
Subject: [PATCH v3 03/10] ipc: segment key change helper introduced

Posted by [Stanislav Kinsbursky](#) on Fri, 10 Aug 2012 14:25:35 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);
- ipc = ipc_findkey(ids, params->key);
+ ipc = ipc_findkey_locked(ids, params->key);
    if (ipc == 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,
```
