
Subject: [PATCH 6/9] namespaces: utsname: implement utsname namespaces

Posted by [serue](#) on Thu, 18 May 2006 15:50:14 GMT

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This patch defines the uts namespace and some manipulators.

Adds the uts namespace to task_struct, and initializes a system-wide init namespace.

It leaves a #define for system_utsname so sysctl will compile.

This define will be removed in a separate patch.

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

```
include/linux/init_task.h | 2 ++
include/linux/nsproxy.h   | 2 ++
include/linux/sched.h     | 1 +
include/linux/utsname.h   | 52 ++++++-----
init/Kconfig              | 8 ++++++
init/version.c            | 22 ++++++-----
kernel/Makefile           | 1 +
kernel/nsproxy.c          | 14 ++++++
kernel/utsname.c          | 43 ++++++
9 files changed, 133 insertions(+), 12 deletions(-)
create mode 100644 kernel/utsname.c
```

d590372d659cf4bb3676f8ee7a509e173685b6ee

diff --git a/include/linux/init_task.h b/include/linux/init_task.h

index 672dc04..ceb68b7 100644

--- a/include/linux/init_task.h

+++ b/include/linux/init_task.h

@ @ -3,6 +3,7 @ @

```
#include <linux/file.h>
```

```
#include <linux/rcupdate.h>
```

```
+#include <linux/utsname.h>
```

```
#define INIT_FDTABLE \
```

```
{ \
```

```
@ @ -70,6 +71,7 @ @ extern struct nsproxy init_nsproxy;
```

```
#define INIT_NS_PROXY(nsproxy) { \
```

```
    .count = ATOMIC_INIT(1), \
```

```
    .nslock = SPIN_LOCK_UNLOCKED, \
```

```
+ .uts_ns = &init_uts_ns, \
```

```
    .namespace = NULL, \
```

```
}
```

```

diff --git a/include/linux/nsproxy.h b/include/linux/nsproxy.h
index 7ebe666..9c2e0ad 100644
--- a/include/linux/nsproxy.h
+++ b/include/linux/nsproxy.h
@@ -5,6 +5,7 @@
#include <linux/sched.h>

struct namespace;
+struct uts_namespace;

/*
 * A structure to contain pointers to all per-process
@@ -21,6 +22,7 @@ struct namespace;
struct nsproxy {
    atomic_t count;
    spinlock_t nslock;
+ struct uts_namespace *uts_ns;
    struct namespace *namespace;
};
extern struct nsproxy init_nsproxy;
diff --git a/include/linux/sched.h b/include/linux/sched.h
index f2c945b..3332d5e 100644
--- a/include/linux/sched.h
+++ b/include/linux/sched.h
@@ -685,6 +685,7 @@
static inline void prefetch_stack(struct
struct audit_context; /* See audit.c */
struct mempolicy;
struct pipe_inode_info;
+struct uts_namespace;

enum sleep_type {
    SLEEP_NORMAL,
diff --git a/include/linux/utsname.h b/include/linux/utsname.h
index 77e97a5..e6120e7 100644
--- a/include/linux/utsname.h
+++ b/include/linux/utsname.h
@@ -1,6 +1,11 @@
#ifdef _LINUX_UTSNAME_H
#define _LINUX_UTSNAME_H

+#include <linux/sched.h>
+#include <linux/kref.h>
+#include <linux/nsproxy.h>
+#include <asm/atomic.h>
+
#define __OLD_UTS_LEN 8

struct oldold_utsname {

```

```
@ @ -30,17 +35,58 @@ struct new_utsname {
    char domainname[65];
};

-extern struct new_utsname system_utsname;
+struct uts_namespace {
+ struct kref kref;
+ struct new_utsname name;
+};
+extern struct uts_namespace init_uts_ns;
+
+static inline void get_uts_ns(struct uts_namespace *ns)
+{
+ kref_get(&ns->kref);
+}
+
+#ifdef CONFIG_UTS_NS
+extern int copy_utsname(int flags, struct task_struct *tsk);
+extern void free_uts_ns(struct kref *kref);
+
+static inline void put_uts_ns(struct uts_namespace *ns)
+{
+ kref_put(&ns->kref, free_uts_ns);
+}
+
+static inline void exit_utsname(struct task_struct *p)
+{
+ struct uts_namespace *uts_ns = p->nsproxy->uts_ns;
+ if (uts_ns) {
+ put_uts_ns(uts_ns);
+ }
+}
+
+#else
+static inline int copy_utsname(int flags, struct task_struct *tsk)
+{
+ return 0;
+}
+
+static inline void put_uts_ns(struct uts_namespace *ns)
+{
+}
+
+static inline void exit_utsname(struct task_struct *p)
+{
+}
+
+#endif

static inline struct new_utsname *utsname(void)
{
```

```

- return &system_utsname;
+ return &current->nsproxy->uts_ns->name;
}

static inline struct new_utsname *init_utsname(void)
{
- return &system_utsname;
+ return &init_uts_ns.name;
}

+#define system_utsname init_uts_ns.name
+
extern struct rw_semaphore uts_sem;
#endif
diff --git a/init/Kconfig b/init/Kconfig
index 3b36a1d..8460e5a 100644
--- a/init/Kconfig
+++ b/init/Kconfig
@@ -166,6 +166,14 @@ config SYSCTL
    building a kernel for install/rescue disks or your system is very
    limited in memory.

+config UTS_NS
+ bool "UTS Namespaces"
+ default n
+ help
+   Support uts namespaces. This allows containers, i.e.
+   vservers, to use uts namespaces to provide different
+   uts info for different servers. If unsure, say N.
+
config AUDIT
    bool "Auditing support"
    depends on NET
diff --git a/init/version.c b/init/version.c
index 3ddc3ce..78cef48 100644
--- a/init/version.c
+++ b/init/version.c
@@ -11,23 +11,27 @@
#include <linux/uts.h>
#include <linux/utsname.h>
#include <linux/version.h>
+#include <linux/sched.h>

#define version(a) Version_ ## a
#define version_string(a) version(a)

int version_string(LINUX_VERSION_CODE);

