

# PlasticFS

## Reference Manual

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This document describes PlasticFS version 1.14  
and was prepared 1 December 2012.

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**NAME**

PlasticFS – The Plastic File System

**DESCRIPTION**

The Plastic File System uses FUSE to manipulate what the file system looks like for user programs. These virtual file systems exist in user space, and no kernel hacks or modules (other than FUSE) are required.

`dos` The *dos* filter may be used to simulate an 8.3 DOS filesystem.

`downcase`

The *downcase* filter may be used to make file names appear to be in lower-case when listed. File names are case-insensitive when being opened, *etc.*

`log` The *log* filter may be used to transparently log file system access, similar to the *strace(1)* program.

`nocase` The *nocase* filter make be used to make file names appear to be case-insensitive when being opened, *etc.*

`shortname`

The *shortname* filter may be used to simulate file systems with shorter filenames.

`smartlink`

The *smartlink* filter make be used to expand environment variables in symbolic links, using the usual *\$name* notation.

`titlecase` The *downcase* filter may be used to make file names appear to be capitalized when listed. File names are case-insensitive when being opened, *etc.*

`upcase` The *upcase* filter may be used to make file names appear to be in upper-case when listed. File names are case-insensitive when being opened, *etc.*

`viewpath`

The *viewpath* filter may be used to union all the directory trees in a view path, so that they appear to be a single directory tree.

Filters may be piped on into the next to form powerful combinations.

It is possible to extend PlasticFS with loadable file system filter modules from shared object files.

The implementation of PlasticFS is strongly tied to GNU Libc, so it is probably Linux specific.

**ARCHIVE SITE**

The latest version of *plasticfs* is available on the Web from:

URL:	<a href="http://plasticfs.sourceforge.net/">http://plasticfs.sourceforge.net/</a>	
File:	<a href="#">plasticfs.html</a>	# the plasticfs page
File:	<a href="#">plasticfs-1.14.README</a>	# Description, from the tar file
File:	<a href="#">plasticfs-1.14.lsm</a>	# Description, LSM format
File:	<a href="#">plasticfs-1.14.tar.gz</a>	# the complete source
File:	<a href="#">plasticfs-1.14.pdf</a>	# Reference Manual

**BUILDING PlasticFS**

Full instructions for building *plasticfs* may be found in the *BUILDING* file included in this distribution.

**USING PlasticFS**

See *plasticfs(3)* for how to make use of PlasticFS on your system.

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*plasticfs* version 1.14

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## RELEASE NOTES

This section details the various features and bug fixes of the various releases. For excruciating and complete detail, and also credits for those of you who have generously sent me suggestions and bug reports, see the *etc/CHANGES.\** files.

### Version 1.14 (2012-Dec-01)

- Some spelling errors have been fixed in the manual pages.
- The Debian packaging has been greatly improved.
- A number of improvements have been made to the build system.
- The PlasticFS project now uses libexplain to report errors.  
<http://libexplain.sourceforge.net/>

### Version 1.13 (2012-May-22)

- This release is mostly minor fixes to the web site.

### Release 1.12 (2010-Oct-18)

- The PlasticFS project is now a FUSE file system. It is no longer available as an LD\_PRELOAD “shared library”.
- The *getxattr(2)*, *setxattr(2)*, *listxattr(2)* and *removexattr(2)* methods are now all fully supported.
- There is a new read-only filter.

### Release 1.11 (2007-Jul-07)

- The problems with tabs in the Makefile hve been fixed.

### Release 1.10 (2007-Jul-06)

- The following SourceForge bugs have been fixed: 1120110, 1747933, 1747971, and 1748056.
- A problem with the `errno` symbol has been fixed.
- Build problems on machines without `<bits/libc-lock.h>` have been fixed to use pthreads locks instead.
- Build problems on 64-bit machines have been fixed.
- The project has been updated to use version 3 of the GNU GPL.
- There is better use of multithreaded I/O in the open hook.

### Release 1.9 (2004-Jul-06)

- A bug has been fixed in the viewpath filter’s `readdir` function. It now correctly deals with `.whiteout` and removed entries.
- The code has been updated to compile under GCC 3.4.
- A bug has been fixed in the 64-bit file locking. Not all *fcntl(2)* commands were handled.

