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Linux System Administration Basics

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User Login

Version A.00

U2794S Module 5 Slides

Next Step — Logon

Now that you have your system installed and running it's time to get to work.

The Linux "user" environment and basic system security are based on users having unique logon identities and passwords.

Linux users are also associated with one or more "group" identities for the sake of access control.

Later we will discuss setting up user accounts in full detail. For now, let us simply examine some of the options available for user login control.

GNOME Login

- The GNOME, GNU Network Object Model Environment, project has built an easy-to-use desktop environment for the user.
- The GNOME development platform is a rich collection of tools, libraries, and components to develop application on UNIX/Linux
- GNOME Office is a set of office productivity applications
- GNOME login provides for customization of login options.
- GNOME makes use of the X Window System protocols and allows for each user account to customize it's appearance and features

For additional information -> http://www.gnome.org

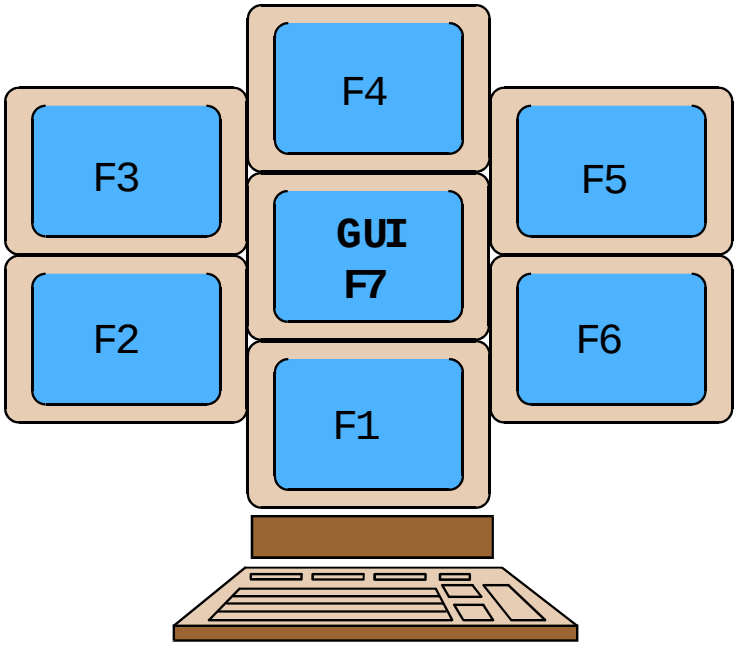
KDE Login

- KDE, the K Desktop Environment, is a network transparent contemporary desktop environment for UNIX/Linux workstations.
- KDE seeks to fill the need for an easy to use desktop for UNIX/Linux workstations, similar to the desktop environments found under the MacOS and MS-Window offerings.
- KDE offers an application development framework with a considerable number of applications already built for use with the K Desktop Environment
- KDE login provides for customization of login options.
- KDE is a graphical environment that uses X Window System protocols. Each user is allowed extensive control over look and feel of their individual session environment.

For additional information -> http://www.kde.org

The "Virtual" Consoles

This feature of the Linux user environment allows the system console to support multiple logon sessions.



To switch from one "virtual" console screen to another, press and hold Alt+Ctrl+F*n* (F1 through F7, depending on which session you want to view). Console 7 is always the GUI, while Consoles 1–6 are provide command line virtual terminal interfaces.

Rebooting into Single-User Mode

- The system can be booted into single-user mode from the LILO prompt
  --> LILO: **linux single**

- The system can be booted into single-user mode even if there are no **/etc/passwd** and **/etc/shadow** files

- Be aware! Anyone can boot the system to single-user mode!

- The newer boot loader, GRUB, avoids this issue by allowing for a boot loader password for various options (such as booting to single user mode). The actual sequence to boot single user is slightly more involved and requires the editing of the GRUB boot configuration file on-the-fly.

