Subject: Re: [RFC][PATCH 4/4]: Enable cloning PTY namespaces
Posted by serue on Wed, 06 Feb 2008 16:03:28 GMT
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Quoting sukadev@us.ibm.com (sukadev@us.ibm.com):
> From: Sukadev Bhattiprolu <sukadev@us.ibm.com>
> Subject: [RFC][PATCH 4/4]: Enable cloning PTY namespaces
>
> Enable cloning PTY namespaces.
>
> TODO:
> This version temporarily uses the clone flag '0x80000000' which
> is unused in mainline atm, but used for CLONE_IO in -mm.
> While we must extend clone() (urgently) to solve this, it hopefully
> does not affect review of the rest of this patchset.
>
> Changelog:
> - Version 0: Based on earlier versions from Serge Hallyn and
> Matt Helsley.
>
> Signed-off-by: Sukadev Bhattiprolu <sukadev@us.ibm.com>

Thanks for carrying this forward, Suka, and Matt.

Of course it still needs at least Pavel's concern addressed, but

Signed-off-by: Serge Hallyn <serue@us.ibm.com>

to start the SOB chain.

thanks,
-serge

> ---
> fs/devpts/inode.c | 84 ++++++++++++++++++++++++++++++++++++++-------
> include/linux/devpts_fs.h | 52 ++++++++++++++++++++++++++++
> include/linux/init_task.h | 1
> include/linux/nsproxy.h | 2 +
> include/linux/sched.h | 2 +
> kernel/fork.c | 2 -
> kernel/nsproxy.c | 17 ++++++--
> 7 files changed, 146 insertions(+), 14 deletions(-)
>
> Index: linux-2.6.24/fs/devpts/inode.c
> ===
> --- linux-2.6.24.orig/fs/devpts/inode.c 2008-02-05 19:16:39.000000000 -0800
> +++ linux-2.6.24/fs/devpts/inode.c 2008-02-05 20:27:41.000000000 -0800
> @@ -25,18 +25,25 @@

```
>  #define DEVPTS_SUPER_MAGIC 0x1cd1
>
>  extern int pty_limit;  /* Config limit on Unix98 ptys */
> -static DEFINE_IDR(allocated_ptys);
>  static DECLARE_MUTEX(allocated_ptys_lock);
> +static struct file_system_type devpts_fs_type;
> +
> +struct pts_namespace init_pts_ns = {
> + .kref = {
> +  .refcount = ATOMIC_INIT(2),
> + },
> + .allocated_ptys = IDR_INIT(init_pts_ns.allocated_ptys),
> + .mnt = NULL,
> +};
>
>  static inline struct idr *current_pts_ns_allocated_ptys(void)
>  {
> - return &allocated_ptys;
> + return &current->nsproxy->pts_ns->allocated_ptys;
>  }
>
> -static struct vfsmount *devpts_mnt;
>  static inline struct vfsmount *current_pts_ns_mnt(void)
>  {
> - return devpts_mnt;
> + return current->nsproxy->pts_ns->mnt;
>  }
>
>  static struct {
> @@ -59,6 +66,42 @@ static match_table_t tokens = {
>   {Opt_err, NULL}
>  };
>
> +struct pts_namespace *new_pts_ns(void)
> +{
> + struct pts_namespace *ns;
> +
> + ns = kmalloc(sizeof(*ns), GFP_KERNEL);
> + if (!ns)
> +  return ERR_PTR(-ENOMEM);
> +
> + ns->mnt = kern_mount_data(&devpts_fs_type, ns);
> + if (IS_ERR(ns->mnt)) {
> +  kfree(ns);
