



## Configuring Disk Space

This appendix provides guidelines for allocating disk space based on the type of ACNS network device and the most common usage of the device.

Disk space in ACNS software is allocated on a per-file system basis, rather than 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 A-1](#).

This appendix discusses the following topics:

- [Disk Storage Overview, page A-1](#)
- [Disk Space-Allocation Guidelines, page A-2](#)
- [Commands Related to Disk File Storage Types, page A-6](#)
- [Updating Storage Capacity on Your Content Engines, page A-10](#)
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## Disk Storage Overview

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

**Table A-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 can store image files and configuration 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 A-2](#).

Table A-2 Disk-Related Commands

Command	Syntax	Description
<b>disk</b>	<b>disk add</b> <i>diskname</i> [sysfs {remaining   <i>disk-space</i> }] [cdnfs {remaining   <i>disk-space</i> }] [cfs {remaining   <i>disk-space</i> }]   [mediafs {from-unused-cdnfs   remaining   <i>disk-space</i> }] <b>disk cancel-config</b> <b>disk config</b> sysfs {remaining   <i>disk-space</i> } [cdnfs {remaining   <i>disk-space</i> }] [cfs {remaining   <i>disk-space</i> }]   [mediafs {from-unused-cdnfs   remaining   <i>disk-space</i> }] <b>disk raid-array add-array</b> <b>disk raid-array repair</b> <i>diskname</i> <b>disk recover</b>	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.)
<b>show disks</b>	<b>show disks configured</b> <b>show disks current</b> <b>show disks details</b> <b>show disks raid-info</b> <b>show disks storage-array</b> <b>show disks storage-array [detail]</b>	Displays information about the disk configurations.

## 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
SYSFS          1.0GB      3.5%
CFS            0.0GB      0.0%
MEDIASF        0.0GB      0.0%
CDNF           28.2GB     96.5%
FREE           0.0GB      0.0%
```



### Note

The **show disks details** command shows the amount of disk space that is allocated to system use. 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 takes 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 the bulk of the storage space and 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.)
- A **disk config** command requires a reboot 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 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 give reasonably good performance. However, if you allocate too little storage space to the cdnfs and run out, you will not be able to acquire or distribute pre-positioned content without removing existing content or increasing the cdnfs by issuing 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
```

where 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 reboot, the allocation has already taken effect and can only be changed by issuing another **disk config** command.

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

```
ContentEngine# show disks details
disk00:Normal        (h00 c00 i00 l00)    17499MB( 17GB)
  disk00/03:CDNFS    9044MB( 8GB) mounted at/sonoma/state
  disk00/04:SYSFS    2047MB( 1GB) mounted at/local/local1
  disk00/05:CFS      2047MB( 1GB)
  disk00/06:MEDIAFS  1023MB( 0GB) mounted at/media/media1
System use:          3317MB( 3GB)
```

```

FREE:                               16MB ( 0GB)
disk01:Not present

```

**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
```

where the `cdnfs` is given the bulk 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 CE-7320 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%
```

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, refer to Chapter 12 of the *Cisco ACNS Software Caching and Streaming Configuration Guide, Release 5.1*.

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 > Content Engines > Platform > File System**.)

