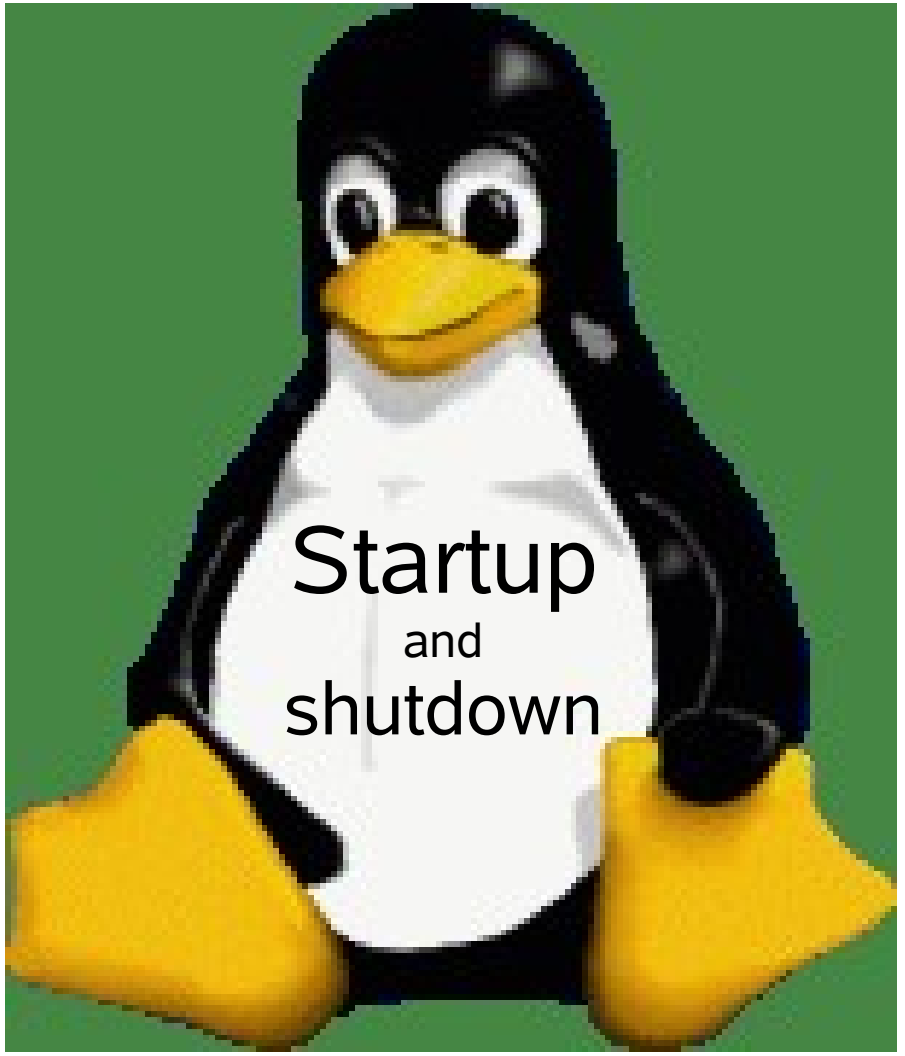
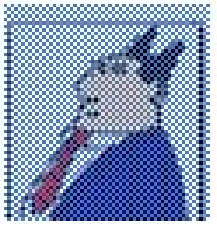
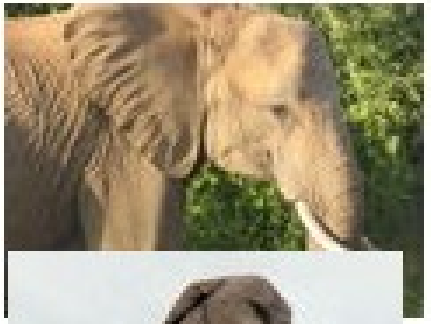
What goes up must come down.



- Shutdown your LINUX.
- New file systems.
- umount
- Application cleanup.
- disconnect from remote hosts.

The really real world.





Philosophy

- You can't press the undo button if an elephat knocks down your house, or eats your crop!
- You can't create a new elephant by calling the copy constructor!

Philosophy

- Human beings do not create objects; they represent them or mold them.
- Computers are used to represent objects.
- In elephant management software, there are no elephants in the computer.

