

joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Now corrupt files so that 2 files point so same block"
```

```
Now corrupt files so that 2 files point so same block
```

```
joe@it4100-a1-sample:~$ █
```

joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ mount | grep sda
```

```
/dev/sda1 on / type ext4 (rw,relatime,errors=remount-ro,data=ordered)
```

```
/dev/sda3 on /home type ext4 (rw,relatime,data=ordered)
```

```
/dev/sda5 on /home/joe/mymounts/d1 type ext4 (rw,relatime,data=ordered)
```

```
/dev/sda6 on /home/joe/mymounts/d2 type ext4 (rw,relatime,data=ordered)
```

```
/dev/sda7 on /home/joe/mymounts/d3 type ext4 (rw,relatime,data=ordered)
```

```
joe@it4100-a1-sample:~$ echo "See what is mounted"
```

```
See what is mounted
```

```
joe@it4100-a1-sample:~$ █
```

joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Here is a file" | sudo tee mymounts/d1/file1.txt
```

Here is a file

```
joe@it4100-a1-sample:~$ cat mymounts/d1/file1.txt
```

Here is a file

```
joe@it4100-a1-sample:~$ █
```

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Another awesome file" | sudo tee mymounts/d1/file2.txt
```

Another awesome file

```
joe@it4100-a1-sample:~$ cat mymounts/d1/file2.txt
```

Another awesome file

```
joe@it4100-a1-sample:~$ █
```

```
joe@it4100-a1-sample:~$ echo "We will corrupt file2 to point at file1"
```

```
We will corrupt file2 to point at file1
```

```
joe@it4100-a1-sample:~$ █
```

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

joe@it4100-a1-sample:~\$ sudo debugfs -b 1024 /dev/sda5 -w

debugfs 1.42.13 (17-May-2015)

debugfs: █

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

debugfs: stat file1.txt

```
Inode: 12   Type: regular   Mode: 0644   Flags: 0x80000
Generation: 1747398615   Version: 0x00000001
User:      0   Group:      0   Size: 15
File ACL: 0   Directory ACL: 0
Links: 1   Blockcount: 2
Fragment:  Address: 0   Number: 0   Size: 0
ctime: 0x58825ac4 -- Fri Jan 20 11:45:24 2017
atime: 0x58825ac6 -- Fri Jan 20 11:45:26 2017
mtime: 0x58825ac4 -- Fri Jan 20 11:45:24 2017
```

EXTENTS:

(0):8705

(END)



⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

debugfs: remember address 8705 (that's where the file is at)█

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

debugfs: mi file2.txt

debugfs: mi file2.txt

Mode	[0100644]
User ID	[0]
Group ID	[0]
Size	[21]
Creation time	[1484937946]
Modification time	[1484937946]
Access time	[1484937950]
Deletion time	[0]
Link count	[1]
Block count high	[0]
Block count	[2]
File flags	[0x80000]
Generation	[0x68272fd8]
File acl	[0]
High 32bits of size	[0]
Fragment address	[0]
Direct Block #0	[127754]
Direct Block #1	[4]
Direct Block #2	[0]
Direct Block #3	[0]
Direct Block #4	[1]
Direct Block #5	[8452] 8705

```
Link count [1]
Block count high [0]
Block count [2]
File flags [0x80000]
Generation [0x68272fd8]
File acl [0]
High 32bits of size [0]
Fragment address [0]
Direct Block #0 [127754]
Direct Block #1 [4]
Direct Block #2 [0]
Direct Block #3 [0]
Direct Block #4 [1]
Direct Block #5 [8452] 8705
Direct Block #6 [0]
Direct Block #7 [0]
Direct Block #8 [0]
Direct Block #9 [0]
Direct Block #10 [0]
Direct Block #11 [0]
Indirect Block [0]
Double Indirect Block [0]
Triple Indirect Block [0]
```

debugfs: █

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

debugfs: q

joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Unmount and remount"
```

Unmount and remount

```
joe@it4100-a1-sample:~$ sudo umount mymounts/d1
```

```
joe@it4100-a1-sample:~$ sudo mount /dev/sda5 mymounts/d1/
```

```
joe@it4100-a1-sample:~$ █
```

joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ cat mymounts/d1/file1.txt
```

Here is a file

```
joe@it4100-a1-sample:~$ cat mymounts/d1/file2.txt
```

Here is a file

```
joe@it4100-a1-sample:~$ echo "See that they point to same block"
```

See that they point to same block

```
joe@it4100-a1-sample:~$ █
```

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Run fsck to fix it!"
```

```
Run fsck to fix it!
```

```
joe@it4100-a1-sample:~$ sudo umount mymounts/d1
```

```
joe@it4100-a1-sample:~$ █
```



⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

joe@it4100-a1-sample:~\$ sudo fsck.ext4 -f /dev/sda5

