
Subject: [PATCH v8 2/5] ipc: add sysctl to specify desired next object id
Posted by [Stanislav Kinsbursky](#) on Wed, 24 Oct 2012 15:35:09 GMT
[View Forum Message](#) <> [Reply to Message](#)

This patch adds 3 new variables and sysctls to tune them (by one "next_id" variable for messages, semaphores and shared memory respectively). This variable can be used to set desired id for next allocated IPC object. By default it's equal to -1 and old behaviour is preserved. If this variable is non-negative, then desired idr will be extracted from it and used as a start value to search for free IDR slot.

Notes:

- 1) this patch doesn't guarantee, that new object will have desired id. So it's up to user space how to handle new object with wrong id.
- 2) After successful id allocation attempt, "next_id" will be set back to -1 (if it was non-negative).

Signed-off-by: Stanislav Kinsbursky <skinsbursky@parallels.com>

```
---  
include/linux/ipc_namespace.h | 1 +  
ipc/ipc_sysctl.c              | 28 +++++  
ipc/util.c                   | 16 ++++++  
ipc/util.h                   | 1 +  
4 files changed, 42 insertions(+), 4 deletions(-)
```

```
diff --git a/include/linux/ipc_namespace.h b/include/linux/ipc_namespace.h  
index 5499c92..8704e40 100644
```

```
--- a/include/linux/ipc_namespace.h  
+++ b/include/linux/ipc_namespace.h  
@@ -24,6 +24,7 @@ struct ipc_ids {  
    unsigned short seq_max;  
    struct rw_semaphore rw_mutex;  
    struct idr ipcs_idr;  
+ int next_id;  
};
```

```
struct ipc_namespace {  
diff --git a/ipc/ipc_sysctl.c b/ipc/ipc_sysctl.c  
index 00fba2b..d06d77a 100644
```

```
--- a/ipc/ipc_sysctl.c  
+++ b/ipc/ipc_sysctl.c  
@@ -158,6 +158,7 @@ static int proc_ipcauto_dointvec_minmax(ctl_table *table, int write,  
  
static int zero;  
static int one = 1;  
+static int int_max = INT_MAX;  
  
static struct ctl_table ipc_kern_table[] = {
```

```

{
@@ -227,6 +228,33 @@ static struct ctl_table ipc_kern_table[] = {
    .extra1 = &zero,
    .extra2 = &one,
},
+ {
+ .procname = "sem_next_id",
+ .data = &init_ipc_ns.ids[IPC_SEM_IDS].next_id,
+ .maxlen = sizeof(init_ipc_ns.ids[IPC_SEM_IDS].next_id),
+ .mode = 0644,
+ .proc_handler = proc_ipc_dointvec_minmax,
+ .extra1 = &zero,
+ .extra2 = &int_max,
+ },
+ {
+ .procname = "msg_next_id",
+ .data = &init_ipc_ns.ids[IPC_MSG_IDS].next_id,
+ .maxlen = sizeof(init_ipc_ns.ids[IPC_MSG_IDS].next_id),
+ .mode = 0644,
+ .proc_handler = proc_ipc_dointvec_minmax,
+ .extra1 = &zero,
+ .extra2 = &int_max,
+ },
+ {
+ .procname = "shm_next_id",
+ .data = &init_ipc_ns.ids[IPC_SHM_IDS].next_id,
+ .maxlen = sizeof(init_ipc_ns.ids[IPC_SHM_IDS].next_id),
+ .mode = 0644,
+ .proc_handler = proc_ipc_dointvec_minmax,
+ .extra1 = &zero,
+ .extra2 = &int_max,
+ },
    {}
};

```

```

diff --git a/ipc/util.c b/ipc/util.c
index 72fd078..a961e46 100644
--- a/ipc/util.c

```

```

+++ b/ipc/util.c
@@ -122,6 +122,7 @@ void ipc_init_ids(struct ipc_ids *ids)

```

```

    ids->in_use = 0;
    ids->seq = 0;
+ ids->next_id = -1;

```

```

{
    int seq_limit = INT_MAX/SEQ_MULTIPLIER;
    if (seq_limit > USHRT_MAX)

```

```

@@ -252,6 +253,7 @@ int ipc_addid(struct ipc_ids* ids, struct kern_ipc_perm* new, int size)