Philosophy

- In designing, running, or debugging software, you must make a distinction between an object and the **representation of an object!**
- A program may represent an object.

Application caching

- Applications “cache” to postpone updating their representations of reality.
- They write “postit” notes to themselves reminding them selves to do it later!
- A system crash causes these notes to be lost!

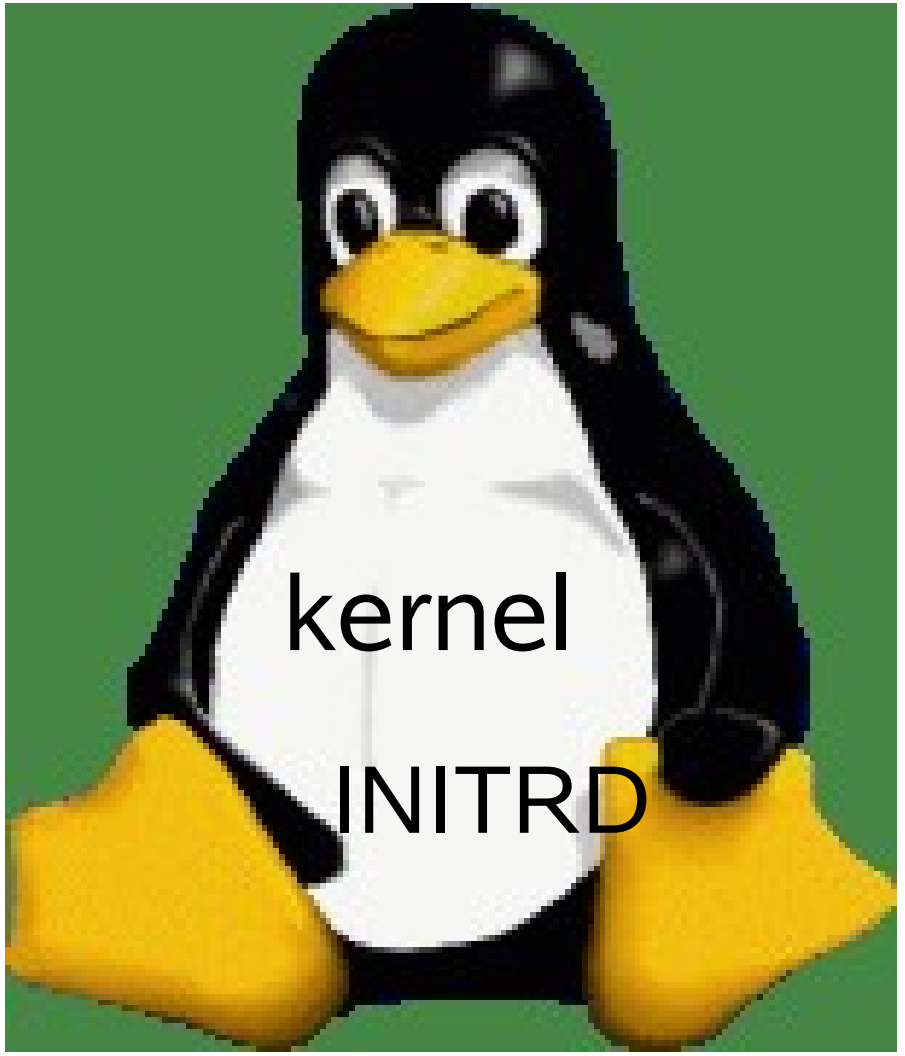
Startup RunLevels

- 0 system halt
- 1 Single user mode
- 2 multiuser, no net, no gui
- 3 muliuser with net, no gui
- 4 not used
- 5 multiuser with gui
- 6 reboot

Run levels on startup

Add number to command line on startup to boot with reduced functionality, to avoid crashes other, problems!

What is INITRD?



