

Startup and Shutdown

Run the code in the boot ROM (BIOS).

x86 Boot: The code in the boot rom does the following.
There is a boot order in the BIOS, attempt to boot from the various devices in the order given until one works.

Disk boot:

- 1) Read the Master Boot Record into RAM.
- 2) Run the code you just loaded.

The MBR contains the Linux loader (LILO)

This loads the bootstrap program which loads the kernel plus its startup code, using a list of disk sectors.

The bootstrap program loads these sectors and branches to the startup code.

The start up code, decompresses the kernel, probes the hardware, and loads the correct drivers

Then starts the first process (`init`)

`init` starts the system daemons,
configures network (if enabled)
starts the login programs (`agetty`)

Init

This is always process number 1, treat it carefully.

`/etc/inittab` – control init behavior

Format : delimited fields (like `passwd`)

First field is an identifier or capability,

second field is a list of runlevels

third field is an action

—(wait init should wait for completion)

—(sysinit do at boot (before boot and bootwait))

fourth field is a process or command to run

—`/sbin/agetty`

`kill -HUP 1`

reread the `inittab` file,

1 is the process ID of the init process

At boot time `init` takes actions directed by files found in the `/etc/rc.d` directory

`inittab` controls the use of these files

(says which files to use and which to ignore)

Linux: The main multiuser boot file is `/etc/rc.d/rc.M`, it invokes many the other files involved in multiuser boot.

Run-level: Linux has run levels

–multiuser: full capabilities

–single user: used for basic maintenance

`initdefault` in `inittab` specifies default run level

`init` commands specify the run levels to which they apply.

`telinit`: tell `init` to change run levels.

`/sbin/telinit 1`: enter run-level 1 (single user)

level 3 is multi user

Booting to single user may be specified at the Boot: prompt.

Shutdown: `init` warns all running processes by sending them a `SIGTERM`. After a wait, all processes that haven't voluntarily quit are forcibly terminated with a `SIGKILL`.

Logging: each time a process stops, `init` records the information in `utmp` and `wtmp`.

`last`: summarize `wtmp`

Shutdown

The file system is cached and live.

Daemons are active even when no user is logged in.

You must flush the cache and close the file system to ensure integrity.

Do not power-off or reset

```
lab17# shutdown -h now
```

shutdown: Halt the daemons, flush the cache, halt the system. (Actually `init` does all the work.)

```
lab17# reboot
```

reboot: Halt the daemons, flush the cache, reboot the system.

equivalent: `shutdown -r now`

equivalent: `ctl-alt-del` (maybe, see `inittab`)

An disorderly shutdown requires a full consistency check of the file system.

An orderly shutdown results in a clean file system, minimal consistency check, and quick boot/reboot.

System V.4 Boot

There is a directory for each run level

level 1: `/etc/rc1.d`

level 3: `/etc/rc3.d`

In each of these directories there are files starting with `S` if they are to be used during startup and `K` if they are to be used during shutdown. Often these are soft links to real files in `/etc/init.d`

Example:

`S30inet`

`S34route`

`S42nfs`

The initializations are run in numeric order, `inet` first, `route` next, `nfs` last.

`S` files are run with a start parameter:

`S34route start`

`K` files are run with a stop parameter