=== disk01 ===
disk01: Not present
CONTENTENGINE#

```

### Remapping of Bad Sectors on Disk Drives

ACNS 5.3 software extends the support for remapping unused bad disk sectors to IDE and SATA disk drives, as well as SCSI disk drives.

The **disk scan-errors** *diskname* EXEC command scans SCSI, IDE, or SATA disks for errors and remaps the bad sectors if they are unused. This command also reports the failed and fixed or unfixed sectors that are found. Use this command to determine whether or not the disk drive has any errors.

The **disk reformat** *diskname* EXEC command performs a low-level format of the SCSI, IDE, or SATA disks. Use this command only as a final resort when the **disk scan-errors** command has been unable to fix all of the disk drive errors. This command erases all of the content on the disk.

If a disk drive continues to report a failure after you have used both the **disk scan-errors** and **disk reformat** commands, you need to replace the disk drive.

### Filtering Multiple Syslog Messages For a Single Failed Sector on Disk Drives

In ACNS releases prior to the ACNS 5.2 release, many disk failure messages were generated when a single disk sector failed, which caused unnecessary concern, filled the `syslog.txt` file, and flooded the communication channel to the Content Distribution Manager. In ACNS 5.2 software, changes for suppressing multiple syslog messages on a single sector failure have been implemented for IDE disk drives. In ACNS 5.3 software, this fix also has been extended to SCSI and SATA disk drives.

To display a list of failed sectors on the disks, use the **show disks failed-sectors** [*diskname*] EXEC command.