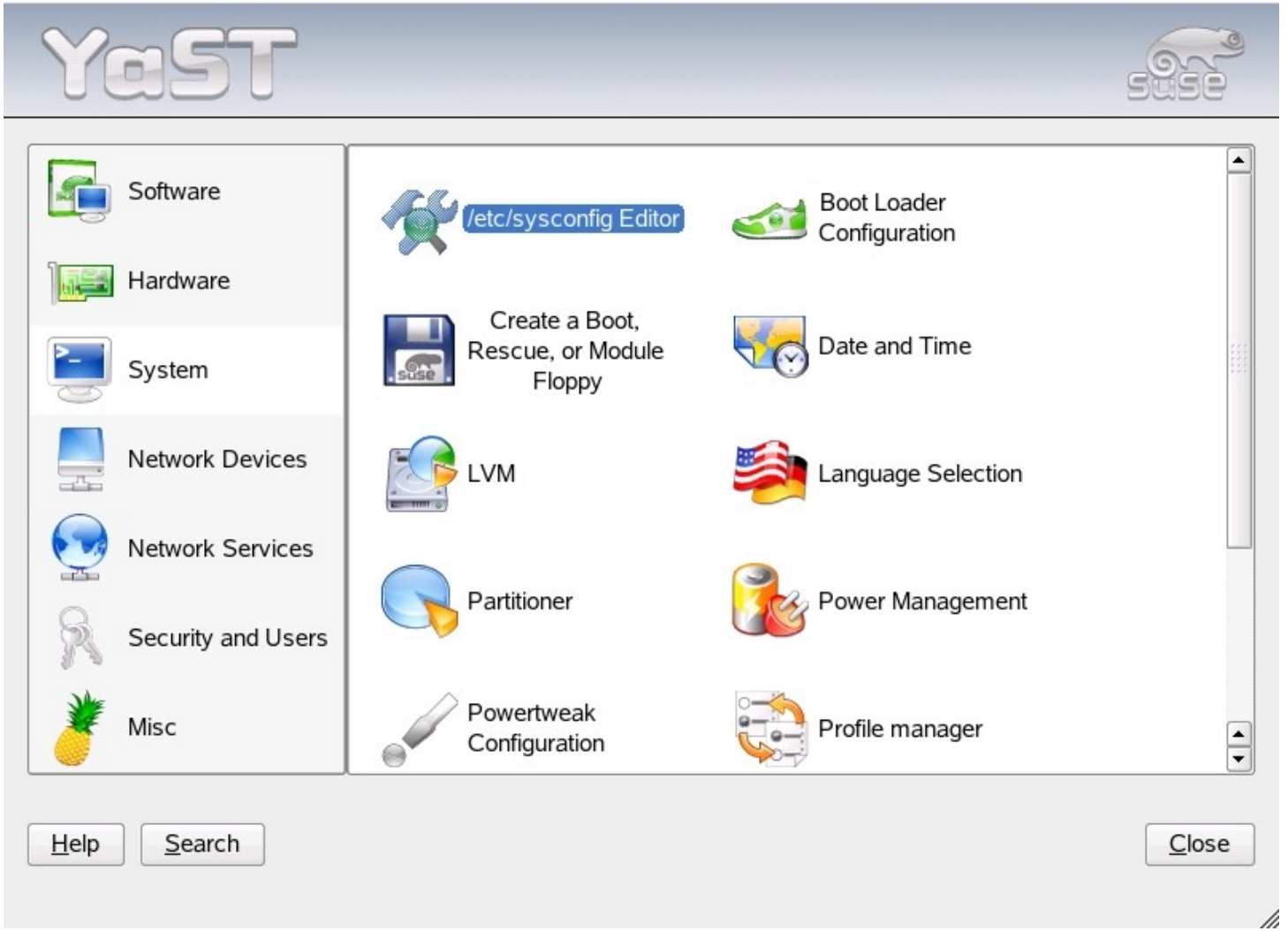
- Modular Kernels – no built in drivers!
- LINUX bootloaders
- GRUB, LILO
- use BIOS to boot
- How do I bring up LINUX, if I do not know how to read the hard disk?

