
Subject: [RFC] v2 - [PATCH 0/3] remove use of proc_mnt
Posted by [Dave Hansen](#) on Thu, 01 Feb 2007 02:53:15 GMT
[View Forum Message](#) <> [Reply to Message](#)

Here's a set of patches which I believe allows multiple instances of /proc to exist. We want these because it allows each pid_namespace to have a completely different view of /proc.

Since the last set, I reorganized them so that we won't see any breakage in the middle of the set.

Can anybody see a good reason not to send them into -mm?

Containers mailing list
Containers@lists.osdl.org
<https://lists.osdl.org/mailman/listinfo/containers>

Subject: [RFC] v2 - [PATCH 2/3] remove proc_mnt's use or killing inodes
Posted by [Dave Hansen](#) on Thu, 01 Feb 2007 02:53:16 GMT
[View Forum Message](#) <> [Reply to Message](#)

We use proc_mnt as a shortcut to find a superblock on which to go killing /proc inodes. This will break if we ever have more than one /proc superblock. So, use the superblock list to go find each of the /proc sb's and kill inodes on each superblock.

This eliminates one more use of proc_mnt.

lxc-dave/fs/proc/generic.c | 28 ++++++-----
1 file changed, 23 insertions(+), 5 deletions(-)

```
diff -puN fs/proc/generic.c~A1-remove-proc_mnt-0 fs/proc/generic.c
--- lxc/fs/proc/generic.c~A1-remove-proc_mnt-0 2007-01-26 14:29:17.000000000 -0800
+++ lxc-dave/fs/proc/generic.c 2007-01-26 14:29:17.000000000 -0800
@@ -547,13 +547,10 @@ static int proc_register(struct proc_dir
     return 0;
 }

-/*
- * Kill an inode that got unregistered..
- */
-static void proc_kill_inodes(struct proc_dir_entry *de)
+static void proc_kill_inodes_sb(struct proc_dir_entry *de,
```

```

+ struct super_block *sb)
+ {
+     struct list_head *p;
- struct super_block *sb = proc_mnt->mnt_sb;

+ /*
+  * Actually it's a partial revoke().
@@ -577,6 +574,27 @@ static void proc_kill_inodes(struct proc
+     file_list_unlock();
+ }

+/*
+ * Kill an inode that got unregistered..
+ */
+static void proc_kill_inodes(struct proc_dir_entry *de)
+{
+ struct list_head *l;
+ struct file_system_type *procfs;
+
+ procfs = get_fs_type("proc");
+ if (!procfs)
+     return;
+
+ spin_lock(&sb_lock);
+ list_for_each(l, &procfs->fs_supers) {
+     struct super_block *sb;
+     sb = list_entry(l, struct super_block, s_instances);
+     proc_kill_inodes_sb(de, sb);
+ }
+ spin_unlock(&sb_lock);
+}
+
+static struct proc_dir_entry *proc_create(struct proc_dir_entry **parent,
+     const char *name,
+     mode_t mode,

```

Containers mailing list
Containers@lists.osdl.org
<https://lists.osdl.org/mailman/listinfo/containers>

Subject: [RFC] v2 - [PATCH 3/3] introduce proc_mnt for pid_ns
Posted by [Dave Hansen](#) on Thu, 01 Feb 2007 02:53:17 GMT
[View Forum Message](#) <> [Reply to Message](#)

The following patch completes the removal of the global proc_mnt.
It fetches the mnt on which to do dentry invalidations from the

pid_namespace in which the task appears.

For now, there is only one pid namespace in mainline so this is straightforward. In the -lxc tree we'll have to do something more complex.

Note that the new proc_compare_super() enforces the "one proc sb per pid_namespace" limit.

/proc currently has some special code to make sure that the root directory gets set up correctly. It proc_mnt variable in order to find its way to the root inode.

