

1.105.1

Manage/Query kernel and kernel modules at runtime

Weight 4

Linux Professional Institute Certification — 102

Angus Lees `gus@inodes.org` Geoffrey Robertson
`ge@ffrey.com` Nick Urbanik `nicku@nicku.org`

2005 July

Description of Objective

1.105.1 Manage/Query kernel and kernel modules at runtime

1.105.1
Manage/Query kernel
and kernel modules at
runtime
Weight 4

Geoff Robertson

Candidates should be able to manage and/or query a kernel and kernel loadable modules. This objective includes using command-line utilities to get information about the currently running kernel and kernel modules. It also includes manually loading and unloading modules as appropriate. It also includes being able to determine when modules can be unloaded and what parameters a module accepts. Candidates should be able to configure the system to load modules by names other than their file name.

Key files, terms, and utilities include:

1.105.1
Manage/Query kernel
and kernel modules at
runtime
Weight 4

Geoff Robertson

```
/lib/modules/kernel-version/modules.dep  
/etc/modules.conf & /etc/conf.modules  
depmod  
insmod  
lsmod  
rmmod  
modinfo  
modprobe  
uname
```

Manage/Query kernel and kernel modules at runtime

Objective

1.105.1
Manage/Query kernel
and kernel modules at
runtime
Weight 4

Geoff Robertson

Candidates should be able to manage and/or query a kernel and kernel loadable modules. This objective includes using command-line utilities to get information about the currently running kernel and kernel modules. It also includes manually loading and unloading modules as appropriate. It also includes being able to determine when modules can be unloaded and what parameters a module accepts. Candidates should be able to configure the system to load modules by names other than their file name.

Manage/Query Kernel and kernel modules at runtime

Key files, terms, and utilities

1.105.1
Manage/Query kernel
and kernel modules at
runtime
Weight 4

Geoff Robertson

```
/lib/modules/kernel-version/modules.dep
```

```
/etc/modules.conf & /etc/conf.modules
```

```
depmod
```

```
insmod
```

```
lsmod
```

```
rmmod
```

```
modinfo
```

```
modprobe
```

```
uname
```

Manage/Query Kernel and kernel modules at runtime

Resources of interest

1.105.1
Manage/Query kernel
and kernel modules at
runtime
Weight 4

Geoff Robertson

▶ `linux-source/Documentation/`

Kernel Module Basics

1.105.1
Manage/Query kernel
and kernel modules at
runtime
Weight 4

Geoff Robertson

- ▶ Kernel modules are chunks of kernel code which can get loaded and unloaded at runtime.
- ▶ Some modules depend on code in other modules.
- ▶ Good for shipping pre-built kernels – but not loading all available code; good for changing between conflicting modules (eg. OSS and ALSA), etc.

uname – Who the kernel thinks it is

Modules are stored in `/lib/modules/`uname
-r`/kernel/`

- a print all information
- s kernel name (“Linux”)
- n “node name” (hostname)
- r kernel release (“2.4.20-3-686”)
- v kernel version (compile time)
- m machine hardware name (“i686”)
- o operating system (“GNU/Linux”)

lsmod – Currently loaded modules

lsmod uses `/proc/modules` to show you which kernel modules are currently loaded.

Module	Size	Used by
bsd_comp	5888	1
ppp_async	10624	1
ppp_generic	29072	6 bsd_comp, ppp_async
slhc	7040	1 ppp_generic
ipv6	230624	10
ds	14596	0
pcmcia_core	62688	1 ds
irda	174400	0
parport_pc	34088	1
lp	10560	0
parport	40552	2 parport_pc, lp

modprobe – Loading modules

Load a module and its dependencies:

```
modprobe modulename [module options]
```

eg: `modprobe ftape ft_fdc_base=0x123`

Unload a module if it's unused:

```
modprobe -r modulename
```

eg: `modprobe -r ftape`

modinfo – Module options

“modinfo ftape” gives:

```
parm:          ft_fdc_base:Base address of FDC controller.  
parm:          ft_fdc_irq:IRQ (interrupt channel) to use.  
parm:          ft_fdc_dma:DMA channel to use.  
parm:          ft_fdc_threshold:Threshold of the FDC Fifo.
```

⋮

```
author:         (c) 1993-1996 Bas Laarhoven (bas@vimec.nl), (c) 1995  
description:    QIC-117 driver for QIC-40/80/3010/3020 floppy tape d  
license:        GPL
```

Configuration in `/etc/modules.conf` (aka
`/etc/conf.modules`).

```
# bogus example
options ftape ft_fdc_base=0x123 fg_fdc_irq=5 ft_fdc_dma=1
alias char-major-27 ftape
```

depmod builds `modules.dep`, describing module
dependencies.

Loading modules - low-level

Low level commands to actually insert or remove a module:

```
insmod filename module options  
rmmod modulename
```

You will probably never use these directly.

License Of This Document

Copyright © 2005, 2003 Angus Lees <gus@inodes.org>, Geoffrey Robertson <ge@ffrey.com> and Nick Urbanik <nicku@nicku.org>. Permission is granted to make and distribute verbatim copies or modified versions of this document provided that this copyright notice and this permission notice are preserved on all copies under the terms of the GNU General Public License as published by the Free Software Foundation—either version 2 of the License or (at your option) any later version.