```

```

kuid_t euid;
kgid_t egid;
int id, err;
+ int next_id = ids->next_id;

if (size > IPCMNI)
size = IPCMNI;
@@ -264,7 +266,8 @@ int ipc_addid(struct ipc_ids* ids, struct kern_ipc_perm* new, int size)
rcu_read_lock();
spin_lock(&new->lock);

- err = idr_get_new(&ids->ipcs_idr, new, &id);
+ err = idr_get_new_above(&ids->ipcs_idr, new,
+ (next_id < 0) ? 0 : ipcid_to_idx(next_id), &id);
if (err) {
spin_unlock(&new->lock);
rcu_read_unlock();
@@ -277,9 +280,14 @@ int ipc_addid(struct ipc_ids* ids, struct kern_ipc_perm* new, int size)
new->cuid = new->uid = euid;
new->gid = new->cgid = egid;

- new->seq = ids->seq++;
- if(ids->seq > ids->seq_max)
- ids->seq = 0;
+ if (next_id < 0) {
+ new->seq = ids->seq++;
+ if(ids->seq > ids->seq_max)
+ ids->seq = 0;
+ } else {
+ new->seq = ipcid_to_seqx(next_id);
+ ids->next_id = -1;
+ }

new->id = ipc_buildid(id, new->seq);
return id;
diff --git a/ipc/util.h b/ipc/util.h
index c8fe2f7..a61e0ca 100644
--- a/ipc/util.h
+++ b/ipc/util.h
@@ -92,6 +92,7 @@ void __init ipc_init_proc_interface(const char *path, const char *header,
#define IPC_SHM_IDS 2

#define ipcid_to_idx(id) ((id) % SEQ_MULTIPLIER)
+#define ipcid_to_seqx(id) ((id) / SEQ_MULTIPLIER)

/* must be called with ids->rw_mutex acquired for writing */
int ipc_addid(struct ipc_ids *, struct kern_ipc_perm *, int);

```

Subject: Re: [PATCH v8 2/5] ipc: add sysctl to specify desired next object id

Posted by [akpm](#) on Wed, 24 Oct 2012 21:41:23 GMT

[View Forum Message](#) <> [Reply to Message](#)

On Wed, 24 Oct 2012 19:35:09 +0400

Stanislav Kinsbursky <skinsbursky@parallels.com> wrote:

```
> This patch adds 3 new variables and sysctls to tune them (by one "next_id"
> variable for messages, semaphores and shared memory respectively).
> This variable can be used to set desired id for next allocated IPC object.
> By default it's equal to -1 and old behaviour is preserved.
> If this variable is non-negative, then desired idr will be extracted from it
> and used as a start value to search for free IDR slot.
>
> Notes:
> 1) this patch doesn't guarantee, that new object will have desired id. So it's
> up to user space how to handle new object with wrong id.
> 2) After successful id allocation attempt, "next_id" will be set back to -1
> (if it was non-negative).
>
> --- a/ipc/ipc_sysctl.c
> +++ b/ipc/ipc_sysctl.c
> @@ -158,6 +158,7 @@ static int proc_ipcauto_dointvec_minmax(ctl_table *table, int write,
>
> static int zero;
> static int one = 1;
> +static int int_max = INT_MAX;
>
> static struct ctl_table ipc_kern_table[] = {
> {
> @@ -227,6 +228,33 @@ static struct ctl_table ipc_kern_table[] = {
> .extra1 = &zero,
> .extra2 = &one,
> },
> + {
> + .procname = "sem_next_id",
> + .data = &init_ipc_ns.ids[IPC_SEM_IDS].next_id,
> + .maxlen = sizeof(init_ipc_ns.ids[IPC_SEM_IDS].next_id),
> + .mode = 0644,
> + .proc_handler = proc_ipc_dointvec_minmax,
> + .extra1 = &zero,
> + .extra2 = &int_max,
> + },
> + {
> + .procname = "msg_next_id",
> + .data = &init_ipc_ns.ids[IPC_MSG_IDS].next_id,
> + .maxlen = sizeof(init_ipc_ns.ids[IPC_MSG_IDS].next_id),
> + .mode = 0644,
> + .proc_handler = proc_ipc_dointvec_minmax,
```

```

> + .extra1 = &zero,
> + .extra2 = &int_max,
> + },
> + {
> + .procname = "shm_next_id",
> + .data = &init_ipc_ns.ids[IPC_SHM_IDS].next_id,
> + .maxlen = sizeof(init_ipc_ns.ids[IPC_SHM_IDS].next_id),
> + .mode = 0644,
> + .proc_handler = proc_ipc_dointvec_minmax,
> + .extra1 = &zero,
> + .extra2 = &int_max,
> + },
> {}
> };