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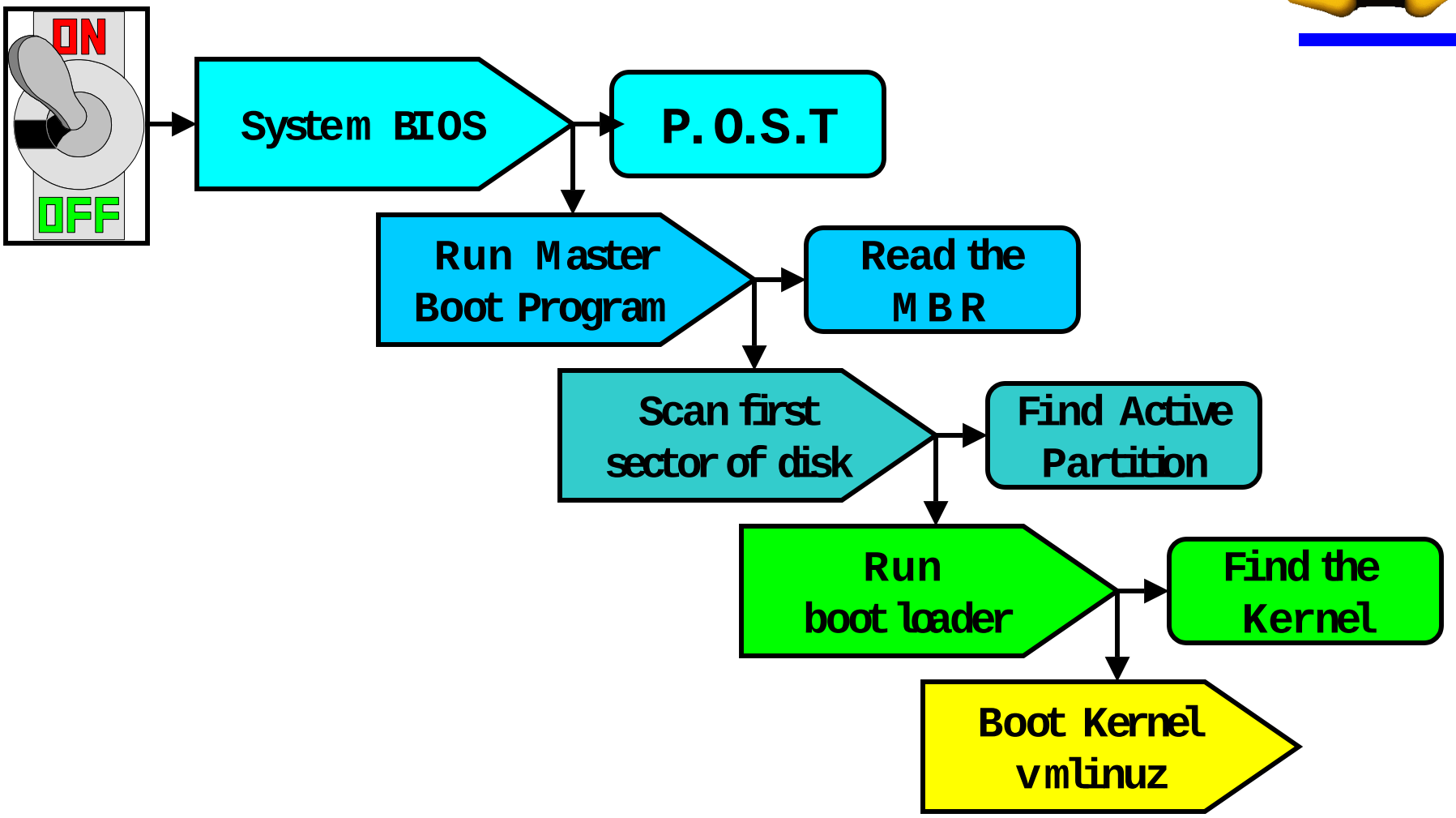
Linux Startup and Shutdown

