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Subject: [RFC][PATCH 06/14] Populate pid\_nrs list with entry for init-pid-ns  
Posted by [Sukadev Bhattiprolu](#) on Wed, 21 Mar 2007 03:20:04 GMT  
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From: Cedric Le Goater <clg@fr.ibm.com>  
Subject: [RFC][PATCH 06/14] Populate pid\_nrs list with entry for init-pid-ns

Create/destroy the pid->pid\_nrs list - when allocating/freeing a struct pid.  
The pid\_nrs list contains just a single struct pid\_nr for now, (corresponding to init-pid-ns).

To enable finding a process based on any of its pid\_t values, replace the use struct pid\_nr, rather than struct pid, in the pid\_hash table.

Finally, reimplement find\_pid() and pid\_nr() based on the pid\_nrs list.

Changelog:

- [Serge Hallyn's comment]: Add comments on what pid->lock protects and that pid->nr will eventually go away.
- [Eric Biederman and containers list comments]: Reworked patches to drop support for unsharing pid namespace and to replace struct pid with struct pid\_nr in the pid\_hash table.

Signed-off-by: Cedric Le Goater <clg@fr.ibm.com>

Signed-off-by: Sukadev Bhattiprolu <sukadev@us.ibm.com>

---

```
include/linux/pid.h | 9 -----
kernel/pid.c        | 73 +++++++++++++++++++++++++++++++++++++++++++++++++++++
2 files changed, 50 insertions(+), 32 deletions(-)
```

Index: 2.6.21-rc3-mm2/kernel/pid.c

=====

--- 2.6.21-rc3-mm2.orig/kernel/pid.c

+++ 2.6.21-rc3-mm2/kernel/pid.c

@@ -194,8 +194,15 @@ static void delayed\_put\_pid(struct rcu\_h

```
void free_pid_nr(struct pid_nr *pid_nr)
{
+ /* We can be called with write_lock_irq(&tasklist_lock) held */
+ unsigned long flags;
+
    free_pidmap(pid_nr->pid_ns, pid_nr->nr);

+ spin_lock_irqsave(&pidmap_lock, flags);
+ hlist_del_rcu(&pid_nr->pid_chain);
+ spin_unlock_irqrestore(&pidmap_lock, flags);
+
    hlist_del_init(&pid_nr->node);
```

```

    put_pid_ns(pid_nr->pid_ns);
@@ -204,14 +211,12 @@ void free_pid_nr(struct pid_nr *pid_nr)

fastcall void free_pid(struct pid *pid)
{
- /* We can be called with write_lock_irq(&tasklist_lock) held */
- unsigned long flags;
+ struct pid_nr *pid_nr;
+ struct hlist_node *pos, *next;

- spin_lock_irqsave(&pidmap_lock, flags);
- hlist_del_rcu(&pid->pid_chain);
- spin_unlock_irqrestore(&pidmap_lock, flags);
+ hlist_for_each_entry_safe(pid_nr, pos, next, &pid->pid_nrs, node)
+ free_pid_nr(pid_nr);

- free_pidmap(&init_pid_ns, pid->nr);
- call_rcu(&pid->rcu, delayed_put_pid);
}

@@ -242,50 +247,70 @@ struct pid_nr *alloc_pid_nr(struct pid_n
    */
    pid_nr->pid = pid;

+ spin_lock_irq(&pidmap_lock);
+ hlist_add_head_rcu(&pid_nr->pid_chain, &pid_hash[pid_hashfn(nr)]);
+ spin_unlock_irq(&pidmap_lock);
+
    return pid_nr;
}

+pid_t pid_nr(struct pid *pid)
+{
+ struct pid_nr* pid_nr;
+ struct hlist_node *pos;
+ struct pid_namespace *ns = task_pid_ns(current);
+
+ if (!pid)
+ return 0;
+
+ hlist_for_each_entry(pid_nr, pos, &pid->pid_nrs, node)
+ if (pid_nr->pid_ns == ns)
+ return pid_nr->nr;
+ return 0;
+}
+EXPORT_SYMBOL_GPL(pid_nr);
+