> +  return ERR_PTR(PTR_ERR(ns->mnt));
> + }
> +
> + idr_init(&ns->allocated_ptys);
```

```
> + kref_init(&ns->kref);
> +
> + return ns;
> +}
> +
> +void free_pts_ns(struct kref *ns_kref)
> +{
> + struct pts_namespace *ns;
> +
> + ns = container_of(ns_kref, struct pts_namespace, kref);
> + BUG_ON(ns == &init_pts_ns);
> +
> + mntput(ns->mnt);
> + /*
> +  * TODO:
> +  *      idr_remove_all(&ns->allocated_ptys); introduced in 2.6.23
> +  */
> + idr_destroy(&ns->allocated_ptys);
> + kfree(ns);
> +}
> +
>  static int devpts_remount(struct super_block *sb, int *flags, char *data)
>  {
>   char *p;
> @@ -160,18 +203,27 @@ static int devpts_test_sb(struct super_b
>
>  static int devpts_set_sb(struct super_block *sb, void *data)
>  {
> - sb->s_fs_info = data;
> + struct pts_namespace *ns = data;
> +
> + sb->s_fs_info = get_pts_ns(ns);
>   return set_anon_super(sb, NULL);
>  }
>
>  static int devpts_get_sb(struct file_system_type *fs_type,
>   int flags, const char *dev_name, void *data, struct vfsmount *mnt)
>  {
> + struct pts_namespace *ns;
>   struct super_block *sb;
>   int err;
>
> + /* hereafter we're very similar to proc_get_sb */
> + if (flags & MS_KERNMOUNT)
> +  ns = data;
> + else
> +  ns = current->nsproxy->pts_ns;
> +
```

```
>   /* hereafter we're very simlar to get_sb_nodev */
> - sb = sget(fs_type, devpts_test_sb, devpts_set_sb, data);
> + sb = sget(fs_type, devpts_test_sb, devpts_set_sb, ns);
>   if (IS_ERR(sb))
>    return PTR_ERR(sb);
>
> @@ -187,16 +239,25 @@ static int devpts_get_sb(struct file_sys
>   }
>
>   sb->s_flags |= MS_ACTIVE;
> - devpts_mnt = mnt;
> + ns->mnt = mnt;
>
>   return simple_set_mnt(mnt, sb);
>  }
>
> +static void devpts_kill_sb(struct super_block *sb)
> +{
> +       struct pts_namespace *ns;
> +
> +       ns = sb->s_fs_info;
> +       kill_anon_super(sb);
> +       put_pts_ns(ns);
> +}
> +
>  static struct file_system_type devpts_fs_type = {
>   .owner  = THIS_MODULE,
>   .name  = "devpts",
>   .get_sb  = devpts_get_sb,
> - .kill_sb = kill_anon_super,
> + .kill_sb = devpts_kill_sb,
>  };
>
>  /*
> @@ -352,18 +413,19 @@ static int __init init_devpts_fs(void)
>   if (err)
>    return err;
>
> - mnt = kern_mount_data(&devpts_fs_type, NULL);
> + mnt = kern_mount_data(&devpts_fs_type, &init_pts_ns);
>   if (IS_ERR(mnt))
>    err = PTR_ERR(mnt);
>   else
> -  devpts_mnt = mnt;
> +  init_pts_ns.mnt = mnt;
>   return err;
>  }
>
```

```
>  static void __exit exit_devpts_fs(void)
>  {
>   unregister_filesystem(&devpts_fs_type);
> - mntput(devpts_mnt);
> + mntput(init_pts_ns.mnt);
> + init_pts_ns.mnt = NULL;
>  }
>
>  module_init(init_devpts_fs)
> Index: linux-2.6.24/include/linux/devpts_fs.h