Version A.00

U2794S Module 6 Slides

Intel (IA-32) Boot Order

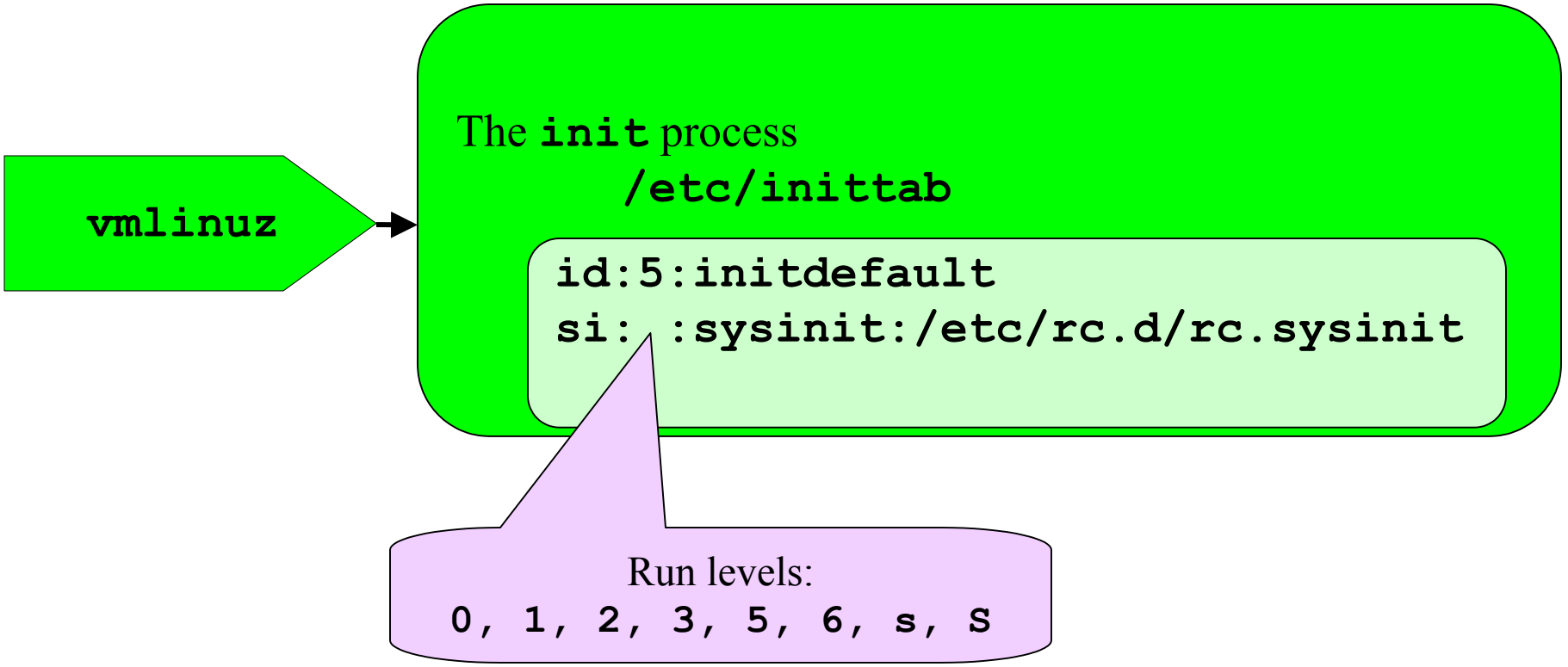


System Boot, "Waking the Linux Kernel"

- Basic input/output system (BIOS)
- Linux loader (**LILO, Grub, ...**)
- Kernel (**/boot/vmlinuz or /vmlinuz**)

- Dual boot system
  - Power on
  - LILO: (GUI) up/down arrow to desired label <Enter>
    (TUI) boot *OS-Name* [Enter]
  - Grub: (GUI) Select desired O/S image from the list