```

```

-struct new_utsname system_utsname = {
- .sysname = UTS_SYSNAME,
- .nodename = UTS_NODENAME,
- .release = UTS_RELEASE,
- .version = UTS_VERSION,
- .machine = UTS_MACHINE,
- .domainname = UTS_DOMAINNAME,
+struct uts_namespace init_uts_ns = {
+ .kref = {
+ .refcount = ATOMIC_INIT(2),
+ },
+ .name = {
+ .sysname = UTS_SYSNAME,
+ .nodename = UTS_NODENAME,
+ .release = UTS_RELEASE,
+ .version = UTS_VERSION,
+ .machine = UTS_MACHINE,
+ .domainname = UTS_DOMAINNAME,
+ },
+ };

-EXPORT_SYMBOL(system_utsname);
-
const char linux_banner[] =
"Linux version " UTS_RELEASE " (" LINUX_COMPILE_BY "@"
LINUX_COMPILE_HOST ") (" LINUX_COMPILER ") " UTS_VERSION "\n";
diff --git a/kernel/Makefile b/kernel/Makefile
index 215fb33..ab7426c 100644
--- a/kernel/Makefile
+++ b/kernel/Makefile
@@ -38,6 +38,7 @@ obj-$(CONFIG_GENERIC_HARDIRQS) += irq/
obj-$(CONFIG_SECCOMP) += seccomp.o
obj-$(CONFIG_RCU_TORTURE_TEST) += rcutorture.o
obj-$(CONFIG_RELAY) += relay.o
+obj-$(CONFIG_UTS_NS) += utsname.o

ifneq ($(CONFIG_SCHED_NO_NO_OMIT_FRAME_POINTER),y)
# According to Alan Modra <alan@linuxcare.com.au>, the -fno-omit-frame-pointer is
diff --git a/kernel/nsproxy.c b/kernel/nsproxy.c
index 4103f58..d2c6e94 100644
--- a/kernel/nsproxy.c
+++ b/kernel/nsproxy.c
@@ -14,6 +14,7 @@
#include <linux/version.h>
#include <linux/nsproxy.h>
#include <linux/namespace.h>
+#include <linux/utsname.h>

```

```

static inline void get_nsproxy(struct nsproxy *ns)
{
@@ -57,6 +58,8 @@ struct nsproxy *dup_namespaces(struct ns
    if (ns) {
        if (ns->namespace)
            get_namespace(ns->namespace);
+   if (ns->uts_ns)
+   get_uts_ns(ns->uts_ns);
    }

    return ns;
@@ -95,6 +98,15 @@ int copy_namespaces(int flags, struct ta
    goto out;
}

+ err = copy_utsname(flags, tsk);
+ if (err) {
+   if (new_ns->namespace)
+   put_namespace(new_ns->namespace);
+   tsk->nsproxy = old_ns;
+   put_nsproxy(new_ns);
+   goto out;
+ }
+
out:
    put_nsproxy(old_ns);
    return err;
@@ -104,5 +116,7 @@ void free_nsproxy(struct nsproxy *ns)
{
    if (ns->namespace)
        put_namespace(ns->namespace);
+   if (ns->uts_ns)
+   put_uts_ns(ns->uts_ns);
    kfree(ns);
}
diff --git a/kernel/utsname.c b/kernel/utsname.c
new file mode 100644
index 0000000..2818c9b
--- /dev/null
+++ b/kernel/utsname.c
@@ -0,0 +1,43 @@
+/*
+ * Copyright (C) 2004 IBM Corporation
+ *
+ * Author: Serge Hallyn <serue@us.ibm.com>
+ *
+ * This program is free software; you can redistribute it and/or
+ * modify it under the terms of the GNU General Public License as

```

```

+ * published by the Free Software Foundation, version 2 of the
+ * License.
+ */
+
+#include <linux/compile.h>
+#include <linux/module.h>
+#include <linux/uts.h>
+#include <linux/utsname.h>
+#include <linux/version.h>
+
+/*
+ * Copy task tsk's utsname namespace, or clone it if flags
+ * specifies CLONE_NEWUTS. In latter case, changes to the
+ * utsname of this process won't be seen by parent, and vice
+ * versa.
+ */
+int copy_utsname(int flags, struct task_struct *tsk)
+{
+ struct uts_namespace *old_ns = tsk->nsproxy->uts_ns;
+ int err = 0;
+
+ if (!old_ns)
+ return 0;
+
+ get_uts_ns(old_ns);
+
+ return err;
+}
+
+void free_uts_ns(struct kref *kref)
+{
+ struct uts_namespace *ns;
+
+ ns = container_of(kref, struct uts_namespace, kref);
+ kfree(ns);
+}
+
+--
1.1.6

```