### Release 1.8 (2003-Jan-16)

- Notes have been added about overcoming the glibc 2.x hidden symbols problem. See the BUILDING file or the Reference Manual for more information.

### Release 1.7 (2003-Mar-03)

- Several GCC 3.2 build problems have been fixed.

### Release 1.6 (2003-Feb-28)

- A bug has been fixed in the viewpath filter which allowed removed (whiteout-ed) files to be opened, even when `ls` couldn’t see them.
- A bug has been fixed in the reference counted string code, which resulted in dereferencing uninitialized pointers, resulting in segfaults.

### Release 1.5 (2003-Feb-03)

- The bug on Debian 2.2 (and possibly other distributions) which resulted in a segfault has been fixed.
- Intercept have been added for the *truncate(2)* and *ftruncate(2)* system calls.

- There is a new `shortname` file system filter which may be used to simulate file systems with short file names. By default it imitates V7 unix, with 14 character filenames.
- There is a new `dos` file system filter, which may be used to make a Unix file system look like an 8.3 DOS file system.

#### **Release 1.4 (2003-Jan-24)**

- An attempt has been made to fix a problem which sometimes caused `plasticfs::getcwd` to segfault. It appears that it may have been caused by over-zealous optimization by the compiler, so the addition of some strategic "volatile" keywords is an attempt to fix it.
- Several build problems have been fixed.
- A problem has been fixed which caused recent versions of GNU `find` to work incorrectly.
- The problem which caused the `chroot` filter to constantly print an error message has been fixed.
- A `stats(2)` intercept has been added, so the `df(1)` command is happier.
- The `nocase`, `upcase`, `downcase` and `titlecase` file system filters have been added. These filters cause filename to appear to be case-insensitive. In addition, each of the filters except `nocase` converts the characters of filenames according to their names (upper-case, lower-case and capitalized, respectively).

#### **Release 1.3 (2003-Jan-16)**

- A bug has been fixed with the handling of "." in pathnames.
- The `chroot` file system filter has been added. This may be used to change the apparent root of the file system.
- A bug has been fixed which caused the PLASTICFS environment to be parsed exactly backwards.
- The viewpath copy-on-write functionality now only copies regular files. Devices are not copied when opened for writing. Also, file copies are unlinked if there was any problem with the copying, rather than leave incomplete copies to confuse future operations.

#### **Release 1.2 (2003-Jan-13)**

- Code has been added so that if the effective user ID is `root` (0) then PlasticFS does absolutely nothing; the program sees the real file system, not the plastic one. This is to prevent PlasticFS being used to subvert security.
- The viewpath copy-on-write functionality now preserves the file's modification time and last access time.
- An intercept has been added for the `access(2)` system call.
- A bug in the viewpath filter has been fixed which caused it to have problems removing directories.
- A bug in the viewpath filter has been fixed which caused it to incorrectly follow symbolic links *outside* the mount point.
- An intercept has been added for the `execve(2)` system call, and the `execl(3)`, `execlp(3)`, `execle(3)`, `execv(3)` and `execvp(3)` functions.
- The `smartlink` filter has been added, which expands shell variables in symbolic links.
- Intercepts have been added for the `utime(2)`, `lutime(2)` and `futime(2)` system calls.

#### **Release 1.1 (2003-Jan-08)**

First public release.

**NAME**

PlasticFS – The Plastic File System

**SPACE REQUIREMENTS**

You will need about 3MB to unpack and build the *PlasticFS* package. Your milage may vary.

**BEFORE YOU START**

There are a few pieces of software you may want to fetch and install before you proceed with your installation of PlasticFS.

## GNU Groff

The documentation for the *PlasticFS* package was prepared using the GNU Groff package (version 1.14 or later). This distribution includes full documentation, which may be processed into PostScript or DVI files at install time – if GNU Groff has been installed.

## GCC

You may also want to consider fetching and installing the GNU C Compiler if you have not done so already. This is not essential. PlasticFS was developed using the GNU C++ compiler, and the GNU C++ libraries.

**Note:** There appear to be problems with GCC 3.0 and later. If you are experiencing problems, try turning off all optimization. If you have the option, use one of the older (2.96) versions.

## GNU Libtool

The shared library is created using GNU Libtool. It is assumed to be installed in the \$PATH.