> ===================================================================
> --- linux-2.6.24.orig/include/linux/devpts_fs.h 2008-02-05 19:16:39.000000000 -0800
> +++ linux-2.6.24/include/linux/devpts_fs.h 2008-02-05 20:21:08.000000000 -0800
> @@ -14,9 +14,45 @@
>  #define _LINUX_DEVPTS_FS_H
>
>  #include <linux/errno.h>
> +#include <linux/nsproxy.h>
> +#include <linux/kref.h>
> +#include <linux/idr.h>
> +
> +struct pts_namespace {
> + struct kref kref;
> + struct idr allocated_ptys;
> + struct vfsmount *mnt;
> +};
> +
> +extern struct pts_namespace init_pts_ns;
>
>  #ifdef CONFIG_UNIX98_PTYS
>
> +extern struct pts_namespace *new_pts_ns(void);
> +extern void free_pts_ns(struct kref *kref);
> +
> +static inline struct pts_namespace *get_pts_ns(struct pts_namespace *ns)
> +{
> + if (ns)
> +  kref_get(&ns->kref);
> + return ns;
> +}
> +
> +static inline void put_pts_ns(struct pts_namespace *ns)
> +{
> + if (ns)
> +  kref_put(&ns->kref, free_pts_ns);
> +}
> +
> +static inline struct pts_namespace *copy_pts_ns(unsigned long flags,
```

```
> +  struct pts_namespace *old_ns)
> +{
> + if (flags & CLONE_NEWPTS)
> +  return new_pts_ns();
> + else
> +  return get_pts_ns(old_ns);
> +}
> +
>  int devpts_new_index(void);
>  void devpts_kill_index(int idx);
>  int devpts_pty_new(struct tty_struct *tty);      /* mknod in devpts */
> @@ -26,6 +62,22 @@ void devpts_pty_kill(int number);   /* u
>  #else
>
>  /* Dummy stubs in the no-pty case */
> +
> +static inline struct pts_namespace *get_pts_ns(struct pts_namespace *ns)
> +{
> + return &init_pts_ns;
> +}
> +
> +static inline void put_pts_ns(struct pts_namespace *ns) { }
> +
> +static inline struct pts_namespace *copy_pts_ns(unsigned long flags,
> +  struct pts_namespace *old_ns)
> +{
> + if (flags & CLONE_NEWPTS)
> +  return ERR_PTR(-EINVAL);
> + return old_ns;
> +}
> +
>  static inline int devpts_new_index(void) { return -EINVAL; }
>  static inline void devpts_kill_index(int idx) { }
>  static inline int devpts_pty_new(struct tty_struct *tty) { return -EINVAL; }
> Index: linux-2.6.24/include/linux/init_task.h
> ===================================================================
> --- linux-2.6.24.orig/include/linux/init_task.h 2008-02-05 19:16:39.000000000 -0800
> +++ linux-2.6.24/include/linux/init_task.h 2008-02-05 19:18:00.000000000 -0800
> @@ -77,6 +77,7 @@ extern struct nsproxy init_nsproxy;
>   .mnt_ns  = NULL,      \
>   INIT_NET_NS(net_ns)                                    \
>   INIT_IPC_NS(ipc_ns)      \
> + .pts_ns  = &init_pts_ns,     \
>   .user_ns = &init_user_ns,    \
>  }
>
> Index: linux-2.6.24/include/linux/nsproxy.h
> ===================================================================
```