Now that we don't have the global proc_mnt, we can fill in the root inode's data in proc_fill_super(), where it takes a wee bit less work than in proc_get_sb().

```
lxc-dave/fs/proc/base.c      | 26 ++++++++
lxc-dave/fs/proc/inode.c     | 11 ++++++
lxc-dave/fs/proc/root.c      | 45 ++++++++-----
lxc-dave/include/linux/pid_namespace.h | 1
lxc-dave/include/linux/proc_fs.h | 1
5 files changed, 61 insertions(+), 23 deletions(-)
```

```
diff -puN fs/proc/base.c~A3-remove-proc_mnt-1 fs/proc/base.c
--- lxc/fs/proc/base.c~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
+++ lxc-dave/fs/proc/base.c 2007-01-31 17:29:43.000000000 -0800
@@ -70,6 +70,7 @@
#include <linux/seccomp.h>
#include <linux/cpuset.h>
#include <linux/audit.h>
+#include <linux/pid_namespace.h>
#include <linux/poll.h>
#include <linux/nsproxy.h>
#include <linux/oom.h>
@@ -1905,9 +1906,11 @@ static struct inode_operations proc_tgid
};

/**
- * proc_flush_task - Remove dcache entries for @task from the /proc dcache.
+ * proc_flush_task_from_pid_ns - Remove dcache entries for @task
+ * from the /proc dcache.
+ *
+ * @task: task that should be flushed.
+ * @pid_ns: pid_namespace in which that task appears
```

```

*
* Looks in the dcache for
* /proc/@pid
@@ -1925,11 +1928,20 @@ static struct inode_operations proc_tgid
*     that no dcache entries will exist at process exit time it
*     just makes it very unlikely that any will persist.
*/
-void proc_flush_task(struct task_struct *task)
+void proc_flush_task_from_pid_ns(struct task_struct *task,
+ struct pid_namespace* pid_ns)
{
    struct dentry *dentry, *leader, *dir;
    char buf[PROC_NUMBUF];
    struct qstr name;
+ struct vfsmount *proc_mnt = pid_ns->proc_mnt;
+
+ /*
+  * It is possible that no /procs have been instantiated
+  * for this particular pid namespace.
+  */
+ if (!proc_mnt)
+     return;

    name.name = buf;
    name.len = snprintf(buf, sizeof(buf), "%d", task->pid);
@@ -1971,6 +1983,16 @@ out:
    return;
}

+void proc_flush_task(struct task_struct *task)
+{
+ /*
+  * Right now, tasks only appear in their own pid_ns.
+  * With containers this function will change to a loop
+  * over all pid_ns's in which the task appears.
+  */
+ proc_flush_task_from_pid_ns(task, current->nsproxy->pid_ns);
+}
+
static struct dentry *proc_pid_instantiate(struct inode *dir,
    struct dentry * dentry,
    struct task_struct *task, void *ptr)
diff -puN fs/proc/inode.c~A3-remove-proc_mnt-1 fs/proc/inode.c
--- lxc/fs/proc/inode.c~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
+++ lxc-dave/fs/proc/inode.c 2007-01-31 17:34:56.000000000 -0800
@@ -67,8 +67,6 @@ static void proc_delete_inode(struct ino
    clear_inode(inode);
}

