Subject: [PATCH v4 3/9] ipc: segment key change helper introduced
Posted by Stanislav Kinsbursky on Mon, 13 Aug 2012 12:31:48 GMT
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This patch introduces existent segment key changing infrastructure.
New function ipc_update_key() can be used change segment key, cuid, cgid
values. It checks for that new key is not used (except IPC_PRIVATE) prior to
set it on existent.
To make this possible, added copying of this fields from user-space in
__get_compat_ipc_perm() and __get_compat_ipc64_perm() functions. Also segment
search by key and lock were splitted into different functions, because
ipc_update_key() doesn't need to lock the segment during check that new key is
not used.

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---
 ipc/compat.c | 6 ++++++
 ipc/util.c | 51 +++---
 ipc/util.h | 2 ++
 3 files changed, 56 insertions(+), 3 deletions(-)

diff --git a/ipc/compat.c b/ipc/compat.c
index a6df704..aa88515 100644
--- a/ipc/compat.c
+++ b/ipc/compat.c
@@ -144,6 +144,9 @@ static inline int __get_compat_ipc64_perm(struct ipc64_perm *p64,
  err = __get_user(p64->uid, &up64->uid);
  err |= __get_user(p64->gid, &up64->gid);
  err |= __get_user(p64->mode, &up64->mode);
+ err |= __get_user(p64->cuid, &up64->cuid);
+ err |= __get_user(p64->cgid, &up64->cgid);
+ err |= __get_user(p64->key, &up64->key);
  return err;
 }

@@ -155,6 +158,9 @@ static inline int __get_compat_ipc_perm(struct ipc64_perm *p,
  err = __get_user(p->uid, &up->uid);
  err |= __get_user(p->gid, &up->gid);
  err |= __get_user(p->mode, &up->mode);
+ err |= __get_user(p->cuid, &up->cuid);
+ err |= __get_user(p->cgid, &up->cgid);
+ err |= __get_user(p->key, &up->key);
  return err;
 }

diff --git a/ipc/util.c b/ipc/util.c
index ac9c6a9..d1e2f25 100644

```
--- a/ipc/util.c
+++ b/ipc/util.c
@@ -173,7 +173,7 @@ void __init ipc_init_proc_interface(const char *path, const char *header,
  * @key: The key to find
  *
  * Requires ipc_ids.rw_mutex locked.
- * Returns the LOCKED pointer to the ipc structure if found or NULL
+ * Returns the UNLOCKED pointer to the ipc structure if found or NULL
  * if not.
  * If key is found ipc points to the owning ipc structure
  */
@@ -195,7 +195,6 @@ static struct kern_ipc_perm *ipc_findkey(struct ipc_ids *ids, key_t key)
    continue;
   }

-  ipc_lock_by_ptr(ipc);
   return ipc;
  }

@@ -203,6 +202,27 @@ static struct kern_ipc_perm *ipc_findkey(struct ipc_ids *ids, key_t key)
 }

 /**
+ * ipc_findkey_locked - find and lock a key in an ipc identifier set
+ * @ids: Identifier set
+ * @key: The key to find
+ *
+ * Requires ipc_ids.rw_mutex locked.
+ * Returns the LOCKED pointer to the ipc structure if found or NULL
+ * if not.
+ * If key is found ipc points to the owning ipc structure
+ */
+
+static struct kern_ipc_perm *ipc_findkey_locked(struct ipc_ids *ids, key_t key)
+{
+ struct kern_ipc_perm *ipc;
+
+ ipc = ipc_findkey(ids, key);
+ if (ipc)
+  ipc_lock_by_ptr(ipc);
+ return ipc;
+}
+
+/**
  * ipc_get_maxid  - get the last assigned id
  * @ids: IPC identifier set
  *
@@ -382,7 +402,7 @@ retry:
```

```
   * a new entry + read locks are not "upgradable"
   */
  down_write(&ids->rw_mutex);
- ipcp = ipc_findkey(ids, params->key);
+ ipcp = ipc_findkey_locked(ids, params->key);
  if (ipcp == NULL) {
   /* key not used */
   if (!(flg & IPC_CREAT))
@@ -749,6 +769,31 @@ int ipcget(struct ipc_namespace *ns, struct ipc_ids *ids,
 }

 /**
+ * ipc_update_key - update the key of an IPC.
+ * @in:  the permission given as input.
+ * @out: the permission of the ipc to set.
+ *
+ * Common routine called by sys_shmctl(), sys_semctl(). sys_msgctl().
+ */
+int ipc_update_key(struct ipc_ids *ids, struct ipc64_perm *in,
+       struct kern_ipc_perm *out)
+{
+
+ if (in->key && out->key != in->key) {
+  /*
+   * Check for existent segment with the same key.
+   * Note: ipc_ids.rw_mutex is taken for write already.
+   */
+  if (ipc_findkey(ids, in->key))
+   return -EEXIST;
+ }
+ out->cuid = in->cuid;
+ out->cgid = in->cgid;
+ out->key = in->key;
+ return 0;
+}
+
+/**
  * ipc_update_perm - update the permissions of an IPC.
  * @in:  the permission given as input.
  * @out: the permission of the ipc to set.
diff --git a/ipc/util.h b/ipc/util.h
index 5f04b02..2bc6a9a 100644
--- a/ipc/util.h
+++ b/ipc/util.h
@@ -126,6 +126,8 @@ struct kern_ipc_perm *ipc_lock(struct ipc_ids *, int);

 void kernel_to_ipc64_perm(struct kern_ipc_perm *in, struct ipc64_perm *out);
 void ipc64_perm_to_ipc_perm(struct ipc64_perm *in, struct ipc_perm *out);
```

```
+int ipc_update_key(struct ipc_ids *ids, struct ipc64_perm *in,
+      struct kern_ipc_perm *out);
 void ipc_update_perm(struct ipc64_perm *in, struct kern_ipc_perm *out);
 struct kern_ipc_perm *ipcctl_pre_down(struct ipc_namespace *ns,
          struct ipc_ids *ids, int id, int cmd,
```