After upgrading from an earlier release of ACNS software to ACNS 5.1 software, 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 `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 CDNs. 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
```

## Commands Related to Disk File Storage Types

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 A-3](#).

Table A-3 *sysfs-Related Commands*

<b>sysfs-Related Command</b>	<b>Syntax</b>	<b>Description</b>
<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> <b>copy running-config startup-config</b> <b>copy running-config tftp</b> { <i>hostname</i>   <i>ipaddress</i> } <i>remotefilename</i> <b>copy startup-config disk</b> <i>filename</i> <b>copy startup-config tftp</b> { <i>hostname</i>   <i>ipaddress</i> } <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> { <i>hostname</i>   <i>ipaddress</i> } <i>remotefilename</i> <b>copy tftp disk</b> { <i>hostname</i>   <i>ipaddress</i> } <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 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.

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

<b>sysfs-Related Command</b>	<b>Syntax</b>	<b>Description</b>
<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 file name is /local1/syslog.txt. The default file name 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.
<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 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>servipaddrs</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 A-4](#).

**Table A-4** *cfs-Related Commands*

cfs-Related Command	Syntax	Description
cfs	<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.
show cfs	<b>show cfs</b> { <b>statistics</b>   <b>volumes</b> }	Displays cfs status.
show statistics	<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 A-5](#).

**Table A-5** *mediafs-Related Commands*

mediafs-Related Command	Syntax	Description
mediafs-division	<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.
show mediafs	<b>show mediafs volumes</b>	Displays media file system volumes.
show statistics	<b>show statistics mediafs</b> <b>show statistics mediacache real requests</b> <b>show statistics mediacache real savings</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 A-6](#).

Table A-6 *cdnfs-Related Commands*

cdnfs-Related Command	Syntax	Description
<code>cdnfs browse</code>	<code>cdnfs browse</code>	Browses through pre-positioned files and directories.
<code>cdnfs cleanup</code>	<code>cdnfs cleanup {info   start   stop}</code>	Cleans up orphan content of deleted channels from the cdnfs.
<code>cdnfs delete-unused-ecdns-files</code>	<code>cdnfs delete-unused-ecdns-files</code>	Deletes legacy E-CDN application data files (data files <i>only</i> ).
<code>cdnfs lookup</code>	<code>cdnfs lookup URL</code>	Looks up the specified URL in the cdnfs and displays information about the file, if the file is present.
<code>copy cdnfs</code>	<code>copy cdnfs disk {url sysfs-filename}</code>	Copies data files out of the cdnfs to the sysfs for further processing.
<code>show cdnfs</code>	<code>show cdnfs volumes</code>	Displays information for cdnfs volumes.
<code>show statistics</code>	<code>show statistics cdnfs</code>	Displays cdnfs-related statistics.

**Note**

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

## Updating Storage Capacity on Your Content Engines

If you have added or deleted 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. (For CLI instructions, see the “[Configuring Disk Space](#)” section on page 3-9.)

## 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 > Content Engines**.
- 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:
- In the Contents pane, choose **Show/Clear Commands > Show Commands**. The Show Commands window appears.
  - Choose **disks** from the drop-down list and enter **current** or **details** in the Arguments field.  
Alternatively, use the **show disks** command in the device CLI.
- Step 4** Calculate the storage you had available before you added or deleted hard disks or a Storage Array by using the following equation:
- $$\text{Prior available storage} = \text{Total storage capacity of device before addition or deletion} - \text{Total storage reserved for channels}$$



