
Subject: [PATCH] Filesystems visibility control group
Posted by [Pavel Emelianov](#) on Thu, 07 Feb 2008 15:04:52 GMT
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After making the devices visibility cg, I thought, that it might be useful to have a filesystem visibility control group.

The patch is rather simple - all the code is in fs/filesystems.c

The main idea is in file_system_proxy object. This coincides in its three first fields with file_system_type (name, flags and next) and is used to lookup the file system. To distinguish between them I use a FS_IS_PROXY flag.

Having this proxy is the easiest way to keep the global list and file_system_type structure (almost) untouched and simplify the code.

The filesystems.list file syntax is simple: [+<->]<name> without a '\n' at the end. Made for 2.6.24-rc8-mm1

Signed-off-by: Pavel Emelianov <xemul@openvz.org>

```
diff --git a/fs/filesystems.c b/fs/filesystems.c
index f37f872..b8189a4 100644
```

```
--- a/fs/filesystems.c
```

```
+++ b/fs/filesystems.c
```

```
@@ -27,9 +27,214 @@
```

```
 * Once the reference is obtained we can drop the spinlock.
```

```
 */
```

```
+/*
```

```
+ * the first three fields of it must coincide with the
```

```
+ * struct file_system_type
```

```
+ */
```

```
+
```

```
+struct file_system_proxy {
```

```
+ char *name;
```

```
+ struct file_system_proxy *next;
```

```
+ int fs_flags;
```

```
+ struct file_system_type *fs;
```

```
+};
```

```
+
```

```
static struct file_system_type *file_systems;
```

```
static DEFINE_RWLOCK(file_systems_lock);
```

```
+#ifdef CONFIG_CGROUP_FS
```

```

#include <linux/cgroup.h>
+
+struct fs_cgroup {
+ struct cgroup_subsys_state css;
+
+ struct file_system_proxy *fs;
+};
+
+static inline struct fs_cgroup *css_to_fs(struct cgroup_subsys_state *ss)
+{
+ return container_of(ss, struct fs_cgroup, css);
+}
+
+static inline struct fs_cgroup *cgroup_to_fs(struct cgroup *c)
+{
+ return css_to_fs(cgroup_subsys_state(c, fs_subsys_id));
+}
+
+static inline struct file_system_type *task_fs_types(struct task_struct *t)
+{
+ struct cgroup_subsys_state *css;
+
+ css = task_subsys_state(t, fs_subsys_id);
+ if (css->cgroup->parent == NULL)
+ return file_systems;
+ else
+ return (struct file_system_type *)css_to_fs(css)->fs;
+}
+
+static struct cgroup_subsys_state *
+fs_create(struct cgroup_subsys *ss, struct cgroup *cont)
+{
+ struct fs_cgroup *fs;
+
+ fs = kzalloc(sizeof(struct fs_cgroup), GFP_KERNEL);
+ if (fs == NULL)
+ return ERR_PTR(-ENOMEM);
+ else
+ return &fs->css;
+}
+
+static void fs_destroy(struct cgroup_subsys *ss, struct cgroup *cont)
+{
+ struct fs_cgroup *fcg;
+ struct file_system_proxy *p, *next;
+
+ fcg = cgroup_to_fs(cont);
+

```

```

+ write_lock(&file_systems_lock);
+ for (p = fcg->fs; p != NULL; p = next) {
+   next = p->next;
+   put_filesystem(p->fs);
+   kfree(p);
+ }
+ write_unlock(&file_systems_lock);
+
+ kfree(fcg);
+}
+
+static ssize_t fs_write(struct cgroup *cont, struct cftype *cft,
+ struct file *f, const char __user *ubuf,
+ size_t nbytes, loff_t *pos)
+{
+ int err, add;
+ char buf[64];
+ struct file_system_type *fs;
+ struct file_system_proxy **p, *proxy = NULL;
+ struct fs_cgroup *fcg;
+
+ if (copy_from_user(buf, ubuf, sizeof(buf)))
+   return -EFAULT;
+
+ buf[sizeof(buf) - 1] = '\0';
+ if (buf[0] == '+')
+   add = 1;
+ else if (buf[0] == '-')
+   add = 0;
+ else
+   return -EINVAL;
+
+ if (add) {
+   err = -ENOMEM;
+   proxy = kmalloc(sizeof(*proxy) + sizeof(buf), GFP_KERNEL);
+   if (proxy == NULL)
+     goto err_alloc;
+ }
+
+ fcg = cgroup_to_fs(cont);
+ write_lock(&file_systems_lock);
+
+ for (p = &fcg->fs; *p != NULL; p = &(*p)->next)
+   if (strcmp((*p)->name, buf + 1) == 0)
+     goto fs_exists;
+
+ err = -ESRCH;
+ if (!add)