Initrd

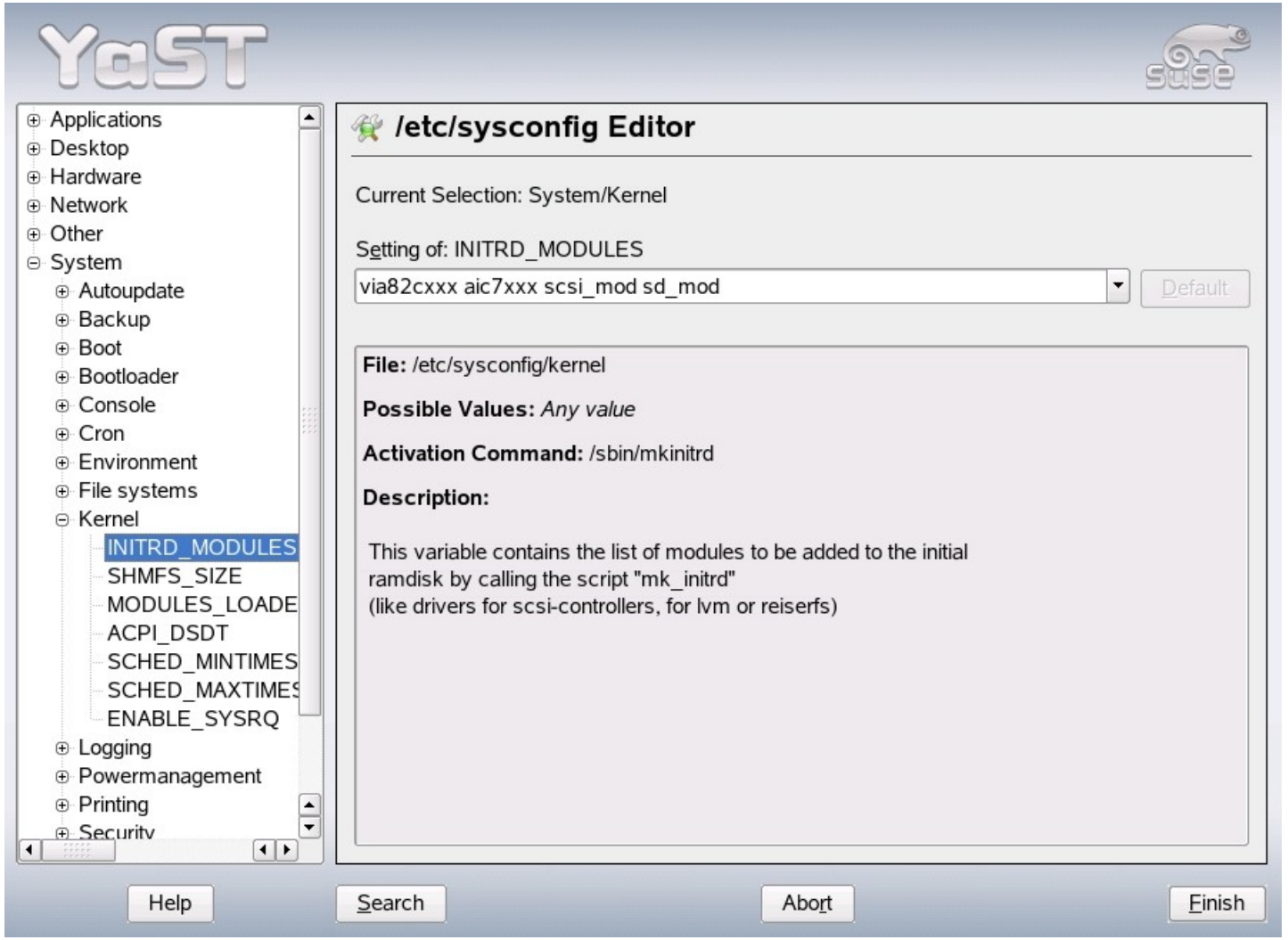
Initrd allows Linux to have a temporary virtual “disk” during booting. On this disk are the drivers necessary to start LINUX (and do other things).

Initrd's are basically the same, but the software to create them is distro dependent. Usually called mkinitrd.

Yast example



sysconfig parameter



Other distros are different!

Red Hat has a different way of specifying which modules are to be included in INITRD. READ YOUR DOCUMENTATION. Luckly, most users don't have to mess with this stuff. It is all figured out by your point and clicky installation installer thingy!

