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Subject: Re: [PATCH] Protect tty drivers list a little  
Posted by [Alexey Dobriyan](#) on Fri, 23 Mar 2007 08:54:03 GMT  
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On Thu, Mar 22, 2007 at 09:29:05AM -0800, Andrew Morton wrote:

> On Thu, 22 Mar 2007 14:25:42 +0300 Alexey Dobriyan <[adobriyan@sw.ru](mailto:adobriyan@sw.ru)> wrote:

> > Additions and removal from tty\_drivers list were just done as well as

> > iterating on it for /proc/tty/drivers generation.

> >

> > --- a/drivers/char/tty\_io.c

> > +++ b/drivers/char/tty\_io.c

> > @@ -127,6 +127,7 @@ EXPORT\_SYMBOL(tty\_std\_termios);

> > into this file \*/

> >

> > LIST\_HEAD(tty\_drivers); /\* linked list of tty drivers \*/

> > +DEFINE\_SPINLOCK(tty\_drivers\_lock);

> >

> > /\* Mutex to protect creating and releasing a tty. This is shared with

> > vt.c for deeply disgusting hack reasons \*/

> > @@ -1086,13 +1087,16 @@ static struct tty\_driver \*get\_tty\_driver

> > {

> > struct tty\_driver \*p;

> >

> > + spin\_lock(&tty\_drivers\_lock);

> > list\_for\_each\_entry(p, &tty\_drivers, tty\_drivers) {

> > dev\_t base = MKDEV(p->major, p->minor\_start);

> > if (device < base || device >= base + p->num)

> > continue;

> > + spin\_unlock(&tty\_drivers\_lock);

> > \*index = device - base;

> > return p;

> > }

> > + spin\_unlock(&tty\_drivers\_lock);

> > return NULL;

> > }

>

> The locking in here is kinda meaningless: we drop the lock and return an

> unrefcounted something which really should have been covered by that lock.

> Or refcounted.

Ahh, indeed. I stated at this place too long choosing spin\_unlock placement, but completely missed pointer :-\

> The reason is that get\_tty\_driver() and its return value are already covered

> by tty\_mutex.

>

> So can we use tty\_mutex to fix this race rather than adding a new lock?

I don't see why we can't do it. So here goes version 2 which also survives some beating described in changelog.

[PATCH] Protect tty drivers list with tty\_mutex

Additions and removal from tty\_drivers list were just done as well as iterating on it for /proc/tty/drivers generation.

testing: modprobe/rmmod loop of simple module which does nothing but tty\_register\_driver() vs cat /proc/tty/drivers loop

BUG: unable to handle kernel paging request at virtual address 6b6b6b6b  
printing eip:

c01cefa7

\*pde = 00000000

Oops: 0000 [#1]

PREEMPT

last sysfs file: devices/pci0000:00/0000:00:1d.7/usb5/5-0:1.0/blInterfaceProto col

Modules linked in: ohci\_hcd af\_packet e1000 ehci\_hcd uhci\_hcd usbcore xfs

CPU: 0

EIP: 0060:[<c01cefa7>] Not tainted VLI

EFLAGS: 00010297 (2.6.21-rc4-mm1 #4)

EIP is at vsnprintf+0x3a4/0x5fc

eax: 6b6b6b6b ebx: f6cb50f2 ecx: 6b6b6b6b edx: ffffffff

esi: c0354700 edi: f6cb6000 ebp: 6b6b6b6b esp: f31f5e68

ds: 007b es: 007b fs: 00d8 gs: 0033 ss: 0068

Process cat (pid: 31864, ti=f31f4000 task=c1998030 task.ti=f31f4000)

Stack: 00000000 c0103f20 c013003a c0103f20 00000000 f6cb50da 0000000a 00000f0e

f6cb50f2 00000010 00000014 ffffffff ffffffff 00000007 c0354753 f6cb50f2

f73e39dc f73e39dc 00000001 c0175416 f31f5ed8 f31f5ed4 0ee00000 f32090bc

Call Trace:

[<c0103f20>] restore\_nocheck+0x12/0x15

[<c013003a>] mark\_held\_locks+0x6d/0x86

[<c0103f20>] restore\_nocheck+0x12/0x15

[<c0175416>] seq\_printf+0x2e/0x52

[<c0192895>] show\_tty\_range+0x35/0x1f3

[<c0175416>] seq\_printf+0x2e/0x52

[<c0192add>] show\_tty\_driver+0x8a/0x1d9

[<c01758f6>] seq\_read+0x70/0x2ba

[<c0175886>] seq\_read+0x0/0x2ba

[<c018d8e6>] proc\_reg\_read+0x63/0x9f

[<c015e764>] vfs\_read+0x7d/0xb5

[<c018d883>] proc\_reg\_read+0x0/0x9f

[<c015eab1>] sys\_read+0x41/0x6a

[<c0103e4e>] sysenter\_past\_esp+0x5f/0x99

=====

Code: 00 8b 4d 04 e9 44 ff ff ff 8d 4d 04 89 4c 24 50 8b 6d 00 81 fd ff 0f 00 00 b8 a4 c1 35 c0 0f 46 e8 8b 54 24 2c 89 e9 89 c8 eb 06 <80> 38 00 74 07 40 4a 83 fa ff 75 f4 29 c8 89 c6 8b 44 24 28 89

EIP: [<c01cefa7>] vsnprintf+0x3a4/0x5fc SS:ESP 0068:f31f5e68

Signed-off-by: Alexey Dobriyan <adobriyan@sw.ru>

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drivers/char/tty\_io.c | 5 ++++-  
fs/proc/proc\_tty.c | 3 +++  
2 files changed, 7 insertions(+), 1 deletion(-)

```
--- a/drivers/char/tty_io.c
+++ b/drivers/char/tty_io.c
@@ -3769,7 +3769,9 @@ int tty_register_driver(struct tty_driver
    if (!driver->put_char)
        driver->put_char = tty_default_put_char;

+ mutex_lock(&tty_mutex);
+ list_add(&driver->tty_drivers, &tty_drivers);
+ mutex_unlock(&tty_mutex);

    if ( !(driver->flags & TTY_DRIVER_DYNAMIC_DEV) ) {
        for(i = 0; i < driver->num; i++)
@@ -3795,8 +3797,9 @@ int tty_unregister_driver(struct tty_dri

    unregister_chrdev_region(MKDEV(driver->major, driver->minor_start),
        driver->num);
-
+ mutex_lock(&tty_mutex);
+ list_del(&driver->tty_drivers);
+ mutex_unlock(&tty_mutex);

/*
 * Free the termios and termios_locked structures because
--- a/fs/proc/proc_tty.c
+++ b/fs/proc/proc_tty.c
@@ -108,6 +108,8 @@ static void *t_start(struct seq_file *m,
{
    struct list_head *p;
    loff_t l = *pos;
+
+ mutex_lock(&tty_mutex);
    list_for_each(p, &tty_drivers)
        if (!l--)
            return list_entry(p, struct tty_driver, tty_drivers);
@@ -124,6 +126,7 @@ static void *t_next(struct seq_file *m,
```

```
static void t_stop(struct seq_file *m, void *v)
{
+ mutex_unlock(&tty_mutex);
}

static struct seq_operations tty_drivers_op = {
```

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