The GNU FTP archives may be found at [ftp.gnu.org](http://ftp.gnu.org), and are mirrored around the world.

Boost The boost library is needed, <http://boost.org/>

## LibExplain

The libexplain error reporting library is needed, <http://libexplain.sourceforge.net/>

**SITE CONFIGURATION**

The **PlasticFS** package is configured using the *configure* program included in this distribution.

The *configure* shell script attempts to guess correct values for various system-dependent variables used during compilation, and creates the *Makefile* and *include/config.h* files. It also creates a shell script *config.status* that you can run in the future to recreate the current configuration.

Normally, you just *cd* to the directory containing *PlasticFS*'s source code and then type

```
% ./configure
...lots of output...
%
```

If you're using *csh* on an old version of System V, you might need to type

```
% sh configure
...lots of output...
%
```

instead to prevent *csh* from trying to execute *configure* itself.

Running *configure* takes a minute or two. While it is running, it prints some messages that tell what it is doing. If you don't want to see the messages, run *configure* using the quiet option; for example,

```
% ./configure --quiet
%
```

To compile the **PlasticFS** package in a different directory from the one containing the source code, you must use a version of *make* that supports the *VPATH* variable, such as *GNU make*. *cd* to the directory where you want the object files and executables to go and run the *configure* script. *configure* automatically checks for the source code in the directory that *configure* is in and in *..* (the parent directory). If for some reason *configure* is not in the source code directory that you are configuring, then it will report that it can't find the source code. In that case, run *configure* with the option *--srcdir=DIR*, where *DIR* is the directory that contains the source code.

By default, *configure* will arrange for the *make install* command to install the **PlasticFS** package's files in */usr/local/bin*, and */usr/local/man*. There are options which allow you to control the placement of these

files.

`--prefix=PATH`

This specifies the path prefix to be used in the installation. Defaults to `/usr/local` unless otherwise specified.

`--exec-prefix=PATH`

You can specify separate installation prefixes for architecture-specific files. Defaults to `$(prefix)` unless otherwise specified.

`--bindir=PATH`

This directory contains executable programs. On a network, this directory may be shared between machines with identical hardware and operating systems; it may be mounted read-only. Defaults to `$(exec_prefix)/bin` unless otherwise specified.

`--mandir=PATH`

This directory contains the on-line manual entries. On a network, this directory may be shared between all machines; it may be mounted read-only. Defaults to `$(prefix)/man` unless otherwise specified.

`configure` ignores most other arguments that you give it; use the `--help` option for a complete list.

On systems that require unusual options for compilation or linking that the *PlasticFS* package's `configure` script does not know about, you can give `configure` initial values for variables by setting them in the environment. In Bourne-compatible shells, you can do that on the command line like this:

```
$ CXX='g++ -traditional' LIBS=-lposix ./configure
...lots of output...
$
```

Here are the *make* variables that you might want to override with environment variables when running `configure`.

Variable: CXX

C++ compiler program. The default is `c++`.

Variable: CPPFLAGS

Preprocessor flags, commonly defines and include search paths. Defaults to empty. It is common to use `CPPFLAGS=-I/usr/local/include` to access other installed packages.

Variable: INSTALL

Program to use to install files. The default is `install` if you have it, `cp` otherwise.

Variable: LIBS

Libraries to link with, in the form `-lfoo -lbar`. The `configure` script will append to this, rather than replace it. It is common to use `LIBS=-L/usr/local/lib` to access other installed packages.

If you need to do unusual things to compile the package, the author encourages you to figure out how `configure` could check whether to do them, and mail diffs or instructions to the author so that they can be included in the next release.

## BUILDING PlasticFS

All you should need to do is use the

```
% make
...lots of output...
%
```

command and wait.

If you have GNU Groff installed, the build will also create a *etc/reference.ps* file. This contains the README file, this BUILDING file, and all of the man pages.

You can remove the program binaries and object files from the source directory by using the

```
% make clean
...lots of output...
%
```

command. To remove all of the above files, and also remove the *Makefile* and *include/config.h* and *config.status* files, use the

```
% make distclean
...lots of output...
%
```

command.

The file *etc/configure.in* is used to create *configure* by a GNU program called *autoconf*. You only need to know this if you want to regenerate *configure* using a newer version of *autoconf*.

## TESTING PlasticFS

The *PlasticFS* package comes with a test suite.