```
joe@it4100-a1-sample:~$ sudo fsck.ext4 -f /dev/sda5
```

```
e2fsck 1.42.13 (17-May-2015)
```

```
Pass 1: Checking inodes, blocks, and sizes
```

```
Running additional passes to resolve blocks claimed by more than one inode...
```

```
Pass 1B: Rescanning for multiply-claimed blocks
```

```
Multiply-claimed block(s) in inode 12: 8705
```

```
Multiply-claimed block(s) in inode 13: 8705
```

```
Pass 1C: Scanning directories for inodes with multiply-claimed blocks
```

```
Pass 1D: Reconciling multiply-claimed blocks
```

```
(There are 2 inodes containing multiply-claimed blocks.)
```

```
File /file1.txt (inode #12, mod time Fri Jan 20 11:45:24 2017)
```

```
has 1 multiply-claimed block(s), shared with 1 file(s):
```

```
    /file2.txt (inode #13, mod time Fri Jan 20 11:45:46 2017)
```

```
Clone multiply-claimed blocks<y>? yes
```

```
File /file2.txt (inode #13, mod time Fri Jan 20 11:45:46 2017)
```

```
has 1 multiply-claimed block(s), shared with 1 file(s):
```

```
    /file1.txt (inode #12, mod time Fri Jan 20 11:45:24 2017)
```

```
Multiply-claimed blocks already reassigned or cloned.
```

```
Pass 2: Checking directory structure
```

```
Pass 3: Checking directory connectivity
```

```
Pass 4: Checking reference counts
```

```
Pass 5: Checking group summary information
```

```
Block bitmap differences:  -8452
```

```
Fix<y>? yes
```

```
Free blocks count wrong for group #0 (3823, counted=3822).
```

```
Fix<y>? yes
```

```
Free blocks count wrong for group #1 (7931, counted=7932).
```

```
Fix<y>? yes
```

```
/dev/sda5: ***** FILE SYSTEM WAS MODIFIED *****
```

```
/dev/sda5: 13/128016 files (0.0% non-contiguous), 26668/512000 blocks
```

```
joe@it4100-a1-sample:~$
```

joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Remount and test"
```

Remount and test

```
joe@it4100-a1-sample:~$ sudo mount /dev/sda5 mymounts/d1/
```

```
joe@it4100-a1-sample:~$ cat mymounts/d1/file*
```

Here is a file

Here is a file

```
joe@it4100-a1-sample:~$ echo "Hmm... did it work?"
```

Hmm... did it work?

```
joe@it4100-a1-sample:~$ █
```

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

joe@it4100-a1-sample:~\$ sudo debugfs -b 1024 /dev/sda5

debugfs 1.42.13 (17-May-2015)

debugfs: █

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

debugfs: stat file1.txt

```
Inode: 12   Type: regular   Mode: 0644   Flags: 0x80000
Generation: 1747398615   Version: 0x00000001
User:      0   Group:      0   Size: 15
File ACL: 0   Directory ACL: 0
Links: 1   Blockcount: 2
Fragment:  Address: 0   Number: 0   Size: 0
ctime: 0x58825ac4 -- Fri Jan 20 11:45:24 2017
atime: 0x58825ac6 -- Fri Jan 20 11:45:26 2017
mtime: 0x58825ac4 -- Fri Jan 20 11:45:24 2017
EXTENTS:
(0):4370
(END)
```

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

```
debugfs: stat file1.txt
```

```
debugfs: stat file2.txt
```

```
debugfs: █
```

```
Inode: 13   Type: regular   Mode: 0644   Flags: 0x80000
Generation: 1747398616   Version: 0x00000001
User:      0   Group:      0   Size: 21
File ACL: 0   Directory ACL: 0
Links: 1   Blockcount: 2
Fragment:  Address: 0   Number: 0   Size: 0
ctime: 0x58825ada -- Fri Jan 20 11:45:46 2017
atime: 0x58825ade -- Fri Jan 20 11:45:50 2017
mtime: 0x58825ada -- Fri Jan 20 11:45:46 2017
EXTENTS:
(0):8705
(END)
```



joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Did you note the 2 different addresses now? It doesn't give us the original block back. It doesn't know where it was. It just gives us a new block with the same data."
```

```
Did you note the 2 different addresses now? It doesn't give us the original block back. It doesn't know where it was. It just gives us a new block with the same data.
```

```
joe@it4100-a1-sample:~$ █
```

⌵ ⌵ ⌵ joe@it4100-a1-sample: ~

```
joe@it4100-a1-sample:~$ echo "Could you change the block address of file 1 back  
and retrieve the original data?"
```

```
Could you change the block address of file 1 back and retrieve the original data  
?
```

```
joe@it4100-a1-sample:~$ █
```