Subject: [PATCH 6/15] Make alloc_pid(), free_pid() and put_pid() work with struct upid

Posted by Pavel Emelianov on Thu, 26 Jul 2007 14:50:22 GMT

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Each struct upid element of struct pid has to be initialized properly,
i.e. its nr mst be allocated from appropriate pidmap and it must be
inserted into the hash.

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---

 include/linux/pid.h |    2 +-
 kernel/pid.c        |   52 +++++++++++++++++++++++++++++++++++++---------------
 2 files changed, 38 insertions(+), 16 deletions(-)

diff -upr linux-2.6.23-rc1-mm1.orig/include/linux/pid.h linux-2.6.23-rc1-mm1-7/include/linux/pid.h
--- linux-2.6.23-rc1-mm1.orig/include/linux/pid.h 2007-07-26 16:34:45.000000000 +0400
+++ linux-2.6.23-rc1-mm1-7/include/linux/pid.h 2007-07-26 16:36:37.000000000 +0400
@@ -83,7 +92,7 @@ extern void FASTCALL(detach_pid(struct t
 extern struct pid *find_get_pid(int nr);
 extern struct pid *find_ge_pid(int nr);

-extern struct pid *alloc_pid(void);
+extern struct pid *alloc_pid(struct pid_namespace *ns);
 extern void FASTCALL(free_pid(struct pid *pid));

 static inline pid_t pid_nr(struct pid *pid)
diff -upr linux-2.6.23-rc1-mm1.orig/kernel/pid.c linux-2.6.23-rc1-mm1-7/kernel/pid.c
--- linux-2.6.23-rc1-mm1.orig/kernel/pid.c 2007-07-26 16:34:45.000000000 +0400
+++ linux-2.6.23-rc1-mm1-7/kernel/pid.c 2007-07-26 16:36:37.000000000 +0400
@@ -28,7 +28,8 @@
 #include <linux/pid_namespace.h>
 #include <linux/init_task.h>

-#define pid_hashfn(nr) hash_long((unsigned long)nr, pidhash_shift)
+#define pid_hashfn(nr, ns) \
+ hash_long((unsigned long)nr + (unsigned long)ns, pidhash_shift)
 static struct hlist_head *pid_hash;
 static int pidhash_shift;
 struct pid init_struct_pid = INIT_STRUCT_PID;
@@ -187,11 +202,13 @@ fastcall void put_pid(struct pid *pid)
  if (!pid)
   return;

- /* FIXME - this must be the namespace this pid lives in */
- ns = &init_pid_ns;
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+ ns = pid->numbers[pid->level].ns;
  if ((atomic_read(&pid->count) == 1) ||
-      atomic_dec_and_test(&pid->count))
+      atomic_dec_and_test(&pid->count)) {
   kmem_cache_free(ns->pid_cachep, pid);
+  if (ns != &init_pid_ns)
+   put_pid_ns(ns);
+ }
 }
 EXPORT_SYMBOL_GPL(put_pid);

@@ -204,45 +221,64 @@ static void delayed_put_pid(struct rcu_h
 fastcall void free_pid(struct pid *pid)
 {
  /* We can be called with write_lock_irq(&tasklist_lock) held */
+ int i;
  unsigned long flags;

  spin_lock_irqsave(&pidmap_lock, flags);
- hlist_del_rcu(&pid->pid_chain);
+ for (i = 0; i <= pid->level; i++)
+  hlist_del_rcu(&pid->numbers[i].pid_chain);
  spin_unlock_irqrestore(&pidmap_lock, flags);

- free_pidmap(&init_pid_ns, pid->nr);
+ for (i = 0; i <= pid->level; i++)
+  free_pidmap(pid->numbers[i].ns, pid->numbers[i].nr);
+
  call_rcu(&pid->rcu, delayed_put_pid);
 }

-struct pid *alloc_pid(void)
+struct pid *alloc_pid(struct pid_namespace *ns)
 {
  struct pid *pid;
  enum pid_type type;
- int nr = -1;
- struct pid_namespace *ns;
+ int i, nr;
+ struct pid_namespace *tmp;

- ns = task_active_pid_ns(current);
  pid = kmem_cache_alloc(ns->pid_cachep, GFP_KERNEL);
  if (!pid)
   goto out;

- nr = alloc_pidmap(ns);
- if (nr < 0)
```

```
-  goto out_free;
+ tmp = ns;
+ for (i = ns->level; i >= 0; i--) {
+  nr = alloc_pidmap(tmp);
+  if (nr < 0)
+   goto out_free;
+
+  pid->numbers[i].nr = nr;
+  pid->numbers[i].ns = tmp;
+  tmp = tmp->parent;
+ }

+ if (ns != &init_pid_ns)
+  get_pid_ns(ns);
+
+ pid->level = ns->level;
  atomic_set(&pid->count, 1);
- pid->nr = nr;
  for (type = 0; type < PIDTYPE_MAX; ++type)
   INIT_HLIST_HEAD(&pid->tasks[type]);

  spin_lock_irq(&pidmap_lock);
- hlist_add_head_rcu(&pid->pid_chain, &pid_hash[pid_hashfn(pid->nr)]);
+ for (i = pid->level; i >= 0; i--)
+  hlist_add_head_rcu(&pid->numbers[i].pid_chain,
+    &pid_hash[pid_hashfn(pid->numbers[i].nr,
+     pid->numbers[i].ns)]);
  spin_unlock_irq(&pidmap_lock);

 out:
  return pid;

 out_free:
+ for (i++; i <= ns->level; i++)
+  free_pidmap(pid->numbers[i].ns, pid->numbers[i].nr);
+
  kmem_cache_free(ns->pid_cachep, pid);
  pid = NULL;
  goto out;
```