The test *will* fail if you run them as *root*. They are supposed to, because PlasticFS does nothing for *root*, it's a security thing (see *plasticfs(3)* for more information). Run the tests as a normal user.

To run the test suite, use the command

```
% make sure
...lots of output...
Passed All Tests
%
```

The tests take a few seconds each, with a few very fast, and a couple very slow, but it varies greatly depending on your CPU.

If all went well, the message

```
Passed All Tests
```

should appear at the end of the make.

## INSTALLING PlasticFS

As explained in the *SITE CONFIGURATION* section, above, the *PlasticFS* package is installed under the */usr/local* tree by default. Use the `--prefix=PATH` option to *configure* if you want some other path. More specific installation locations are assignable, use the `--help` option to *configure* for details.

All that is required to install the *PlasticFS* package is to use the

```
% make install
...lots of output...
%
```

command. Control of the directories used may be found in the first few lines of the *Makefile* file and the other files written by the *configure* script; it is best to reconfigure using the *configure* script, rather than attempting to do this by hand.

## GETTING HELP

If you need assistance with the *PlasticFS* package, please do not hesitate to contact the author at

```
Peter Miller <pmiller@opensource.org.au>
```

Any and all feedback is welcome.

When reporting problems, please include the version number given by the

```
% PlasticFS -version
PlasticFS version 1.14.D001
...warranty disclaimer...
%
```

command. Please do not send this example; run the program for the exact version number.

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*PlasticFS* version 1.14

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Version 3, 29 June 2007

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**NAME**

plasticfs-mount – mount a plastic file system

**SYNOPSIS**

**plasticfs-mount** [ *option...* ] *filter-spec mount-point*  
**plasticfs-mount** -V

**DESCRIPTION**

The *plasticfs-mount* program is used to mount plastic file systems.

For details of the *filter-spec* command line argument, see the *File Systems* section, below. You will almost always need to quote this argument to protected shell special characters.

The *mount-point* command line argument must be a directory, and it must be empty.

**OPTIONS**

The following options are understood:

- D Increase the level of debug output. May be specified more than one for increasingly verbose output.
- d Have the underlying FUSE machinery produce debug output. This option also implies the -f option.
- f Have the daemon run in the foreground, rather than forking and detaching a separate process.
- h Print some help information.
- o *mount-options*  
This option may be used to pass additional mount options to the underlying FUSE implementation. To specify multiple options, separate with commas. You may need to quote the options to protect shell special characters. You may use this option more than once.
- r Mount the file system read-only.
- V  
Print the version of the *plasticfs-mount* program being executed.

All other options will produce a diagnostic error.

**THE FILE SYSTEMS**

This section describes the various file systems and filters you can mount. You will almost always need to quote the *filter-spec* on the command line to protected shell special characters.

**The Filter Specification**

The *filter-spec* command line argument is a string which will be parsed to figure out what you want the Plastics File System to do for you. It is possible to apply more than one filter to a file system.

For example, to make a file system appear to have case-insensitive converted-to-uppercase file names, the *filter-spec* would look like this:

```
toupper | /some/where
```

Each filter is separated by “pipe” (|) characters. You chain filters together.

To interpret filter specifications, read them from left-to-write for what would happen to a write action, and read them right-to-left for what would happen for a read operation.

If you get very fancy, it may occasionally to use “(” parentheses “)” to group your filters to avoid ambiguity.

**Endpoints**

Endpoints appear as the last (right-hand) element of any *filter-spec*.

**Loopback**

The commonest filter end-point is a directory specified with an absolute path. If only an absolute path appears as the *filter-spec* this behaves as a loop-back mount. It is defined here because it is going to appear on the right-hand end of almost every *filter-spec* you write.

## View Path

It is possible to specify a set of directories as a “view path”. These directories are “unioned” together and are presented as a single unified directory tree. Operations which modify files are always performed in the first directory specified, copy the files if necessary.

The *filter-spec* would look something like this:

```
viewpath /dir1 /dir2 /dir3
```

If files are to be modified, the first directory tree specified must be writable; all subsequent directories may be read-only.

When accessing files, they are searched for in all of the directories specified, in the order specified. The first found will be used. Files are created and modified in the first directory only. If files from directory trees later in the view path are to be modified, they are first copied into the first directory tree in the view path before the file is opened for writing.