**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.

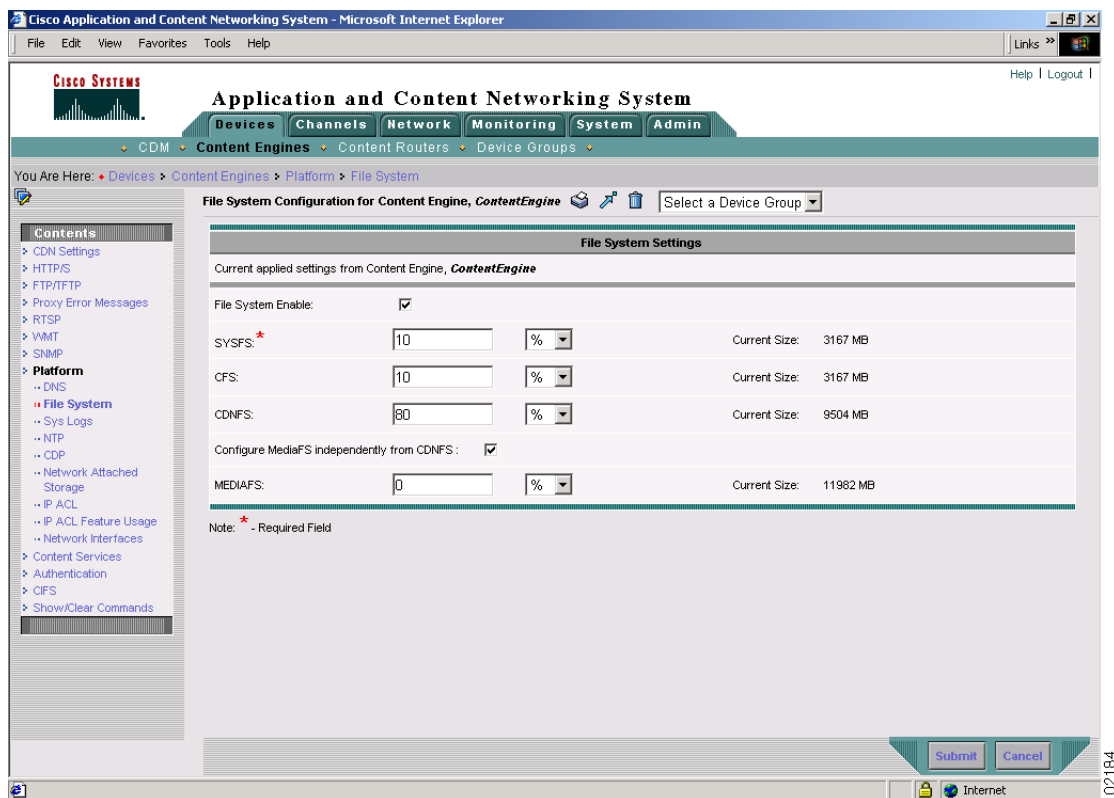
---

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

- Choose **Devices > Content Engines**.
- Click the **Edit** Icon next to the name of the Content Engine that you want to update.
- In the Contents pane, choose **CDN Settings > Channels**. The View Channels Subscribed to Content Engine window appears.

- d. Click the **Printer** icon to print the table, or make a note of the channel names subscribed to the Content Engine.
  - e. Choose **Channels > Channels**.
  - f. Click the **Edit** icon next to the name of the first channel that is subscribed to the Content Engine. The channel quota information is displayed under the Manifest heading in the Channel Quota field.
  - g. Click each channel in your subscription list and add up the disk quota for each channel.
- Step 5** Go back to the Modifying Content Engine Window (**Devices > Content Engines > CDN Settings > Activation**).
- Step 6** In the Contents pane choose **Platform > File System**. The File System Configuration window appears. (See [Figure A-1](#).)

**Figure A-1 File System Configuration Window**



- Step 7** Enter a value in the field for each file system that you want to update.
- Step 8** Choose a unit of measure from the drop-down list.
- Step 9** Click **Submit**.
- Step 10** Reboot your Content Engine for the disk configuration to take effect:
- a. Choose **Devices > Content Engines**.
  - b. Click the **Edit** icon next to the name of the Content Engine that you want to reboot. The Modifying Content Engine window appears.
  - c. Click the **Reboot** icon. You are prompted to confirm your decision.
  - d. Click **OK** to begin rebooting the Content Engine.

- Step 11** Verify that the new storage capacity is recognized:
- In the Contents pane, choose **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 reissue 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, as a result of deletion, the storage capacity of the Content Engines falls below the required size, 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 **Channels > 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 Assigning Content Engines to Channel window appears.
- Step 4** Check the check box next to the name of the Content Engines that you wish to remove from this list and click **Remove Selected CEs**.
- 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 to a Network Attached Storage Device

ACNS 5.1 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 password, 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.

Mounting NAS shares to a Content Engine can be accomplished through the CLI or the Content Distribution Manager GUI.

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

**Note**

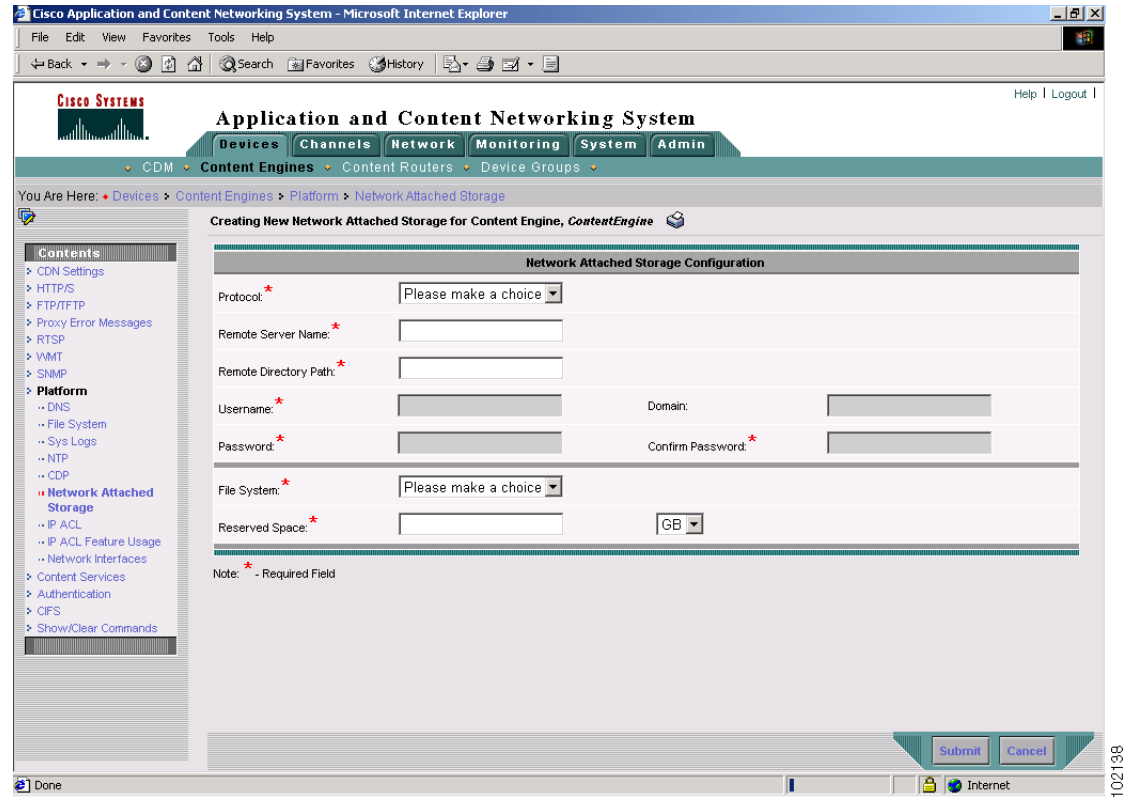
If a share is attached to a Content Engine as network-attached storage, you should *not* modify the share content, or use the share for other purposes. For example, you should not create arbitrary subdirectories under the share and put content in them. Moreover, the subdirectories of the share should not be exported and shared either by ACNS Content Engines or by arbitrary NFS/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 on 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 > Content Engines**. The Content Engines 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 **Platform > Network Attached Storage**. 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 A-2](#).)

Figure A-2 Creating New Network Attached Storage Window



- Step 5** Choose an option from the **Protocol** drop-down list to specify whether you wish 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 > Content Engines**. The Content Engines 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 **Platform > Network Attached Storage**. The Network Attached Storage for Content Engine window appears.
  - Step 4** Click the **Edit** icon next to the NAS that you want to delete. The Modifying Network Attached Storage window appears.
  - Step 5** Click the **Trash** icon to delete the NAS. 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 ACNS 5.1 syntax for this command is:

