

11. Assignment (optional) Filesystems

Issue: July 6—Due: July 13

Exercise 17: Filesystem using ROT13 on textual files

10 Points

Implement a filesystem in userspace which uses the ROT13 substitution cipher¹ whenever it stores a textual file (for simplicity we simply use suffix `.txt` as indicator).

In the tutorial a short introduction to the Filesystem in Userspace² Framework will be given. Your filesystem is based on one of the example filesystems provided with the FUSE code³.

To get the examples up and running we did the following:

```
$ ssh holupire@mond01.inf.uni-konstanz.de
$ mkdir A11 && cd A11
$ ftp http://www.inf.uni-konstanz.de/dbis/teaching/ss09/os/fuse-2.7.4.tar.gz
$ tar xzf fuse-2.7.4.tar.gz
$ cd fuse-2.7.4/
$ ./configure
$ (cd lib && make)
$ cd example/ && make
$ mkdir -p /tmp/holupire/mnt
$ ./hello /tmp/holupire/mnt/
$ mount
[...]
lt-hello on /tmp/holupire/mnt type fuse.lt-hello (rw,nosuid,nodev,user=holupire)
$ cat /tmp/holupire/mnt/hello
Hello World!
$ fusermount -u /tmp/holupire/mnt/
```

Your filesystem will be based on `fuse-2.7.4/example/fusexmp.c`. In fact, for most of the work it will use the *real* underlying filesystem, i.e., the FUSE filesystem will be mounted on `/tmp/mnt` and use `/tmp/backing` as its storage. To achieve this, do something like the following:

```
$ mkdir -p /tmp/holupire/mnt && mkdir /tmp/holupire/backing
$ ./fusexmp -omodule=subdir,subdir=/tmp/holupire/backing /tmp/holupire/mnt/
```

Your task is to watch the filesystem activity and perform ROT13 *encryption* whenever a file with suffix `.txt` is stored.

Hint: It is often useful to get debug output from your filesystem (when your code writes to `stderr`). Mount your filesystem with either the `-d` (FUSE debug output is given as well) or the `-f` flag. The filesystem stays in foreground and prints to the terminal. Of course, to operate on the mounted instance you have to use a different shell.

¹<http://en.wikipedia.org/wiki/ROT13>

²<http://fuse.sourceforge.net/>

³<http://www.inf.uni-konstanz.de/dbis/teaching/ss09/os/fuse-2.7.4.tar.gz>