```

```

-struct vfsmount *proc_mnt;
-
static void proc_read_inode(struct inode * inode)
{
inode->i_mtime = inode->i_atime = inode->i_ctime = CURRENT_TIME;
@@ -183,6 +181,7 @@ out_mod:

int proc_fill_super(struct super_block *s, void *data, int silent)
{
+ struct proc_inode *ei;
  struct inode * root_inode;

  s->s_flags |= MS_NODIRATIME | MS_NOSUID | MS_NOEXEC;
@@ -200,6 +199,14 @@ int proc_fill_super(struct super_block *
  s->s_root = d_alloc_root(root_inode);
  if (!s->s_root)
    goto out_no_root;
+ /* Seed the root directory with a pid so it doesn't need
+ * to be special in base.c. I would do this earlier but
+ * the only task alive when /proc is mounted the first time
+ * is the init_task and it doesn't have any pids.
+ */
+ ei = PROC_I(root_inode);
+ if (!ei->pid)
+ ei->pid = find_get_pid(1);
  return 0;

out_no_root:
diff -puN fs/proc/root.c~A3-remove-proc_mnt-1 fs/proc/root.c
--- lxc/fs/proc/root.c~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
+++ lxc-dave/fs/proc/root.c 2007-01-31 17:34:21.000000000 -0800
@@ -18,6 +18,7 @@
#include <linux/bitops.h>
#include <linux/smp_lock.h>
#include <linux/mount.h>
+#include <linux/pid_namespace.h>

#include "internal.h"

@@ -27,21 +28,35 @@ struct proc_dir_entry *proc_net, *proc_n
struct proc_dir_entry *proc_sys_root;
#endif

+static int proc_compare_super(struct super_block *s, void *p)
+{
+ struct pid_namespace *pid_ns = p;
+ if (pid_ns->proc_mnt->mnt_sb == s)

```

```

+ return 1;
+ return 0;
+}
+
static int proc_get_sb(struct file_system_type *fs_type,
    int flags, const char *dev_name, void *data, struct vfsmount *mnt)
{
- if (proc_mnt) {
- /* Seed the root directory with a pid so it doesn't need
-  * to be special in base.c. I would do this earlier but
-  * the only task alive when /proc is mounted the first time
-  * is the init_task and it doesn't have any pids.
-  */
- struct proc_inode *ei;
- ei = PROC_I(proc_mnt->mnt_sb->s_root->d_inode);
- if (!ei->pid)
- ei->pid = find_get_pid(1);
- }
- return get_sb_single(fs_type, flags, data, proc_fill_super, mnt);
+ struct super_block *s;
+ struct pid_namespace *pid_ns = current->nsproxy->pid_ns;
+ int error;
+
+ s = sget(fs_type, proc_compare_super, set_anon_super, pid_ns);
+ if (IS_ERR(s))
+ return PTR_ERR(s);
+ if (!pid_ns->proc_mnt)
+ pid_ns->proc_mnt = mnt;
+
+ error = fill_if_new_sb(s, pid_ns, flags, proc_fill_super);
+ if (error)
+ return error;
+
+ do_remount_sb(s, flags, data, 0);
+ error = simple_set_mnt(mnt, s);
+
+ return error;
}

static struct file_system_type proc_fs_type = {
@@ -58,12 +73,6 @@ void __init proc_root_init(void)
    err = register_filesystem(&proc_fs_type);
    if (err)
        return;
- proc_mnt = kern_mount(&proc_fs_type);
- err = PTR_ERR(proc_mnt);
- if (IS_ERR(proc_mnt)) {
- unregister_filesystem(&proc_fs_type);

```

```

- return;
- }
  proc_misc_init();
  proc_net = proc_mkdir("net", NULL);
  proc_net_stat = proc_mkdir("net/stat", NULL);
diff -puN include/linux/pid_namespace.h~A3-remove-proc_mnt-1 include/linux/pid_namespace.h
--- lxc/include/linux/pid_namespace.h~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
+++ lxc-dave/include/linux/pid_namespace.h 2007-01-31 17:29:43.000000000 -0800
@@ -20,6 +20,7 @@ struct pid_namespace {
  struct pidmap pidmap[PIDMAP_ENTRIES];
  int last_pid;
  struct task_struct *child_reaper;
+ struct vfsmount *proc_mnt;
};

extern struct pid_namespace init_pid_ns;
diff -puN include/linux/proc_fs.h~A3-remove-proc_mnt-1 include/linux/proc_fs.h
--- lxc/include/linux/proc_fs.h~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
+++ lxc-dave/include/linux/proc_fs.h 2007-01-31 17:32:22.000000000 -0800
@@ -109,7 +109,6 @@ extern struct proc_dir_entry *create_pro
  struct proc_dir_entry *parent);
extern void remove_proc_entry(const char *name, struct proc_dir_entry *parent);

-extern struct vfsmount *proc_mnt;
extern int proc_fill_super(struct super_block *, void *, int);
extern struct inode *proc_get_inode(struct super_block *, unsigned int, struct proc_dir_entry *);

diff -puN include/linux/fs.h~A3-remove-proc_mnt-1 include/linux/fs.h
diff -puN include/linux/mount.h~A3-remove-proc_mnt-1 include/linux/mount.h
-