```
CE(config)# [no] network-filesystem client nfs remote_server remote_dir [mediafs | cdnfs]
reserved-disk-space reserved-disk-space
```

```
CE(config)# [no] network-filesystem client cifs remote_server remote_dir [mediaf | cdnfs]
reserved-disk-space reserved-disk-space username username password pswd [domain domain]
```

The attachment of a NAS share takes effect after the command is issued. 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
- Real proxy

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 the NAS mediafs is detached:

- WMT proxy
- RealProxy



### Note

When you detach NAS mediafs storage, 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. Then the NAS 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 demonstrate the syntax and usage of the **network-filesystem** command.

In this example, the remote directory “/pub/cemedia1” on NFS server 128.197.162.144 is attached as mediaafs storage on the Content Engine.

```
CE1(config)# network-filesystem client nfs 128.197.162.44 /pub/cemedia1/ mediaafs
reserved-disk-space 10.5GB
```

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

```
CE2(config)# network-filesystem client nfs 128.197.162.44 /pub/cemedia2/ mediaafs
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 128.197.162.44 /pub/cecdn1/ cdnfs
reserved-disk-space 30GB
```

The following examples attach mediaafs and cdnfs storage, respectively, from the CIFS server 128.107.162.55, with the username and password provided for authentication purposes.

```
CE4(config)# network-filesystem client cifs 128.197.162.55 /pub/cemedia/ mediaafs
reserved-disk-space 40.5GB username cifs_ceusr password a#%^&*
```

```
CE5(config)# network-filesystem client cifs 128.197.162.55 /pub/cecdn/ cdnfs
reserved-disk-space 50.5GB username cifs_ceusr password a#%^&*
```

## When Errors Occur

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 the error message “this NAS share is being used by another CE: <CE-name> from date <date>”, and you are prompted to use the **network-filesystem preempt EXEC** command before reattempting to attach the NAS.

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

For error recovery from these two rare situations, use the **network-filesystem preempt EXEC** command to preempt the NAS share from the mistaken “other” Content Engine. The preempt command will do nothing if the Content Engine itself has already owned the NAS share.

For example:

```
CE# network-filesystem client nfs 128.107.162.44 /pub/cecdn1/ preempt
```

```
CE# network-filesystem client cifs 128.107.162.55 /pub/cemedia1/ 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 give up 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 on-disk pre-positioned content. The synchronization can be done right before the NAS share is detached from Content Engine, or anytime after the NAS share is detached. Acquisition and distribution pre-detaching synchronization is mandatory when a NAS `cdnfs` is to be detached and is executed when you use the **no network-filesystem** command to detach the NAS share. If acquisition and distribution pre-detaching synchronization fails for whatever reason, post-detaching synchronization can be performed with the **acquisition-distribution database-cleanup EXEC** mode 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. The rough speed estimation is 1 hour per 10,000 objects. If you only need to detach a NAS share temporarily, then synchronization might 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 run this task. 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 5.1 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 `cdnfs` and 10 minutes for `mediafs`), the NAS health prober assigns the NAS share a “failed” status, and the ACNS 5.1 network stops using it. After 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 the NAS Device Configuration and Statistics

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

- Step 1** In the Content Distribution Manager GUI, choose **Devices > Content Engines**.
- 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 **CDN Settings > Status**. The View Network Configuration window appears.
- Step 4** 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 the NAS device usage statistics, follow these steps:

---

- Step 1** In the Content Distribution Manager GUI, choose **Devices > Content Engines**.
- 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 **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 the NAS device statistics from the CLI, use the following **show** commands:

```
CE# show statistics cdnfs
```

```
CE# show statistics mediafs
```

---

■ Mounting to a Network Attached Storage Device