Directory listings are assembled from the directory contents of the corresponding directory in each of the view path directory trees. Duplicates are suppressed.

### Removed Files:

If a file is removed from the view, and it appears later in the view path than the first directory (*dir1*), it is added to a “whiteout” file, and the file effectively disappears. The true file is not affected; this is because *all* modifications *only* occur in the first directory (*dir1*) and later directories are treated as read-only.

When a file is unlinked, its name is added to the `.whiteout` file (in the first directory tree of the view path, `.whiteout` files in later directory trees of the view path are ignored). It’s a simple text file containing one filename per line. Each directory has one (if needed). Some jiggery-pokery is required to suppress the names of unlinked files returned by `readdir(3)`, but since we needed jiggery-pokery to suppress duplicates anyway, it is actually very little extra code. When a file is created, its name is removed from the `.whiteout` file.

I’m told this is the way the BSD union filesystem works, too.

Removing the `.whiteout` file is usually a bad idea, because removed files from further along the view path will mysteriously reappear.

### Advanced Use:

You don’t have to use simple directories when building the view path. The grammar will accept three filter chains; the simplest filter chain, of course, being just a directory name.

The *filter-spec* must end in one of the above endpoints. Anything else will result in a syntax error.

## Filters

This section defines filters you can apply to endpoints, or even chain together.

### dos

The *dos* file system filter is used to make the files under *directory* appear to be a DOS file system with 8.3 filenames (eight characters before the first dot, three characters after the dot). Only alphanumerics, minus (–) and dot (.) are allowed in filenames.

When files are searched for (*open(2)*, *lstat(2)*, *etc*) they will be searched for ignoring the case of the characters in their names.

When files are created, the case of the characters presented will be preserved into the deeper file system, although they will appear in upper-case when listed via the filter.

The filenames will be converted to DOS-like names when reading directory contents (via *ls(1)*, *readdir(3)*, *etc*).

### Text vs Binary

This file system *does not* alter file contents. File contents are treated just as they are for all Unix files.

It is a possible future extension to The Plastic File System to implement *dos2unix* and *unix2dos* filters. Whether you would want it combined with the DOS *file name* filter depends on what you are trying to simulate. However, this is complicated by a lack of `O_BINARY`, so there is no hint to *open(2)* as to whether the file is expected to be text or binary.

**Example:**

You wish to make a CD-Rom for use on a DOS-like operating system, and you don't want to see all of the warnings *mkisofs(1)* is going to spew out. The *filter-spec* would look like this:

```
"dos | /tmp/example"
```

and the commands would look like this:

```
mkdir /tmp/mount-point
plasticfs-mount "dos | /tmp/example" /tmp/mount-point
mkisofs -o /tmp/example.iso /tmp/mount-point
plasticfs-umount /tmp/mount-point
rmdir /tmp/mount-point
```

will make *mkisofs(1)* think the file names are already in the correct DOS-like form. Note that the *mkisofs(1)* file name mangling is done in a very different way to that done by *plasticfs(3)*.

downcase

The *downcase* file system filter is used to make the files appear to be lower-case.

When files are searched for (*open(2)*, *lstat(2)*, etc) they will be searched for ignoring the case of the characters in their names.

When file are created, the case of the characters presented will be preserved into the deeper file system, although they will appear in lower-case when listed via the filter.

The case of filenames will be converted to lower-case when reading directory contents (via *ls(1)*, *readdir(3)*, etc).

**Example:**

If you have a PC floppy mounted at `/mnt/floppy` and all of the file names are inconveniently in upper-case. To make the filenames appear to be lower-case, the *filter-spec* would look like this:

```
"down-case | /mnt/floppy"
```

and the commands would look like this:

```
mkdir /tmp/mount-point
plasticfs-mount "down-case | /mnt/floppy" /tmp/mount-point
```

command to have a a lower-case interpretation available within the `/tmp/mount-point` directory. Use the *plasticfs-umount* command when you are done with it.

log

The PlasticFS *log* filter is used to transparently log file system accesses to the named file. The file is created if it does not exist. Each file system access will append a line of text to the log file.

You may specify more than one log filter in your *filter-spec*. This is useful to see the “before” and “after” effects of other PlasticFS filters.