/boot partition

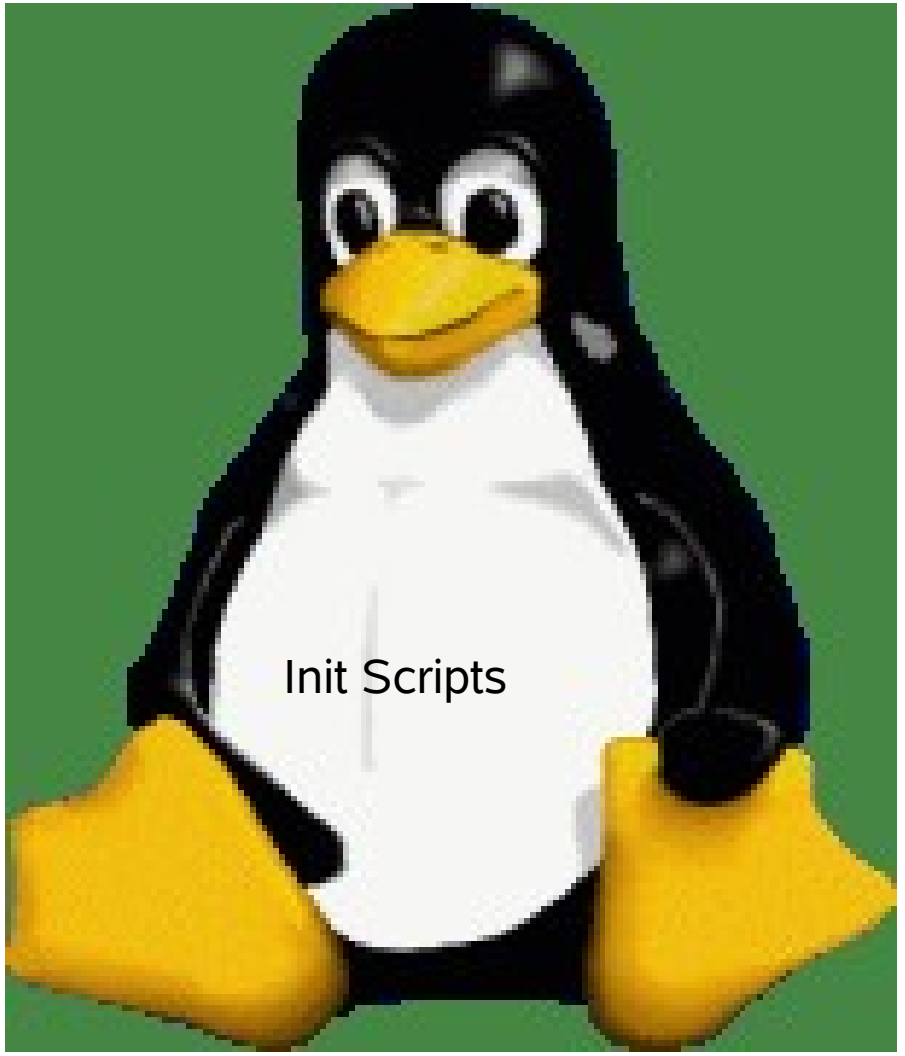
- Bootloader uses BIOS to read in kernel, INITRD!
- Therefore, kernel, INITRD must be in a partition readable **by the BIOS!**
- So put it in /boot
- overcome bios limits!

Large Disk Howto disk limits

http://www.tldp.org/HOWTO/Large-Disk-HOWTO-4.html

- ATA Specification (for IDE disks) - the 137 GB limit
- BIOS Int 13 - the 8.5 GB limit
- 528 MB limit
- 2.1 GB limit
- 3.2 GB limit
- 7.9 GB limit
- 8.4 GB limit
- 4.2 GB limit
- 7.9 GB limit
- 8.4 GB limit
- 33.8 GB limit
- 137 GB limit
- 2 TiB limit

Init Scripts



- located in /etc/init.d/
- control what happens at startup, shutdown time.
- LINUX STANDARD BASE defines
- Really controled by links in /etc/init.d/rc?.d (don't touch)