Linux's First Process– `init`



The `rc` Script Model

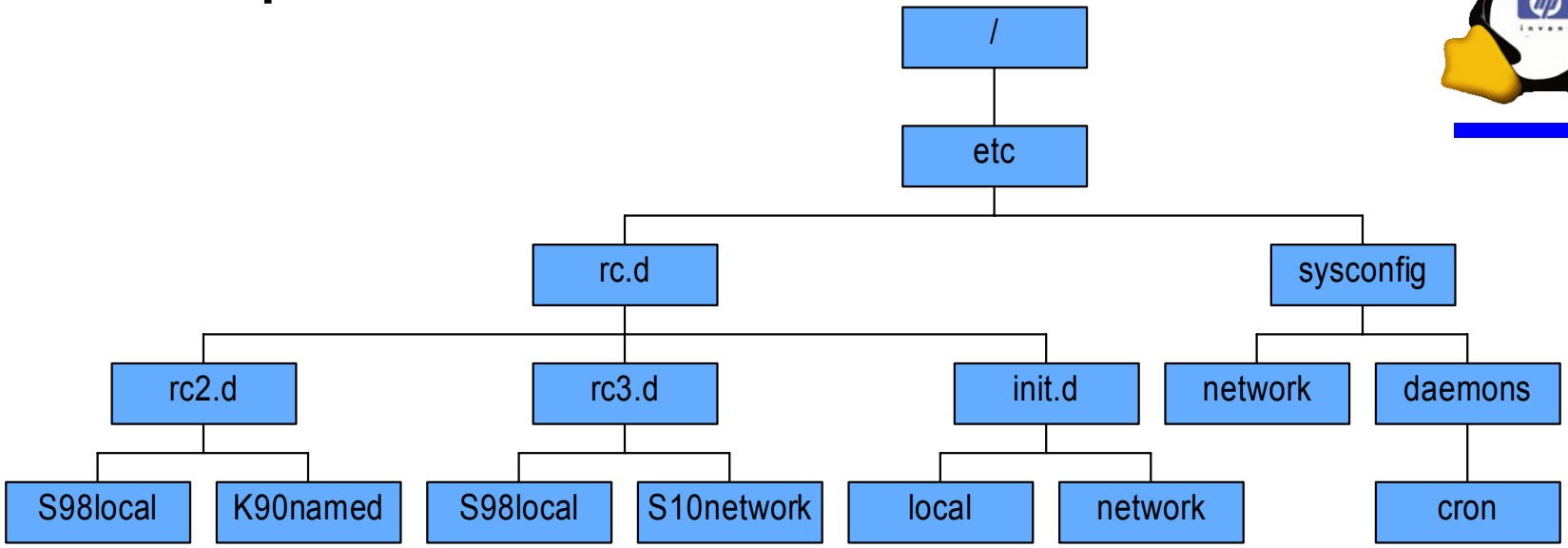
- Linux distributions follow a couple different "rc" script models.
  - Some use the older BSD "rc" model (ie. SuSE)
  - RedHat follows a modified SysV model
- For the SysV model execution scripts are most commonly stored in:

  `/etc/rc.d/init.d`
- Link scripts are stored in either **`/etc/rc.d/rcN.d`** or **`/etc/rcN.d`**
  - Run states are independent and not hierarchical ! (this is a fundamental difference between Linux and most UNIX variants, be careful !)
- Start and Kill scripts use a two digit sequencing number in their naming convention. (ie. S20Sendmail and K80Sendmail)
- To store configuration information look in the following directories (and sub-directories):

  For SuSE : **`/etc/rc.config`** file

  For Red Hat : **`/etc/sysconfig`** directory

rc Script Locations



- Some available management utilities:

chkconfig command line utility

ntsysv a TUI utility

-> System Settings -> Service Configuration

-> System -> SysV-Init Editor

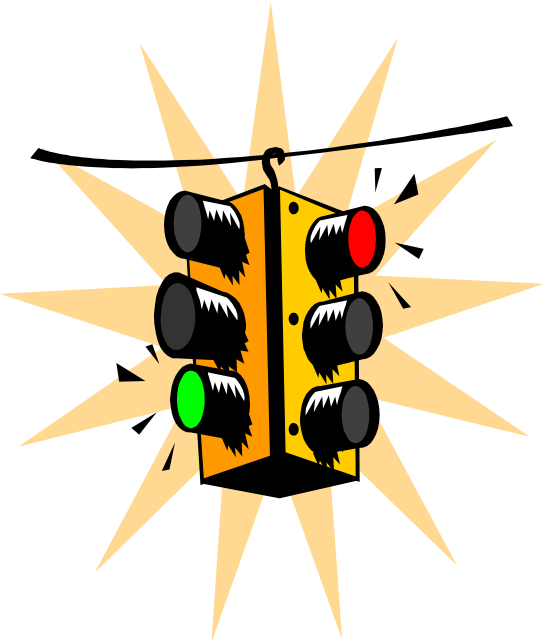
System Shutdown Commands

Syntax: **shutdown[-tkrhfFc] *time*|now**

Shutdown to single-user:

- **# shutdown**
- **# init 1**

- Reboot:
  - **# shutdown -r *time***
  - **# reboot**
  - **# init 6**
- Halt:
  - **# shutdown -h *time***
  - **# reboot -h**
  - **# init 0**
- Restart your X-session



Ctrl + Alt + Del

System Administration Tools and Techniques

Version A.00

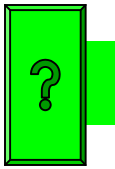
U2794S Module 7 Slides

Sources of Information

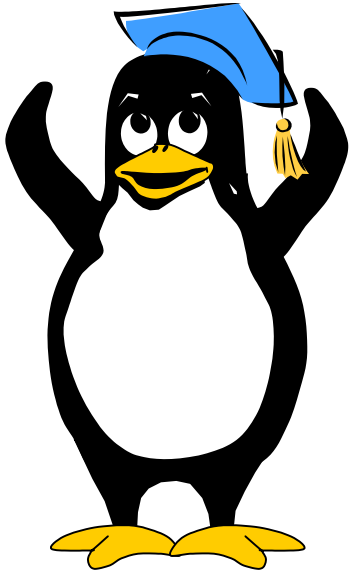
- Online documentation
  - FAQs and HOWTOs
- Internet resources (license required for access to some areas)
  - **http://sunsite.unc.edu**
  - **http://www.redhat.com**
  - **http://slashdot.org** (Linux news)
  - **http://freshmeat.net** (Linux downloads)
  - **http://linuxv2.com** (kernel development)
  - **http://metalab.unc.edu/pub/Linux (**MetaLab archives over 55 gigabytes of Linux programs and documentation, freely available for download via FTP and WWW access)
  - **http://www.hp.com/go/linux**
  - HP support line
- Internet newsgroups (**comp.os.linux.***); for example,
  - **comp.os.linux.networking**
  - **comp.os.linux.security**
  - **comp.os.linux.admin**
  - **comp.os.linux.setup**
  - **comp.os.linux.hardware**
- An astounding number of books

Linux Documentation Project

- Standard (and totally free) documentation suite for Linux:



http://www.linuxdoc.org/



(many mirrored sites)

Configuration Files and the System Administrator

The Linux operating system's configuration is controlled by a host of ASCII text files accessible to the administrator (**root**), for editing manually, or through one of the many GUI and TUI utilities available to the **root** user.

- **/etc/passwd**
- **/etc/group**
- **/etc/hosts**
- **/etc/services**
- **etc...**

/etc/passwd and /etc/group

The file **/etc/passwd** contains the basic user configuration parameters.

```
root:1e2wsFt563w6x:0:0:,,,:/root:/bin/sh
user:3he5Ty67sd32d!:101:20:,,,:/home/user:/bin/sh
<user name>:<encrypted
password>:UID:GID:comments:HOME:SHELL
```

The file **/etc/group** contains the basic group configuration parameters.

```
Bin::0:root
users::20:user,user2,user3,……..
<group name>:<encrypted password>:GID:<members> (comma
delimited)
```