```

Containers mailing list
Containers@lists.osdl.org
<https://lists.osdl.org/mailman/listinfo/containers>

Subject: Re: [RFC] v2 - [PATCH 3/3] introduce proc_mnt for pid_ns
Posted by [ebiederm](#) on Thu, 01 Feb 2007 20:35:48 GMT
[View Forum Message](#) <> [Reply to Message](#)

Dave Hansen <hansenc@us.ibm.com> writes:

```

> The following patch completes the removal of the global proc_mnt.
> It fetches the mnt on which to do dentry invalidations from the
> pid_namespace in which the task appears.
>
> For now, there is only one pid namespace in mainline so this is

```

> straightforward. In the -lxc tree we'll have to do something
> more complex.
>
> Note that the new proc_compare_super() enforces the "one proc sb
> per pid_namespace" limit.
>
> /proc currently has some special code to make sure that the root
> directory gets set up correctly. It proc_mnt variable in order
> to find its way to the root inode.
>
> Now that we don't have the global proc_mnt, we can fill in the
> root inode's data in proc_fill_super(), where it takes a wee bit
> less work than in proc_get_sb().

Yep. The hard part was actually moving the code into proc_get_sb :)

```
> ---
>
> lxc-dave/fs/proc/base.c          | 26 ++++++-----
> lxc-dave/fs/proc/inode.c         | 11 +++++--
> lxc-dave/fs/proc/root.c | 45 ++++++-----
> lxc-dave/include/linux/pid_namespace.h | 1
> lxc-dave/include/linux/proc_fs.h   | 1
> 5 files changed, 61 insertions(+), 23 deletions(-)
>
> diff -puN fs/proc/base.c~A3-remove-proc_mnt-1 fs/proc/base.c
> --- lxc/fs/proc/base.c~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
> +++ lxc-dave/fs/proc/base.c 2007-01-31 17:29:43.000000000 -0800
> @@ -70,6 +70,7 @@
> #include <linux/seccomp.h>
> #include <linux/cpuset.h>
> #include <linux/audit.h>
> +#include <linux/pid_namespace.h>
> #include <linux/poll.h>
> #include <linux/nsproxy.h>
> #include <linux/oom.h>
> @@ -1905,9 +1906,11 @@ static struct inode_operations proc_tgid
> };
>
> /**
> - * proc_flush_task - Remove dcache entries for @task from the /proc dcache.
> + * proc_flush_task_from_pid_ns - Remove dcache entries for @task
> + *      from the /proc dcache.
> *
> * @task: task that should be flushed.
> + * @pid_ns: pid_namespace in which that task appears
> *
> * Looks in the dcache for
```



```

> * /proc/@pid
> @@ -1925,11 +1928,20 @@ static struct inode_operations proc_tgid
> *      that no dcache entries will exist at process exit time it
> *      just makes it very unlikely that any will persist.
> */
> -void proc_flush_task(struct task_struct *task)
> +void proc_flush_task_from_pid_ns(struct task_struct *task,
> + struct pid_namespace* pid_ns)
> {
>     struct dentry *dentry, *leader, *dir;
>     char buf[PROC_NUMBUF];
>     struct qstr name;
> + struct vfsmount *proc_mnt = pid_ns->proc_mnt;
> +
> + /*
> + * It is possible that no /procs have been instantiated
> + * for this particular pid namespace.
> + */
> + if (!proc_mnt)
> +     return;

>     name.name = buf;
>     name.len = snprintf(buf, sizeof(buf), "%d", task->pid);
> @@ -1971,6 +1983,16 @@ out:
>     return;
> }
>
> +void proc_flush_task(struct task_struct *task)
> +{
> + /*
> + * Right now, tasks only appear in their own pid_ns.
> + * With containers this function will change to a loop
> + * over all pid_ns's in which the task appears.
> + */
> + proc_flush_task_from_pid_ns(task, current->nsproxy->pid_ns);
> +}
> +