Install / Uninstall Init scripts

- Use insserv to install.
- /usr/lib/lsb/install_initd

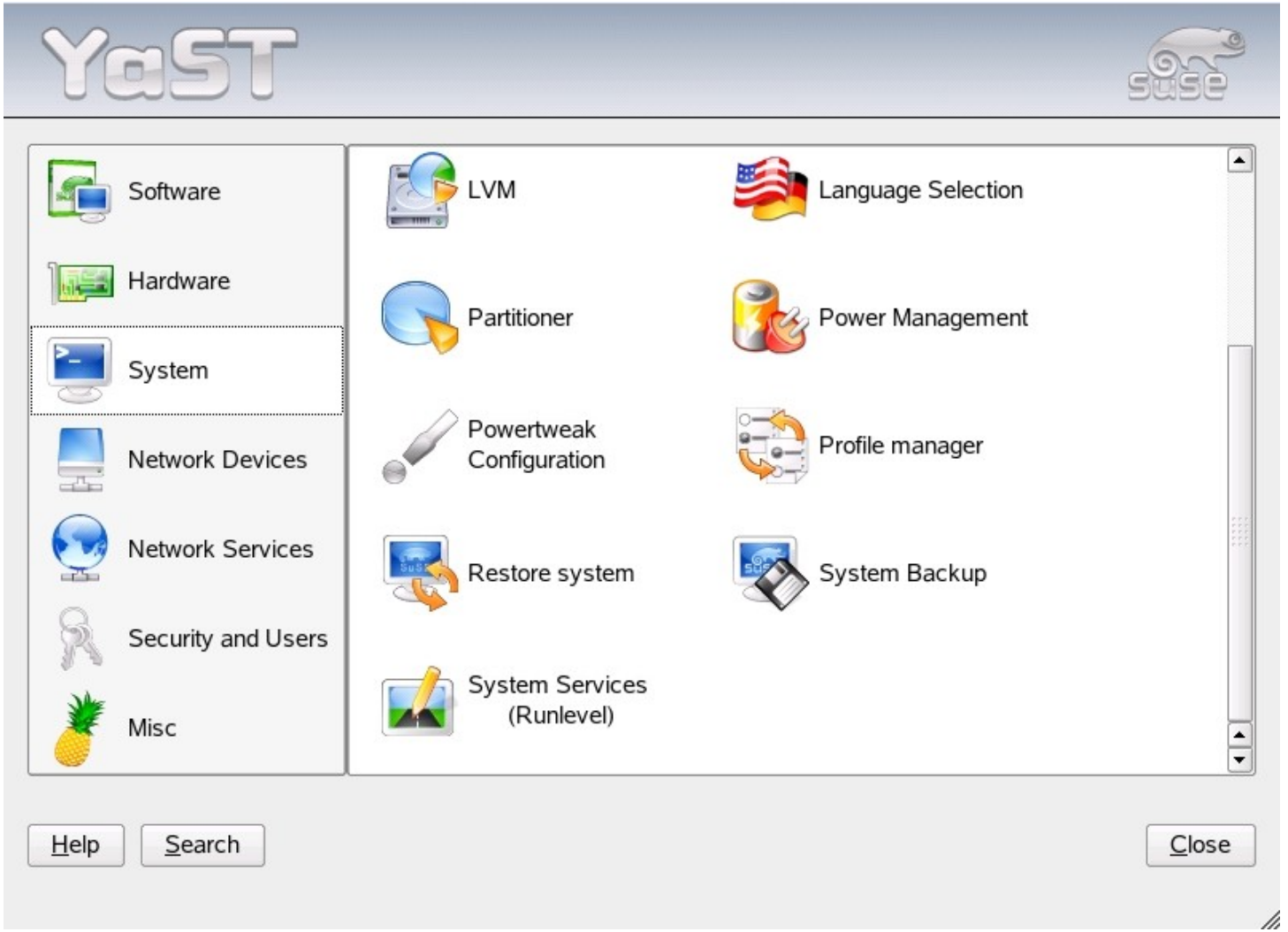
- Use insserv -r to remove
- /usr/lib/lsb/remove_initd

These programs really manipulate the links in /etc/init.d/rc.?d. Every time they run they recompute these links. Take a run level parameter so you can control what happens at various run levels.