**Example:**

If you want to see every thing that *make(1)* does to a particular directory, `$SRC` you could use a *filter-spec* like this:

```
"log /tmp/make.log.txt | $SRC"
```

and commands like this:

```
mkdir /tmp/mount-point
plasticfs-mount "log /tmp/make.log.txt | $SRC" \
/tmp/mount-point
cd /tmp/mount-point
make
cd
plasticfs-umount /tmp/mount-point
```

```
less /tmp/make.log.txt
```

command to have all file accesses logged.

#### nocase

The *nocase* file system filter is used to make the files under *directory* appear to be case-insensitive.

When files are searched for (*open(2)*, *lstat(2)*, *etc*) they will be searched for ignoring the case of the characters in their names.

When file are created, the case of the characters presented will be preserved.

The case of filenames will be unaltered when reading directory contents (via *ls(1)*, *readdir(3)*, *etc*).

#### read-only

The *read-only* filter may be used to make a file system appear to be read only, refusing to modify its contents, and reporting EROFS to all modification attempts. Using the `-r` option would be more efficient.

#### shortname

The *shortname* file system filter is used to make the files under *directory* appear to have a limit of *length* characters. The length limit defaults to 14, to simulate Version 7 Unix.

When files are created, the full filename presented will be preserved into the deeper file system.

The filenames will be shortened when reading directory contents (via *ls(1)*, *readdir(3)*, *etc*).

The *filter-spec* includes an optional size:

```
short-name [ size ] | filter
```

#### Example:

If you want to simulate a Version 7 Unix file system, use a command like

```
mkdir /tmp/mount-point
plasticfs-mount "short-name | /tmp/example" /tmp/mount-point
cd /tmp/mount-point
```

To simulate PRIMOS 30 character case-insensitive filenames, use a command like

```
mkdir /tmp/mount-point
plasticfs-mount "short-name 30 | nocase | /tmp/example" \
/tmp/mount-point
cd /tmp/mount-point
```

Note that this does *not* simulate the PRIMOS “>” separators, you will have to use Unix “/” separators.

Use the *plasticfs-umount(1)* command when you are done.

#### smartlink

The *smartlink* file system filter expands environment variables in symbolic links when files are being accessed.

This is a cute idea from DG/UX. It is done automatically by The DG/UX libc, they call them “e-links”.

#### Example:

Say you wanted to support several architectures from the same binary directory

```
/some/package/bin/
  linux/
    progs
  solaris/
    progs
  bsd/
    progs
```

If you add a symbolic link

```
cd bin
ln -s '$ARCH' /some/package/bin/arch
```

(note the *single* quotes).

```
mkdir /tmp/bin
plasticfs-mount "smart-link | /some/package/bin" \
  /tmp/bin
PATH=${PATH}:/tmp/bin/arch
```

This assumes the the ARCH environment variable has been appropriately for each system *before* the *plasticfs-mount(1)* command is called. This is because it is the *plasticfs-mount(1)* command's environment which is used to look-up environment variables, **not** the file system user's environment variables.

#### titlecase

The *titlecase* file system filter is used to make the files under *directory* appear to have each word within them capitalized (first letter upper-case and subsequent letters lower-case).

When files are searched for (*open(2)*, *lstat(2)*, *etc*) they will be searched for ignoring the case of the characters in their names.

When file are created, the case of the characters presented will be preserved into the deeper file system, although they will appear in capitalized when listed via the filter.

The case of filenames will be capitalized when reading directory contents (via *ls(1)*, *readdir(3)*, *etc*).

#### upcase

The *upcase* file system filter is used to make the files under *directory* appear to be upper-case.

When files are searched for (*open(2)*, *lstat(2)*, *etc*) they will be searched for ignoring the case of the characters in their names.

When file are created, the case of the characters presented will be preserved into the deeper file system, although they will appear in upper-case when listed via the filter.

The case of filenames will be converted to upper-case when reading directory contents (via *ls(1)*, *readdir(3)*, *etc*).

```
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#
```

## COPYRIGHT

*plasticfs* version 1.14

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**NAME**

platicfs-umount – unmount plastic file systems

**SYNOPSIS**

**platicfs-umount** [ *option...* ] *filename...*

**platicfs-umount -Help**

**platicfs-umount -VERSion**

**DESCRIPTION**

The *platicfs-umount* program is used to unmount plastic file systems mounted with the *platicfs-mount(1)* command.