> --- linux-2.6.24.orig/include/linux/nsproxy.h 2008-02-05 19:16:39.000000000 -0800
> +++ linux-2.6.24/include/linux/nsproxy.h 2008-02-05 19:18:00.000000000 -0800
> @@ -8,6 +8,7 @@ struct mnt_namespace;
> struct uts_namespace;
> struct ipc_namespace;
> struct pid_namespace;
> +struct pts_namespace;
>
> /*
>   * A structure to contain pointers to all per-process
> @@ -29,6 +30,7 @@ struct nsproxy {
>   struct pid_namespace *pid_ns;
>   struct user_namespace *user_ns;
>   struct net   *net_ns;
> + struct pts_namespace *pts_ns;
> };
> extern struct nsproxy init_nsproxy;
>
> Index: linux-2.6.24/include/linux/sched.h
> ===
> --- linux-2.6.24.orig/include/linux/sched.h 2008-02-05 19:16:39.000000000 -0800
> +++ linux-2.6.24/include/linux/sched.h 2008-02-05 19:54:05.000000000 -0800
> @@ -27,6 +27,8 @@
> #define CLONE_NEWUSER 0x10000000 /* New user namespace */
> #define CLONE_NEWPID 0x20000000 /* New pid namespace */
> #define CLONE_NEWNET 0x40000000 /* New network namespace */
> +#define CLONE_NEWPTS   (CLONE_NEWNS|0x80000000) /* Temporary - only for patch review */
> +   /* Badly need to /extend clone() !!! */
>
> /*
>   * Scheduling policies
> Index: linux-2.6.24/kernel/fork.c
> ===
> --- linux-2.6.24.orig/kernel/fork.c 2008-02-05 19:16:39.000000000 -0800
> +++ linux-2.6.24/kernel/fork.c 2008-02-05 19:18:00.000000000 -0800
> @@ -1655,7 +1655,7 @@ asmlinkage long sys_unshare(unsigned lon
>   if (unshare_flags & ~(CLONE_THREAD|CLONE_FS|CLONE_NEWNS|CLONE_SIGHAND|
>   CLONE_VM|CLONE_FILES|CLONE_SYSVSEM|
>   CLONE_NEWUTS|CLONE_NEWIPC|CLONE_NEWUSER|
> -   CLONE_NEWNET))
> +   CLONE_NEWNET|CLONE_NEWPTS))
>   goto bad_unshare_out;
>
>   if ((err = unshare_thread(unshare_flags)))
> Index: linux-2.6.24/kernel/nsproxy.c
> ===
> --- linux-2.6.24.orig/kernel/nsproxy.c 2008-02-05 19:16:39.000000000 -0800

```
> +++ linux-2.6.24/kernel/nsproxy.c 2008-02-05 19:18:00.000000000 -0800
> @@ -21,6 +21,7 @@
>  #include <linux/utsname.h>
>  #include <linux/pid_namespace.h>
>  #include <net/net_namespace.h>
> +#include <linux/devpts_fs.h>
>
>  static struct kmem_cache *nsproxy_cachep;
>
> @@ -92,8 +93,17 @@ static struct nsproxy *create_new_namesp
>    goto out_net;
>   }
>
> + new_nsp->pts_ns = copy_pts_ns(flags, tsk->nsproxy->pts_ns);
> + if (IS_ERR(new_nsp->pts_ns)) {
> +  err = PTR_ERR(new_nsp->pts_ns);
> +  goto out_pts;
> + }
> +
>   return new_nsp;
>
> +out_pts:
> + if (new_nsp->net_ns)
> +  put_net(new_nsp->net_ns);
>  out_net:
>   if (new_nsp->user_ns)
>    put_user_ns(new_nsp->user_ns);
> @@ -130,7 +140,8 @@ int copy_namespaces(unsigned long flags,
>   get_nsproxy(old_ns);
>
>   if (!(flags & (CLONE_NEWNS | CLONE_NEWUTS | CLONE_NEWIPC |
> -    CLONE_NEWUSER | CLONE_NEWPID | CLONE_NEWNET)))
> +    CLONE_NEWUSER | CLONE_NEWPID | CLONE_NEWNET |
> +    CLONE_NEWPTS)))
>    return 0;
>
>   if (!capable(CAP_SYS_ADMIN)) {
> @@ -169,6 +180,8 @@ void free_nsproxy(struct nsproxy *ns)
>    put_pid_ns(ns->pid_ns);
>   if (ns->user_ns)
>    put_user_ns(ns->user_ns);
> + if (ns->pts_ns)
> +  put_pts_ns(ns->pts_ns);
>   put_net(ns->net_ns);
>   kmem_cache_free(nsproxy_cachep, ns);
>  }
> @@ -183,7 +196,7 @@ int unshare_nsproxy_namespaces(unsigned
>   int err = 0;
```

>
>   if (!(unshare_flags & (CLONE_NEWNS | CLONE_NEWUTS | CLONE_NEWIPC |
> -   CLONE_NEWUSER | CLONE_NEWNET)))
> +   CLONE_NEWUSER | CLONE_NEWNET | CLONE_NEWPTS)))
>   return 0;
>
>   if (!capable(CAP_SYS_ADMIN))
> _____
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