```

ipc_kern_table[] is (badly) documented in Documentation/sysctl/kernel.txt. Can we at least mention these controls in there? Better, create a new way of properly documenting each control and document these three in that manner? Better still, document all the other ones as well ;)

The patch adds these controls to CONFIG_CHECKPOINT_RESTORE=n kernels. Why is this?

Subject: Re: [PATCH v8 2/5] ipc: add sysctl to specify desired next object id
 Posted by [Stanislav Kinsbursky](#) on Thu, 25 Oct 2012 07:53:10 GMT
[View Forum Message](#) <> [Reply to Message](#)

```

> On Wed, 24 Oct 2012 19:35:09 +0400
> Stanislav Kinsbursky <skinsbursky@parallels.com> wrote:
>
>> This patch adds 3 new variables and sysctls to tune them (by one "next_id"
>> variable for messages, semaphores and shared memory respectively).
>> This variable can be used to set desired id for next allocated IPC object.
>> By default it's equal to -1 and old behaviour is preserved.
>> If this variable is non-negative, then desired idr will be extracted from it
>> and used as a start value to search for free IDR slot.
>>
>> Notes:
>> 1) this patch doesn't guarantee, that new object will have desired id. So it's
>> up to user space how to handle new object with wrong id.
>> 2) After successful id allocation attempt, "next_id" will be set back to -1
>> (if it was non-negative).
>>
>> --- a/ipc/ipc_sysctl.c
>> +++ b/ipc/ipc_sysctl.c

```

```

>> @@ -158,6 +158,7 @@ static int proc_ipcauto_dointvec_minmax(ctl_table *table, int write,
>>
>> static int zero;
>> static int one = 1;
>> +static int int_max = INT_MAX;
>>
>> static struct ctl_table ipc_kern_table[] = {
>> {
>> @@ -227,6 +228,33 @@ static struct ctl_table ipc_kern_table[] = {
>> .extra1 = &zero,
>> .extra2 = &one,
>> },
>> + {
>> + .procname = "sem_next_id",
>> + .data = &init_ipc_ns.ids[IPC_SEM_IDS].next_id,
>> + .maxlen = sizeof(init_ipc_ns.ids[IPC_SEM_IDS].next_id),
>> + .mode = 0644,
>> + .proc_handler = proc_ipc_dointvec_minmax,
>> + .extra1 = &zero,
>> + .extra2 = &int_max,
>> + },
>> + {
>> + .procname = "msg_next_id",
>> + .data = &init_ipc_ns.ids[IPC_MSG_IDS].next_id,
>> + .maxlen = sizeof(init_ipc_ns.ids[IPC_MSG_IDS].next_id),
>> + .mode = 0644,
>> + .proc_handler = proc_ipc_dointvec_minmax,
>> + .extra1 = &zero,
>> + .extra2 = &int_max,
>> + },
>> + {
>> + .procname = "shm_next_id",
>> + .data = &init_ipc_ns.ids[IPC_SHM_IDS].next_id,
>> + .maxlen = sizeof(init_ipc_ns.ids[IPC_SHM_IDS].next_id),
>> + .mode = 0644,
>> + .proc_handler = proc_ipc_dointvec_minmax,
>> + .extra1 = &zero,
>> + .extra2 = &int_max,
>> + },
>> {}
>> };
>
> ipc_kern_table[] is (badly) documented in
> Documentation/sysctl/kernel.txt. Can we at least mention these
> controls in there? Better, create a new way of properly documenting
> each control and document these three in that manner? Better still,
> document all the other ones as well ;)
>

```

Yes, sure. I'll do my best.

> The patch adds these controls to CONFIG_CHECKPOINT_RESTORE=n kernels.

> Why is this?

>

I'll fix this.

--

Best regards,
Stanislav Kinsbursky