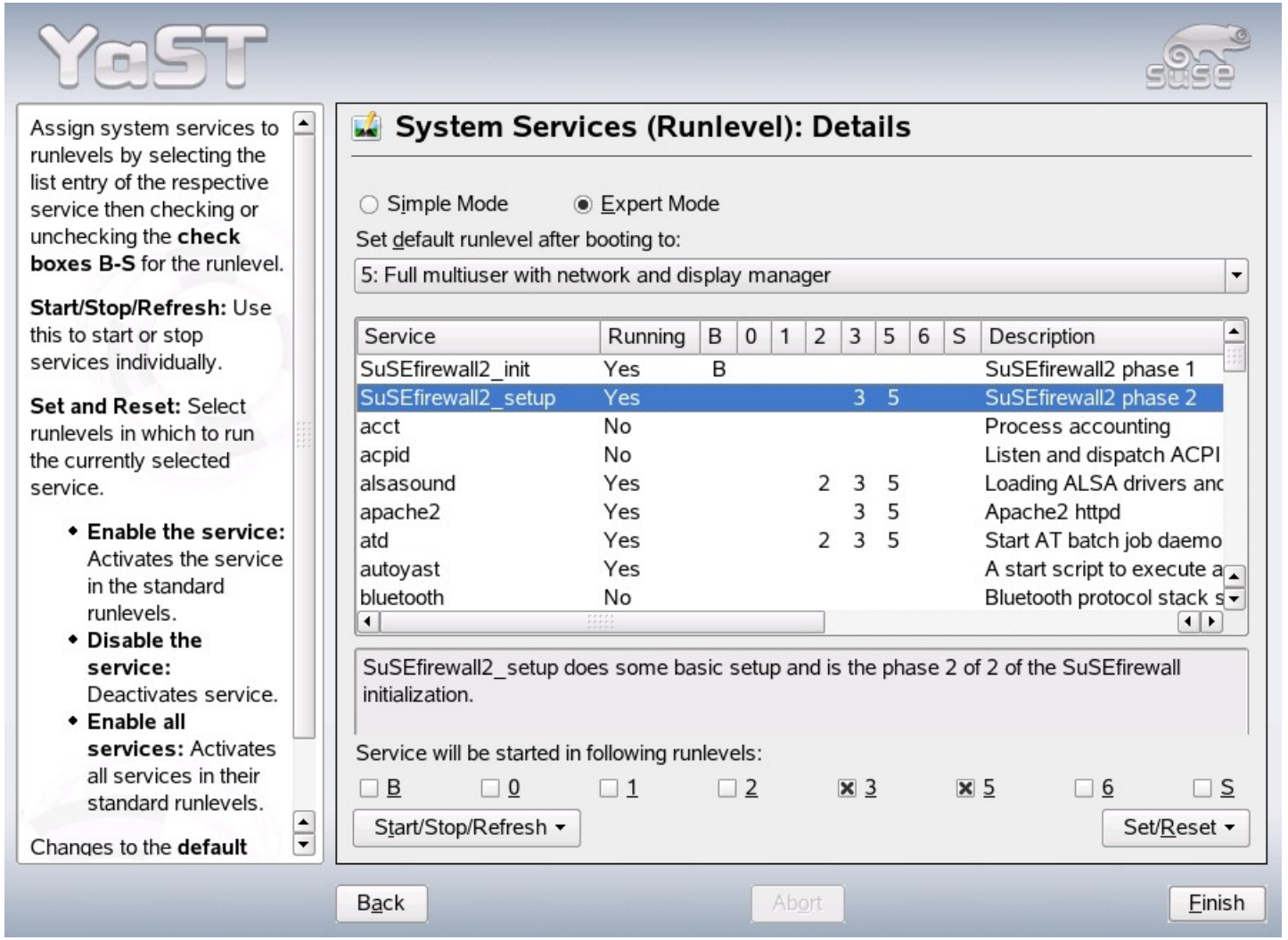
These scripts can be run manually:

```
#cd /etc/init.d
#./sendmail restart                #restarts sendmail!
```

System Services (runlevel)



Control scripts for runlevels



Other Distributions are different

Write your own init scripts

- In Bash
- Start with /etc/init.d/skeleton
- Read all the documentation first.
- define start, stop, maybe restart.
- Control script execution order with
- # Provides:
- # Required-Start:
- # Required-Stop:

Start/Kill Daemons

- startproc
- start_daemon
- to start daemons.

- killproc
- to kill daemons.