```

```

+ goto err_unlock;
+
+ for (fs = file_systems; fs != NULL; fs = fs->next)
+ if (strcmp(fs->name, buf + 1) == 0)
+ break;
+
+ if (fs == NULL)
+ goto err_srch;
+
+ if (!try_module_get(fs->owner))
+ goto err_srch;
+
+ proxy->name = (char *) (proxy + 1);
+ strcpy(proxy->name, fs->name);
+ proxy->fs_flags = fs->fs_flags | FS_IS_PROXY;
+ proxy->fs = fs;
+ proxy->next = fcg->fs;
+ fcg->fs = proxy;
+ write_unlock(&file_systems_lock);
+
+ return nbytes;
+
+fs_exists:
+ if (add) {
+ err = -EEXIST;
+ goto err_srch;
+ }
+
+ proxy = *p;
+ *p = proxy->next;
+ write_unlock(&file_systems_lock);
+ put_filesystem(proxy->fs);
+ kfree(proxy);
+ return nbytes;
+
+err_srch:
+ kfree(proxy);
+err_unlock:
+ write_unlock(&file_systems_lock);
+err_alloc:
+ return err;
+}
+
+static ssize_t fs_read(struct cgroup *cont, struct cftype *cft,
+ struct file *f, char __user *ubuf,
+ size_t nbytes, loff_t *pos)
+{
+ int len;

```

```

+ char *buf;
+ struct fs_cgroup *fcg;
+ struct file_system_proxy *p;
+
+ buf = (char *)__get_free_page(GFP_KERNEL);
+
+ len = 0;
+ fcg = cgroup_to_fs(cont);
+ read_lock(&file_systems_lock);
+ for (p = fcg->fs; p != NULL; p = p->next) {
+   if (len + strlen(p->name) > PAGE_SIZE)
+     break;
+
+   len += sprintf(buf + len, "%s\n", p->name);
+ }
+ read_unlock(&file_systems_lock);
+
+ return simple_read_from_buffer(ubuf, nbytes, pos, buf, len);
+}
+
+static struct cftype fs_files[] = {
+ {
+   .name = "list",
+   .write = fs_write,
+   .read = fs_read,
+ },
+};
+
+static int fs_populate(struct cgroup_subsys *ss, struct cgroup *cont)
+{
+ return cgroup_add_files(cont, ss,
+   fs_files, ARRAY_SIZE(fs_files));
+}
+
+struct cgroup_subsys fs_subsys = {
+ .name = "filesystems",
+ .subsys_id = fs_subsys_id,
+ .create = fs_create,
+ .destroy = fs_destroy,
+ .populate = fs_populate,
+};
+
+#else
+static inline struct file_system_type *task_fs_types(struct task_struct *t)
+{
+ return file_systems;
+}
+
+#endif
+

```

```

/* WARNING: This can be used only if we _already_ own a reference */
void get_filesystem(struct file_system_type *fs)
{
@@ -41,13 +246,29 @@ void put_filesystem(struct file_system_type *fs)
    module_put(fs->owner);
}

-static struct file_system_type **find_filesystem(const char *name, unsigned len)
+static struct file_system_type **find_filesystemp(const char *name, unsigned len)
{
    struct file_system_type **p;
    for (p=&file_systems; *p; p=(*p)->next)
        if (strlen((*p)->name) == len &&
            strncmp((*p)->name, name, len) == 0)
            break;
+
+ return p;
+}
+
+static struct file_system_type *find_filesystem(const char *name, unsigned len)
+{
+ struct file_system_type *p;
+
+ for (p = task_fs_types(current); p != NULL; p = p->next)
+     if (strlen(p->name) == len &&
+         strncmp(p->name, name, len) == 0)
+         break;
+
+ if (p && (p->fs_flags & FS_IS_PROXY))
+     p = ((struct file_system_proxy *)p)->fs;
+
+ return p;
+}

@@ -74,7 +295,7 @@ int register_filesystem(struct file_system_type * fs)
    return -EBUSY;
    INIT_LIST_HEAD(&fs->fs_supers);
    write_lock(&file_systems_lock);
- p = find_filesystem(fs->name, strlen(fs->name));
+ p = find_filesystemp(fs->name, strlen(fs->name));
    if (*p)
        res = -EBUSY;
    else
@@ -131,7 +352,8 @@ static int fs_index(const char __user * __name)

    err = -EINVAL;
    read_lock(&file_systems_lock);
- for (tmp=file_systems, index=0 ; tmp ; tmp=tmp->next, index++) {

