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Subject: [RFC][PATCH 14/16] Introduce proc\_mnt for pid\_ns  
Posted by [Sukadev Bhattiprolu](#) on Thu, 24 May 2007 01:14:42 GMT  
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Subject: Introduce proc\_mnt for pid\_ns

From: Dave Hansen <[hansenc@us.ibm.com](mailto:hansenc@us.ibm.com)>

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. The proc\_flush\_task() code takes a task, and  
needs to be able to find the corresponding proc superblocks on  
which that task's /proc/<pid> directories could appear. We  
can tell in which pid namespaces a task appears, so I put a  
pointer from the pid namespace to the corresponding proc\_mnt.

/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.

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Signed-off-by: Sukadev Bhattiprolu <[sukadev@us.ibm.com](mailto:sukadev@us.ibm.com)>

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```
fs/proc/base.c          | 32 ++++++
fs/proc/inode.c          | 11 ++++++
fs/proc/root.c          | 52 ++++++
include/linux/pid_namespace.h | 1
include/linux/proc_fs.h   | 1
5 files changed, 75 insertions(+), 22 deletions(-)
```

Index: lx26-21-mm2/fs/proc/base.c

```
=====
--- lx26-21-mm2.orig/fs/proc/base.c 2007-05-22 16:59:49.000000000 -0700
+++ lx26-21-mm2/fs/proc/base.c 2007-05-22 16:59:56.000000000 -0700
@@ -2005,9 +2005,11 @@ static const struct inode_operations pro
};

/**
 * 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
@@ -2025,11 +2027,22 @@ static const struct inode_operations pro
+ * 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)
+static 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;
+
+ WARN_ON(!pid_ns);
+ /*
+ * It is possible that no /procs have been instantiated
+ * for this particular pid namespace.
+ */
+ if (!pid_ns->proc_mnt)
+     return;
+ proc_mnt = pid_ns->proc_mnt;

+     name.name = buf;
+     name.len = snprintf(buf, sizeof(buf), "%d", task->pid);
@@ -2071,6 +2084,21 @@ out:
+     return;
+ }

+void proc_flush_task(struct task_struct *task)
+{
+ int i;
+ struct pid *pid;
+ struct upid* upid;
+
+ pid = task_pid(task);
+ if (!pid)
+     return;
+
+ upid = &pid->upid_list[0];
+ for (i = 0; i < pid->num_upids; i++, upid++)
+     proc_flush_task_from_pid_ns(task, upid->pid_ns);
+}
+
+static struct dentry *proc_pid_instantiate(struct inode *dir,

```

```

    struct dentry * dentry,
    struct task_struct *task, const void *ptr)
Index: lx26-21-mm2/fs/proc/inode.c

```

```

=====
--- lx26-21-mm2.orig/fs/proc/inode.c 2007-05-22 16:51:19.000000000 -0700
+++ lx26-21-mm2/fs/proc/inode.c 2007-05-22 16:59:56.000000000 -0700
@@ -6,6 +6,7 @@

```

```

#include <linux/time.h>
#include <linux/proc_fs.h>
#include <linux/hardirq.h>
#include <linux/kernel.h>
#include <linux/mm.h>
#include <linux/string.h>
@@ -74,8 +75,6 @@ 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;
@@ -458,6 +457,8 @@ out_mod:

```

```

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

    s->s_flags |= MS_NODIRATIME | MS_NOSUID | MS_NOEXEC;
@@ -466,6 +467,7 @@ int proc_fill_super(struct super_block *
    s->s_magic = PROC_SUPER_MAGIC;
    s->s_op = &proc_sops;
    s->s_time_gran = 1;
+ s->s_fs_info = pid_ns;

```

```

    de_get(&proc_root);
    root_inode = proc_get_inode(s, PROC_ROOT_INO, &proc_root);
@@ -476,6 +478,11 @@ 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.
+  */
+ ei = PROC_I(root_inode);

```

```

+ ei->pid = find_get_pid(1);
  return 0;

out_no_root:
Index: lx26-21-mm2/fs/proc/root.c
=====
--- lx26-21-mm2.orig/fs/proc/root.c 2007-05-22 16:51:19.000000000 -0700
+++ lx26-21-mm2/fs/proc/root.c 2007-05-22 16:59:56.000000000 -0700
@@ -12,32 +12,56 @@
#include <linux/time.h>
#include <linux/proc_fs.h>
#include <linux/stat.h>
+#include <linux/hardirq.h>
#include <linux/init.h>
#include <linux/sched.h>
#include <linux/module.h>
#include <linux/bitops.h>
#include <linux/smp_lock.h>
#include <linux/mount.h>
+#include <linux/pid_namespace.h>

#include "internal.h"

struct proc_dir_entry *proc_net, *proc_net_stat, *proc_bus, *proc_root_fs, *proc_root_driver;

+static int proc_test_sb(struct super_block *s, void *data)
+{
+ struct pid_namespace *pid_ns = data;
+ if (s->s_fs_info == pid_ns)
+ 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);
+ int error;
+ struct super_block *s;

```

```

+ struct pid_namespace *pid_ns;
+
+ /*
+  * We can eventually derive this out of whatever mount
+  * arguments the user supplies, but just take it from
+  * current for now.
+  */
+ pid_ns = task_active_pid_ns(current);
+
+ s = sget(fs_type, proc_test_sb, set_anon_super, pid_ns);
+ if (IS_ERR(s))
+ return PTR_ERR(s);
+
+ error = proc_fill_super(s, pid_ns, 0);
+ if (error) {
+ deactivate_super(s);
+ return error;
+ }
- return get_sb_single(fs_type, flags, data, proc_fill_super, mnt);
+
+ if (!pid_ns->proc_mnt)
+ pid_ns->proc_mnt = mnt;
+
+ do_remount_sb(s, flags, data, 0);
+ return simple_set_mnt(mnt, s);
+ }

```

```

static struct file_system_type proc_fs_type = {
@@ -54,12 +78,6 @@ 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);

```

Index: lx26-21-mm2/include/linux/pid\_namespace.h

```

=====
--- lx26-21-mm2.orig/include/linux/pid_namespace.h 2007-05-22 16:59:53.000000000 -0700
+++ lx26-21-mm2/include/linux/pid_namespace.h 2007-05-22 16:59:56.000000000 -0700
@@ -33,6 +33,7 @@ struct pid_namespace {
int last_pid;
struct task_struct *child_reaper;

```

```
atomic_t terminating;  
+ struct vfsmount *proc_mnt;  
};
```

```
extern struct pid_namespace init_pid_ns;  
Index: lx26-21-mm2/include/linux/proc_fs.h
```

```
=====
```

```
--- lx26-21-mm2.orig/include/linux/proc_fs.h 2007-05-22 16:51:19.000000000 -0700  
+++ lx26-21-mm2/include/linux/proc_fs.h 2007-05-22 16:59:56.000000000 -0700  
@@ -125,7 +125,6 @@ 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 *);
```

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Containers mailing list  
Containers@lists.linux-foundation.org  
<https://lists.linux-foundation.org/mailman/listinfo/containers>

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