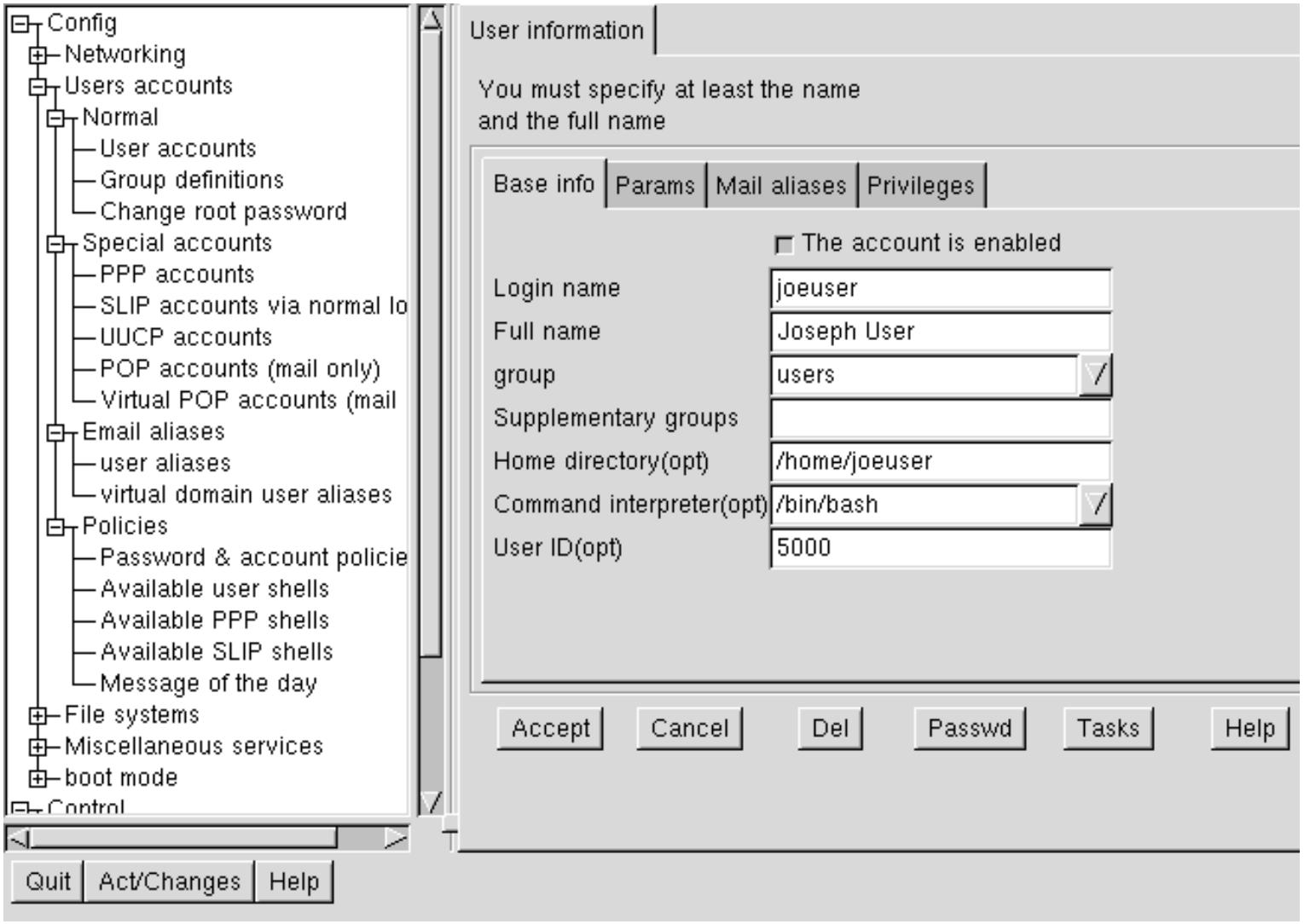
Creating User Accounts

- Command line
  - **# useradd *username* and groupadd *groupname***
  - **# passwd *username***
- KDE desktop:
  - Click on the **K -> System -> User Manager**
- GNOME desktop:
  - Click on **Start Here -> System Settings -> User Manager**
- Some distributions have their own graphical tools:
  - For SuSE: **yast** (yet another startup tool):

