

# 1.105.1

## Manage/Query kernel and kernel modules at runtime

### Weight 4

Linux Professional Institute Certification — 102

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# Topic 105 Kernel [7]

Where we are up to

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## 1.105.1 Manage/Query kernel and kernel modules at runtime [4]

### 1.105.2 Reconfigure, build, and install a custom kernel and kernel [3]

# Description of Objective

## 1.105.1 Manage/Query kernel and kernel modules at runtime

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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.

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# Key files, terms, and utilities include:

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

— the file built by `depmod` showing which module depends on what other modules

`/etc/modules.conf` & `/etc/conf.modules` — configuration file for `modprobe`

`depmod` — determines module dependencies and rebuilds `modules.dep`

`insmod` — low level command to insert a module into running kernel

`lsmod` — list modules loaded into kernel

`rmmod` — low level command to remove a module from kernel

`modinfo` — shows details about a particular module

`modprobe` — the tool for inserting and removing modules into/from the running kernel

# Manage/Query Kernel and kernel modules at runtime

Resources of interest

- ▶ `<linux-source>/Documentation/`

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# Kernel Module Basics

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- ▶ 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.

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# 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”)

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# lsmod – Currently loaded modules

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**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      |

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# modprobe – Loading and removing modules

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## Load a module and its dependencies:

```
$ sudo modprobe <modulename> [<module options>] ←  
eg: $ sudo modprobe ftape ft_fdc_base=0x123 ←
```

## Unload a module if it's unused:

```
$ sudo modprobe -r <modulename> ←  
eg: $ sudo modprobe -r ftape ←
```

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“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) 1995-1996 Kai Harrekiel
description: QIC-117 driver for QIC-40/80/3010/3020 floppy tape drives.
license:   GPL
```

# modprobe maintenance

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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.

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# Loading modules - low-level

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Low level commands to actually insert or remove a module:

```
insmod <filename> <module options>  
rmmod <modulename>
```

You will probably never use these directly; use `modprobe` or `modprobe -r` instead.

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