```

This is flat out wrong. We need to get the pid_namespace from task if we get it from anywhere. In reality we most likely need to derive it from struct pid.

Can you leave the access to proc_mnt as init_pid_ns.proc_mnt for now?
And otherwise leave off addressing this case until we have gotten the structure into the hash table to support multiple pid namespaces?

```

> static struct dentry *proc_pid_instantiate(struct inode *dir,
>     struct dentry * dentry,

```

```

> struct task_struct *task, void *ptr)
> diff -puN fs/proc/inode.c~A3-remove-proc_mnt-1 fs/proc/inode.c
> --- lxc/fs/proc/inode.c~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
> +++ lxc-dave/fs/proc/inode.c 2007-01-31 17:34:56.000000000 -0800
> @@ -67,8 +67,6 @@ static void proc_delete_inode(struct inode
> clear_inode(inode);
> }
>
> -struct vfsmount *proc_mnt;
> -
> static void proc_read_inode(struct inode * inode)
> {
> inode->i_mtime = inode->i_atime = inode->i_ctime = CURRENT_TIME;
> @@ -183,6 +181,7 @@ out_mod:
>
> int proc_fill_super(struct super_block *s, void *data, int silent)
> {
> + struct proc_inode *ei;
> struct inode * root_inode;
>
> s->s_flags |= MS_NODIRATIME | MS_NOSUID | MS_NOEXEC;
> @@ -200,6 +199,14 @@ int proc_fill_super(struct super_block *
> s->s_root = d_alloc_root(root_inode);
> if (!s->s_root)
> goto out_no_root;
> + /* Seed the root directory with a pid so it doesn't need
> + * to be special in base.c. I would do this earlier but
> + * the only task alive when /proc is mounted the first time
> + * is the init_task and it doesn't have any pids.
> + */

```

The comment about doing this earlier no longer applies as you are removing the proc kern_mount.

```

> + ei = PROC_I(root_inode);
> + if (!ei->pid)
> + ei->pid = find_get_pid(1);

```

Because of the other tests and the fact that we just allocated the root inode that ei->pid is NULL so the test is simply confusing.

To make our lives easier can we also do:

```

s->s_fs_info = data; /* The pid_namespace for this filesystem */

> return 0;
>
> out_no_root:
> diff -puN fs/proc/root.c~A3-remove-proc_mnt-1 fs/proc/root.c