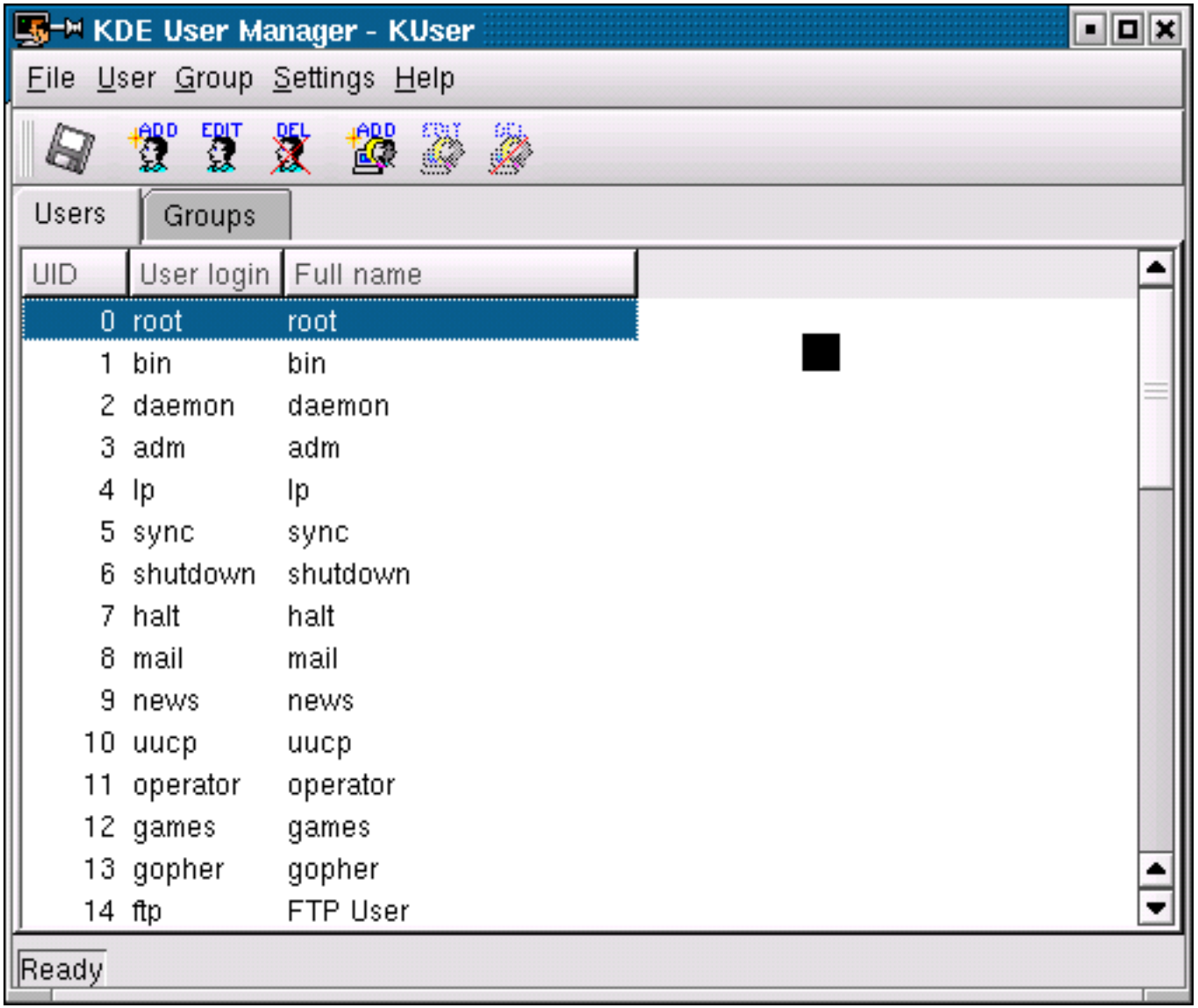
    # yast -> System administration -> User administration
  - For Red Hat 6.x: **linuxconf**

