

## 1.106.2

# Change runlevels and shutdown or reboot system Weight 3

Linux Professional Institute Certification — 102

Angus Lees [gus@inodes.org](mailto:gus@inodes.org)

Geoffrey Robertson [ge@ffrey.com](mailto:ge@ffrey.com)

Nick Urbanik [nicku@nicku.org](mailto:nicku@nicku.org)

2005 July

### Description of Objective

Candidates should be able to manage the runlevel of the system. This objective includes changing to single user mode, shutdown or rebooting the system. Candidates should be able to alert users before switching runlevel, and properly terminate processes. This objective also includes setting the default runlevel.

### Key files, terms, and utilities include:

`/etc/inittab`  
`shutdown`  
`init`

### Change runlevels and shutdown or reboot system

Candidates should be able to manage the runlevel of the system. This objective includes changing to single user mode, shutdown or rebooting the system. Candidates should be able to alert users before switching runlevel, and properly terminate processes. This objective also includes setting the default runlevel.

### Boot the system

`/etc/inittab`  
`shutdown`  
`init`

### `/sbin/init`

“init” is the process started by the kernel after booting. It is up to `init` to start the rest of the system. The usual “SysV init” does this according to `/etc/inittab`.

The kernel also treats process ID 1 (`init`) specially:

- PID 1 is skipped by various “kill all” operations, etc
- “orphaned” child processes are adopted by PID 1

### Telling `init` what to do

By sending signals directly (as root) or by running various commands, which relay to `init`:

**telinit** Tell `init` to reload `inittab`, re-exec itself or switch runlevels

**shutdown** Initiate a shutdown by doing some book-keeping and then signalling `init`

**halt, reboot, poweroff** Tools used to initiate or finalise special kinds of shutdown

**runlevel** Find out current or previous runlevel

### Runlevels

The Linux Standards Base ([http://refspecs.freestandards.org/LSB\\_3.0.0/L](http://refspecs.freestandards.org/LSB_3.0.0/L)) defines the following standard runlevels that all distributions should follow to be compliant:

- |   |  |
|---|--|
| 0 | halt   |
| 1 | single user mode   |
| 2 | multiuser with no network services exported              |
| 3 | normal/full multiuser                                    |
| 4 | reserved for local use, default is normal/full multiuser |
| 5 | multiuser with a display manager or equivalent           |
| 6 | reboot   |

Passed through via kernel command line, `telinit` or default in `/etc/inittab`.

**/etc/inittab**

*id : runlevels : action : process*

```
# /etc/inittab: init(8) configuration.
```

```
id:5:initdefault:
```

```
# System initialization.
```

```
si::sysinit:/etc/rc.d/rc.sysinit
```

```
# /etc/init.d executes the S and K scripts
# scripts when change runlevel.
```

```
10:0:wait:/etc/rc.d/rc 0
```

```
11:1:wait:/etc/rc.d/rc 1
```

```
12:2:wait:/etc/rc.d/rc 2
```

```
13:3:wait:/etc/rc.d/rc 3
```

```
14:4:wait:/etc/rc.d/rc 4
```

```
15:5:wait:/etc/rc.d/rc 5
```

```
16:6:wait:/etc/rc.d/rc 6
```

/etc/init.d/rc runs all the “K” scripts in /etc/rcN.d/, followed by the “S” scripts.

**/etc/inittab**

```
# Trap CTRL-ALT-DELETE
ca::ctrlaltdel:/sbin/shutdown -t3 -r now
```

```
# When our UPS tells us power has
# failed, assume we have a few minutes
# of power left. Schedule a shutdown
# for 2 minutes from now.
# This does, of course, assume you have
# power installed and your
# UPS connected and working correctly.
```

```
pf::powerfail:/sbin/shutdown -f -h +2 "Power Failure; System Shutting Down"
```

```
# If power was restored before the shutdown kicked in, cancel it.
pr:12345:powerokwait:/sbin/shutdown -c "Power Restored; Shutdown Cancelled"
```

**/etc/inittab**

```
# Run gettys in standard runlevels
```

```
#co:2345:respawn:/sbin/agetty ttyS0 38400 vt100
```

```
1:2345:respawn:/sbin/mingetty tty1
```

```
2:2345:respawn:/sbin/mingetty tty2
```

```
3:2345:respawn:/sbin/mingetty tty3
```

```
4:2345:respawn:/sbin/mingetty tty4
```

```
5:2345:respawn:/sbin/mingetty tty5
```

```
6:2345:respawn:/sbin/mingetty tty6
```

```
# Run xdm in runlevel 5
```

```
x:5:once:/etc/X11/prefdm -nodaemon
```

```
#co:2345:respawn:/sbin/agetty ttyS0 38400 vt100
```

```
S1:2345:respawn:/sbin/mgetty ttyS1
```

**/etc/inittab**

```
# Example how to put a getty on a serial line (for a terminal)
```

```
#
```

```
#T0:23:respawn:/sbin/getty -L ttyS0 9600 vt100
```

```
#T1:23:respawn:/sbin/getty -L ttyS1 9600 vt100
```

```
# Example how to put a getty on a modem line.
```

```
#
```

```
#T3:23:respawn:/sbin/mgetty -x0 -s 57600 ttyS3
```

**Initiating a shutdown**

*shutdown [options] time [message]*

Popular options:

**-r** Reboot

**-h** Halt

**-c** Cancel a running shutdown

“time” can be *HH:MM* (eg 17:30) or *+minutes* (eg +5) or “now”

Examples:

```
shutdown -r now
```

```
shutdown -h 17:30 Scheduled hardware maintenance
```

**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.