```

```

+ for (tmp = task_fs_types(current), index = 0; tmp;
+   tmp = tmp->next, index++) {
+   if (strcmp(tmp->name,name) == 0) {
+     err = index;
+     break;
@@ -148,8 +370,9 @@ static int fs_name(unsigned int index, char __user * buf)
int len, res;

    read_lock(&file_systems_lock);
- for (tmp = file_systems; tmp; tmp = tmp->next, index--)
- if (index <= 0 && try_module_get(tmp->owner))
+ for (tmp = task_fs_types(current); tmp; tmp = tmp->next, index--)
+ if (index <= 0 && ((tmp->fs_flags & FS_IS_PROXY) ||
+   try_module_get(tmp->owner)))
    break;
    read_unlock(&file_systems_lock);
    if (!tmp)
@@ -158,7 +381,8 @@ static int fs_name(unsigned int index, char __user * buf)
/* OK, we got the reference, so we can safely block */
len = strlen(tmp->name) + 1;
res = copy_to_user(buf, tmp->name, len) ? -EFAULT : 0;
- put_filesystem(tmp);
+ if (!(tmp->fs_flags & FS_IS_PROXY))
+ put_filesystem(tmp);
    return res;
}

@@ -168,7 +392,8 @@ static int fs_maxindex(void)
int index;

    read_lock(&file_systems_lock);
- for (tmp = file_systems, index = 0 ; tmp ; tmp = tmp->next, index++)
+ for (tmp = task_fs_types(current), index = 0; tmp;
+   tmp = tmp->next, index++)
    ;
    read_unlock(&file_systems_lock);
    return index;
@@ -203,7 +428,7 @@ int get_filesystem_list(char * buf)
struct file_system_type * tmp;

    read_lock(&file_systems_lock);
- tmp = file_systems;
+ tmp = task_fs_types(current);
    while (tmp && len < PAGE_SIZE - 80) {
        len += sprintf(buf+len, "%s\t%s\n",
            (tmp->fs_flags & FS_REQUIRES_DEV) ? "" : "nodev",
@@ -221,13 +446,13 @@ struct file_system_type *get_fs_type(const char *name)
unsigned len = dot ? dot - name : strlen(name);

```

```

    read_lock(&file_systems_lock);
- fs = *(find_filesystem(name, len));
+ fs = find_filesystem(name, len);
    if (fs && !try_module_get(fs->owner))
        fs = NULL;
    read_unlock(&file_systems_lock);
    if (!fs && (request_module("%.*s", len, name) == 0)) {
        read_lock(&file_systems_lock);
- fs = *(find_filesystem(name, len));
+ fs = find_filesystem(name, len);
        if (fs && !try_module_get(fs->owner))
            fs = NULL;
        read_unlock(&file_systems_lock);
diff --git a/include/linux/cgroup_subsys.h b/include/linux/cgroup_subsys.h
index 228235c..cda4be7 100644
--- a/include/linux/cgroup_subsys.h
+++ b/include/linux/cgroup_subsys.h
@@ -42,3 +42,9 @@ SUBSYS(mem_cgroup)
#endif

/* */
+
+#ifdef CONFIG_CGROUP_FS
+SUBSYS(fs)
+#endif
+
+/* */
diff --git a/include/linux/fs.h b/include/linux/fs.h
index a456afe..19b6e0e 100644
--- a/include/linux/fs.h
+++ b/include/linux/fs.h
@@ -93,6 +93,7 @@ extern int dir_notify_enable;
#define FS_REQUIRES_DEV 1
#define FS_BINARY_MOUNTDATA 2
#define FS_HAS_SUBTYPE 4
+#define FS_IS_PROXY 4096 /* This is a proxy for control groups */
#define FS_REVAL_DOT 16384 /* Check the paths ".", ".." for staleness */
#define FS_RENAME_DOES_D_MOVE 32768 /* FS will handle d_move()
    * during rename() internally.
@@ -1426,12 +1427,12 @@ int sync_inode(struct inode *inode, struct writeback_control *wbc);

struct file_system_type {
    const char *name;
+ struct file_system_type * next;
    int fs_flags;
    int (*get_sb) (struct file_system_type *, int,
        const char *, void *, struct vfsmount *);