    # linuxconf -> Config -> Users -> Normal -> User Accounts

Using **linuxconf**



The KDE User Manager - KUser



The Red Hat User Manager

Red Hat User Manager

Action Help

New User | New Group | Properties | Delete | Help | Refresh

Filter by: Apply filter

Users | Groups

User Name	Primary Group	Full Name	Login Shell	Home Directory
adm	adm	adm	/sbin/nologin	/var/adm
amanda	disk	Amanda user	/bin/bash	/var/lib/amanda
apache	apache	Apache	/bin/false	/var/www
bin	bin	bin	/sbin/nologin	/bin
ccooper	ccooper	Chris Cooper	/bin/bash	/home/ccooper
daemon	daemon	daemon	/sbin/nologin	/sbin
ftp	ftp	FTP User	/sbin/nologin	/var/ftp
games	users	games	/sbin/nologin	/usr/games
gdm	gdm		/sbin/nologin	/var/gdm
gopher	gopher	gopher	/sbin/nologin	/var/gopher
gtux	users	gnome tux	/bin/bash	/home/gtux
halt	root	halt	/sbin/halt	/sbin
ident	ident	pident user	/sbin/nologin	/
junkbust	junkbust		/bin/bash	/etc/junkbuster
ldap	ldap	LDAP User	/bin/false	/var/lib/ldap
lp	lp	lp	/sbin/nologin	/var/spool/lpd
mail	mail	mail	/sbin/nologin	/var/spool/mail
mailman	mailman	GNU Mailing List Mana	/bin/false	/var/mailman
mailnull	mailnull		/dev/null	/var/spool/mqueue
mysql	mysql	MySQL Server	/bin/bash	/var/lib/mysql

crypt– Linux's Front Line Security

- Password encryption is based on the the **crypt** routine.
- The routine requires a 2-character "encryption key" and performs the encryption on the first 8 characters of the argument.
- To crypt plain text passwords a process calls the kernel function (in pseudo code):

```
string=crypt("mygr8pwd","AZ")
print(string)   -> AZwr.EfTdeWeI
```

- If it were called with a longer "password."

```
sting=crypt("mygr8pwdlonger","AZ")
print(string)   ->  AZwr.EfTdeWeI
```

The **/etc/shadow** File

The basic **crypt** algorithm cannot be reversed. However, because the crypt "key" is stored as the first two characters of the **/etc/passwd** password field, a clever hacker can employee any of a number of programs and scripts to simply "guess" your password.

One method to improve the basic security of your system is to remove the encrypted passwords from **/etc/passwd**, which is readable by anyone and everyone. This can be accomplished with "shadow passwords." Once enabled, the encryption's are stored in **/etc/shadow**, a file that is readable only by **root**.

To convert from the standard passwords to "shadow passwords" enter:

 # pwconv (This can be reversed with **pwunconv**.)

NOTE: Shadow passwords can be used in conjunction with MD5 encryption.

/etc/passwd Corrupted

- The system uses the **/etc/passwd** file first to validate login details.
- On average, the **/etc/passwd** file is read once for every twelve file accesses.
- The **/etc/passwd** file contains the following fields of data:

```
Name:passwd:UID:GID:Text:HOME_path:Login_shell
```

- Do not use spaces, except in the "**Text**" field.
- Use the **pwchk** command to check the file syntax.

Shadow Passwords Corrupted

- The **/etc/shadow** file contains user password controls.
- The user's password, in encrypted form, is stored in this file.
- The fields in this file are:
  - Name:Password:Last_Change:Min:Max:Warn:Inactive:
  - Expiry_Date:Reserved_Field
- Password entries may differ if PAM is in use on the system.