**OPTIONS**

The following options are understood:

**-V**

Print the version of the *platicfs-umount* program being executed.

All other options will produce a diagnostic error. ## plasticfs - The Plastic File System # Copyright (C) 2010 Peter Miller ## This program is free software; you can redistribute it and/or modify # it under the terms of the GNU General Public License as published by # the Free Software Foundation; either version 3 of the License, or (at # your option) any later version. ## This program is distributed in the hope that it will be useful, # but WITHOUT ANY WARRANTY; without even the implied warranty of # MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE. See the GNU # General Public License for more details. ## You should have received a copy of the GNU General Public License # along with this program. If not, see <<http://www.gnu.org/licenses/>>. #

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**NAME**

How to add a new file system filter

**DESCRIPTION**

This section describes how to add a new file system filter. It's mostly a set of reminders for the maintainer. If you want a file system filter added to the distribution, use this method and e-mail the maintainer a patch (generated with `diff -u -r`, usually) and it can be added to the sources if appropriate.

**New Files**

The following files need to be create for a new file system filter.

lib/plasticfs/filter/*name*.h

This is the class declaration. You need to override the appropriate methods from the `plasticfs_filter` class; care should be taken to ensure the signatures match exactly. Override as few methods as possible.

lib/plasticfs/filter/*name*.cc

This is the class definition for the above file.

man/man1/plasticfs\_*name*.1

This file describes the new file system filter. Take a look at the other files in the same directory for examples.

**Modified Files**

The following files need to be updated to mention the new file system filter.

etc/README.man

Mention the new file system filter in the section of this file which describes the supported file system filters.

etc/plasticfs.html

Mention the new file system filter in the section of this file which describes the supported file system filters.

include/plasticfs/parse.cc

Add the new file system filter to the table of filter names and their factory methods.

Makefile

Actually, the system the maintainer automatically generates this file, but if you aren't using Aegis you will need to edit this file for your own use.

**Use of C++**

You probably noticed that PlasticFS is written in C++. There are some things you have to *avoid* using.

- You can't use global constructors and destructors. This requires significant machinery to make them work correctly for loadable modules (not impossible, I just haven't found any real need to introduce the machinery). This means all of your static and global variables need to be of simple types (integers or pointers).
- You can't use `iostreams`. They call out to functions that PlasticFS intercepts, with the result that classes which use `iostreams` get themselves into infinite recursions. Just say no.
- You can't use `stdio`, either, and for the same reasons. General input and output are provided by the `input` and `output` class heirarchies.
- You can't use templates. We don't have the usual linker stage which resolves their non-inline methods into code.
- You can't use any of the Standard Template Library (STL). It uses templates (obviously), and it's failure cases use `iostreams` (not so obviously).
- You can't use exceptions. All of the functions we intercept are C functions, and they shall not throw *anything*.

**IDEAS**

The range of possible file systems is enormous. Here are just a few ideas...

trash A trash-can file system filter could move (copy) deleted files to \$(HOME)/.trash so that they can be retrieved if you change your mind.

cache A caching file system filter could transparently copy files from a remote directory tree to a local copy. Useful for dealing with slow or unreliable networks.

iconv An iconv file system filter could map file names from one character set encoding to another.

loopback

A file system filter which acts like a loopback mount.

hide A file system filter which hides a directory tree. (May be combined with loopback to appear to move a directory tree.)

dos A file system that appears to have 8.3 filenames.

crop A file system that appears to have short (e.g. V7 unix 14 character) filenames.

RCS

A file system which presents files as the head revision of RCS files, and accesses other versions as *filename@@version*, much like ClearCase does. E.g.

```
diff main.c@@1.1 main.c@@1.2
```

You could even have automatic *ci(1)* on close if opened for writing. Possible for CVS and SCCS, etc, as well.

*O(log n)* A file system that transparently turns *something* into *s/so/something* for use with huge mailservers (etc). Number of layers configurable.

dos2unix

It is possible to implement *dos2unix* and *unix2dos* filters. This is complicated by a lack of `O_BINARY`, so there is no hint to *open(2)* as to whether the file is expected to be text or binary.

zlib A file system that transparently gunzips files.

ftp And, of course, the transparent FTP access file system is never far from such a list.

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