```

```

struct pid *alloc_pid(void)
{
    struct pid *pid;
    enum pid_type type;
- int nr = -1;
+ struct pid_nr *pid_nr;

    pid = kmem_cache_alloc(pid_cachep, GFP_KERNEL);
    if (!pid)
- goto out;
-
- nr = alloc_pidmap(task_pid_ns(current));
- if (nr < 0)
- goto out_free;
+ return NULL;

    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)]);
- spin_unlock_irq(&pidmap_lock);
+ INIT_HLIST_HEAD(&pid->pid_nrs);
+
+ pid_nr = alloc_pid_nr(task_pid_ns(current), pid);
+ if (!pid_nr)
+ goto out_free_pid;
+
+ pid->nr = pid_nr->nr; /* pid->nr to be removed soon */
+ hlist_add_head(&pid_nr->node, &pid->pid_nrs);

-out:
    return pid;

-out_free:
+out_free_pid:
    kmem_cache_free(pid_cachep, pid);
- pid = NULL;
- goto out;
+ return NULL;
}

struct pid * fastcall find_pid(int nr)
{
    struct hlist_node *elem;

```

```
- struct pid *pid;
+ struct pid_nr *pid_nr;
+ struct pid_namespace *ns = task_pid_ns(current);
```

```
- hlist_for_each_entry_rcu(pid, elem,
+ hlist_for_each_entry_rcu(pid_nr, elem,
    &pid_hash[pid_hashfn(nr)], pid_chain) {
- if (pid->nr == nr)
- return pid;
+ if (pid_nr->nr == nr && pid_nr->pid_ns == ns)
+ return pid_nr->pid;
}
return NULL;
}
```

Index: 2.6.21-rc3-mm2/include/linux/pid.h

```
=====
--- 2.6.21-rc3-mm2.orig/include/linux/pid.h
+++ 2.6.21-rc3-mm2/include/linux/pid.h
@@ -120,14 +120,7 @@ extern struct pid_nr *alloc_pid_nr(struct
    struct pid *pid);
extern struct pid *alloc_pid(void);
extern void FASTCALL(free_pid(struct pid *pid));
-
-static inline pid_t pid_nr(struct pid *pid)
-{
- pid_t nr = 0;
- if (pid)
- nr = pid->nr;
- return nr;
-}
+extern pid_t pid_nr(struct pid *pid);

#define do_each_pid_task(pid, type, task) \
do { \

--
```

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

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Subject: Re: [RFC][PATCH 06/14] Populate pid\_nrs list with entry for init-pid-ns  
Posted by [ebiederm](#) on Wed, 21 Mar 2007 09:23:28 GMT  
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sukadev@us.ibm.com writes:

```

> From: Cedric Le Goater <clg@fr.ibm.com>
> Subject: [RFC][PATCH 06/14] Populate pid_nrs list with entry for init-pid-ns
>
> Create/destroy the pid->pid_nrs list - when allocating/freeing a struct pid.
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> to init-pid-ns).
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> To enable finding a process based on any of its pid_t values, replace the
> use struct pid_nr, rather than struct pid, in the pid_hash table.
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> Finally, reimplement find_pid() and pid_nr() based on the pid_nrs list.
>
> Changelog:
> - [Serge Hallyn's comment]: Add comments on what pid->lock protects
>   and that pid->nr will eventually go away.
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> Signed-off-by: Cedric Le Goater <clg@fr.ibm.com>
> Signed-off-by: Sukadev Bhattiprolu <sukadev@us.ibm.com>
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>  pid_nr->pid = pid;
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> + spin_unlock_irq(&pidmap_lock);
> +

```

Hmm. I think we really need to hash in some of the bits of the pid\_namespace so processes with identical pids don't get put on the same hash chain. It isn't critical but it is a good idea.

Eric

---

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Subject: Re: [RFC][PATCH 06/14] Populate pid\_nrs list with entry for init-pid-ns  
Posted by [ebiederm](#) on Wed, 21 Mar 2007 09:38:14 GMT  
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sukadev@us.ibm.com writes:

```
> Signed-off-by: Cedric Le Goater <clg@fr.ibm.com>
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Eric

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Subject: Re: [RFC][PATCH 06/14] Populate pid\_nrs list with entry for init-pid-ns  
Posted by [Herbert Poetzl](#) on Fri, 23 Mar 2007 01:27:51 GMT  
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On Wed, Mar 21, 2007 at 03:23:28AM -0600, Eric W. Biederman wrote:

```
> sukadev@us.ibm.com writes:
>
> > From: Cedric Le Goater <clg@fr.ibm.com>
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> pid_namespace so processes with identical pids don't get put on
> the same hash chain. It isn't critical but it is a good idea.

```

yes, can't hurt to distribute that a little, was  
already thinking about something like this:

```
#define pid_hashfn(nr) hash_long((unsigned long)(nr ^ space), pidhash_shift)
```

as the hash\_long should distribute any changes  
quite evenly ...

best,  
Herbert

> Eric

> \_\_\_\_\_

> Containers mailing list

> Containers@lists.linux-foundation.org

> <https://lists.linux-foundation.org/mailman/listinfo/containers>

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