```

```

void (*kill_sb) (struct super_block *);
struct module *owner;
- struct file_system_type * next;
  struct list_head fs_supers;

  struct lock_class_key s_lock_key;
diff --git a/init/Kconfig b/init/Kconfig
index 732a1c2..60d5f08 100644
--- a/init/Kconfig
+++ b/init/Kconfig
@@ -292,6 +292,12 @@ config CGROUP_NS
     for instance virtual servers and checkpoint/restart
     jobs.

+config CGROUP_FS
+ bool "Filesystems control group"
+ depends on CGROUPS
+ help
+   Tune the filesystems visibility
+
+ config CPUSETS
+   bool "Cpuset support"
+   depends on SMP && CGROUPS

```

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

Subject: Re: [PATCH] Filesystems visibility control group
Posted by [Dave Hansen](#) on Thu, 07 Feb 2008 17:09:29 GMT
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On Thu, 2008-02-07 at 18:04 +0300, Pavel Emelyanov wrote:
> Having this proxy is the easiest way to keep the global list and
> file_system_type structure (almost) untouched and simplify the code.
>
> The filesystems.list file syntax is simple: [+<name> without
> a '\n' at the end. Made for 2.6.24-rc8-mm1

For what would you want this? What kinds of filesystems would you like
to restrict the use of in a container?

-- Dave

Containers mailing list
Containers@lists.linux-foundation.org

Subject: Re: [PATCH] Filesystems visibility control group
Posted by [Paul Jackson](#) on Thu, 07 Feb 2008 18:13:29 GMT
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> useful to have a filesystem visibility control group.

idle minds would like to know ... what is one of these?

--

I won't rest till it's the best ...
Programmer, Linux Scalability
Paul Jackson <pj@sgi.com> 1.940.382.4214

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

Subject: Re: [PATCH] Filesystems visibility control group
Posted by [Pavel Emelianov](#) on Fri, 08 Feb 2008 08:13:31 GMT
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Dave Hansen wrote:

> On Thu, 2008-02-07 at 18:04 +0300, Pavel Emelyanov wrote:
>> Having this proxy is the easiest way to keep the global list and
>> file_system_type structure (almost) untouched and simplify the code.
>>
>> The filesystems.list file syntax is simple: [+<name> without
>> a '\n' at the end. Made for 2.6.24-rc8-mm1
>
> For what would you want this? What kinds of filesystems would you like
> to restrict the use of in a container?

Any you want to.

E.g. ext3 with its journaling thread. Having 100 containers
with a journal in each kills the node.
E.g. cgroupsfs if you don't want your cgroup create its
own ones.
E.g. NFS that can stuck on umount and block you container
on stop.

> -- Dave

Containers mailing list
Containers@lists.linux-foundation.org
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Subject: Re: [PATCH] Filesystems visibility control group
Posted by [serue](#) on Fri, 08 Feb 2008 15:54:48 GMT
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Quoting Pavel Emelyanov (xemul@openvz.org):

> Dave Hansen wrote:
> > On Thu, 2008-02-07 at 18:04 +0300, Pavel Emelyanov wrote:
> >> Having this proxy is the easiest way to keep the global list and
> >> file_system_type structure (almost) untouched and simplify the code.
> >>
> >> The filesystems.list file syntax is simple: [+<name> without
> >> a '\n' at the end. Made for 2.6.24-rc8-mm1
> >
> > For what would you want this? What kinds of filesystems would you like
> > to restrict the use of in a container?
>
> Any you want to.
>
> E.g. ext3 with its journaling thread. Having 100 containers
> with a journal in each kills the node.
> E.g. cgroupsfs if you don't want your cgroup create its
> own ones.

Ah, so that answers that question - you enforce this by umounting
/cgroups in the container and not letting them remount it?

> E.g. NFS that can stuck on umount and block you container
> on stop.

>
> > -- Dave

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

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