```

```

> --- lxc/fs/proc/root.c~A3-remove-proc_mnt-1 2007-01-31 17:29:43.000000000 -0800
> +++ lxc-dave/fs/proc/root.c 2007-01-31 17:34:21.000000000 -0800
> @@ -18,6 +18,7 @@
> #include <linux/bitops.h>
> #include <linux/smp_lock.h>
> #include <linux/mount.h>
> +#include <linux/pid_namespace.h>
>
> #include "internal.h"
>
> @@ -27,21 +28,35 @@ struct proc_dir_entry *proc_net, *proc_n
> struct proc_dir_entry *proc_sys_root;
> #endif
>
> +static int proc_compare_super(struct super_block *s, void *p)
> +{
> + struct pid_namespace *pid_ns = p;
> + if (pid_ns->proc_mnt->mnt_sb == s)
> + return 1;
> + return 0;
> +}
> +
> static int proc_get_sb(struct file_system_type *fs_type,
> int flags, const char *dev_name, void *data, struct vfsmount *mnt)
> {
> - if (proc_mnt) {
> - /* Seed the root directory with a pid so it doesn't need
> - * to be special in base.c. I would do this earlier but
> - * the only task alive when /proc is mounted the first time
> - * is the init_task and it doesn't have any pids.
> - */
> - struct proc_inode *ei;
> - ei = PROC_I(proc_mnt->mnt_sb->s_root->d_inode);
> - if (!ei->pid)
> - ei->pid = find_get_pid(1);
> - }
> - return get_sb_single(fs_type, flags, data, proc_fill_super, mnt);
> + struct super_block *s;
> + struct pid_namespace *pid_ns = current->nsproxy->pid_ns;
> + int error;
> +
> + s = sget(fs_type, proc_compare_super, set_anon_super, pid_ns);
> + if (IS_ERR(s))
> + return PTR_ERR(s);
> + if (!pid_ns->proc_mnt)
> + pid_ns->proc_mnt = mnt;
> +
> + error = fill_if_new_sb(s, pid_ns, flags, proc_fill_super);

```

```

> + if (error)
> + return error;
> +
> + do_remount_sb(s, flags, data, 0);
> + error = simple_set_mnt(mnt, s);
> +
> + return error;
> }

```

I don't know why the generic code in the super.c likes to do this outside of the set method in sget but it doesn't make any sense to me.

It looks to me like if we leave off creating fill_if_new_sb. Create a tailored set set_proc_super method for proc the code will be simpler and with less error handling.

Basically we will either get a setup superblock back from sget or we don't get one.

```

static int proc_test_sb(struct super_block *s, void *data)
{
    struct pid_namespace *pid_ns = p;
    return s->s_fs_info == data;
}

```

```

static int proc_set_sb(struct super_block *s, void *data)
{
    int ret;
    ret = set_anon_super(s, NULL);
    if (!ret)
    ret = proc_fill_super(s, data, 0);
    return ret;
}

```

```

static int proc_get_sb(struct file_system_type *fs_type,
    int flags, const char *dev_name, void *data, struct vfsmount *mnt)
{
    struct super_block *s;
    s = sget(fs_type, proc_test_sb, proc_set_sb, current->nsproxy->pid_ns);
    if (IS_ERR(s))
        return PTR_ERR(s);
    do_remount_sb(s, flags, data, 0);
    return simple_set_mnt(mnt, s);
}

```

```

>
> static struct file_system_type proc_fs_type = {
> @@ -58,12 +73,6 @@ void __init proc_root_init(void)
>   err = register_filesystem(&proc_fs_type);
>   if (err)
>       return;
>   - proc_mnt = kern_mount(&proc_fs_type);
>   - err = PTR_ERR(proc_mnt);
>   - if (IS_ERR(proc_mnt)) {
>   -   unregister_filesystem(&proc_fs_type);
>   -   return;
>   - }
>   proc_misc_init();
>   proc_net = proc_mkdir("net", NULL);
>   proc_net_stat = proc_mkdir("net/stat", NULL);
> diff -puN include/linux/pid_namespace.h~A3-remove-proc_mnt-1
> include/linux/pid_namespace.h
> --- lxc/include/linux/pid_namespace.h~A3-remove-proc_mnt-1 2007-01-31
> 17:29:43.000000000 -0800
> +++ lxc-dave/include/linux/pid_namespace.h 2007-01-31 17:29:43.000000000 -0800
> @@ -20,6 +20,7 @@ struct pid_namespace {
>   struct pidmap pidmap[PIDMAP_ENTRIES];
>   int last_pid;
>   struct task_struct *child_reaper;
> + struct vfsmount *proc_mnt;

```

And with my other suggestions we don't wind up needing this.

Eric

Containers mailing list
Containers@lists.osdl.org
<https://lists.osdl.org/mailman/listinfo/containers>
