Appendixes

PID_00148394

Index

1. Appendix A. Command tables

A.1. Filesystem

Figure A.1

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
ls [pattern]	Lists contents of a specific directory ->"-a" displays all contents, including those starting with "." ->"-l" displays complete info related to contents ->"-h" followed by "-l" displays file sizes in byte units, KB, MB, GB ->"-S" sorts lists by size ->"-w" displays list by columns ->"-R" displays list recursively, going through all subdirectories ->"--color" colours list text according to file type
cd [path]	Changes to specified directory. By default, it changes to the user's home.
pwd	Displays the full path to the current directory
find [parameters] [path]	Finds a specified file or directory ->"-iname pattern" recursively searches pattern from current directory ->"-ilname pattern" similar to "-iname" but search ignores case ->"-maxdepth numLevels" Searches drilling down to specified depth level ->"-uid UID" forces UID match ->"-gid GID" forces GID match
ln path [NewLinkname]	Creates a link to a file or directory. If it is not a symbolic link, an exact copy is created and modified for any updating (hard link) ->"-s" creates a symbolic link

A.2. System's help function

Figure A.2

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
man [section_number] command	Displays the command's manual contents through a pager
info command	Another source of help; sometimes it complements the man command contents and some other times it is the only documentation maintained
apropos keyword	Finds all commands including the keyword in the description of the built-in manual

A.3. File permissions

Figure A.3

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
chmod mode file	Sets up file and/or directory permissions –> "-R" change is made recursively, i.e. it affects all files and directories within the specified directory
chown owner[.group] file	Sets up file and/or directory owner and group (if specified) –> "-R" command is run recursively
chgrp group file	Sets up group that files or directories belong to –> "-R" command is run recursively
umask mode	Starts up permissions for all files created from the moment the command is executed

A.4. Copying and deleting files

Figure A.4

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
rm filename(s)	Deletes specified files and/or directories –> "-f" eliminates confirmation messages –> "-R" recursively removes files in the specified directory –> "-i" tells rm to prompt the user for confirmation before removing each file and directory
rmdir directory	Deletes empty directories
cp source target	Copies files from specified origin to specified destination –> "-f" does not prompt for confirmation –> "-i" prompts for confirmation before copying each file –> "-l" creates links instead of copying actual files –> "-R" acts recursively copying entire contents of subdirectories –> "-s" creates symbolic links instead of copying actual files
mv source target	Moves files from specified origin to specified destination –> "-f" does not prompt for confirmation –> "-i" prompts for confirmation before moving each file

A.5. Shutdown or restart

Figure A.5

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
logout	Exits shell and goes back to login
halt	Starts up system halt process (computer should never be turned off before Power Down is displayed
reboot	Reboots system, i.e. starts up system halt and resets computer

A.6. Operations with files

Figure A.6

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
cat [file]	Displays contents of file or record of keystrokes when no file has been specified –>"-n" numbers displayed lines
less file	Pager to display contents of files. Options listed below are NOT command parameters but direct access keys or shortcuts –>/pattern" to search for a specified pattern within the pager; use the "n" and "N" keys to go to the next or previous occurrence respectively. –>END to go to end of file –>HOME to go to start of file –>PAGE DOWN to go to next page –>PAGE UP to go to previous page –>RETURN to go to next line –>SPACE to go to next page
more file	Displays contents of file similarly to the less command with some restrictions (it does not offer the option to go back, for example)
grep [pattern] file	Finds lines matching the pattern y displays them –>"-b" displays byte number of each found line –>"-c" does not display lines, but counts them and returns number –>"-e pattern" useful when the pattern starts with the "-" character –>"-i" search ignores case –>"-n" displays line number –>"-v" reverses find results –>"-w" selects only lines in which pattern is a complete word
cut file	Displays file fields –>"-d character" sets field delimiter character –>"-f field number" sets field to display –>"-b listBytes" of selected field, when only specified bytes separated by commas are to be displayed
wc file	Displays number of bytes, lines and words of file –>"-c" displays bytes only –>"-l" displays lines only –>"-w" displays word number only
diff file1 file2	Displays differences between file 1 and file 2 –>"-B" ignores blank lines –>"-i" ignores case –>"-w" ignores blank spaces

A.7. File compression and security copies

Figure A.7

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
tar option(s) archive_name file_name(s)	Joins multiple files and directories in a single tarball file (with .tar extension) –>"-cf" creates a tarball file from specified files in current directory –>"-cvf" verbose option with the same results as the above parameter to display the list of files included in the archive –>"-cvzf" same as above but resulting in a compressed archive with gzip –>"-x" extracts contents from a tarball file –>"-xvzf" extracts and decompresses archive displaying process results (compressed files are appended with the ".tar.gz" or ".tgz" extensions)
cpio	Backsup
gzip file	Compresses file and appends ".gz" extension to file name –>"-d" decompresses file
gunzip file	Decompresses file
zip archive_name source_file(s)	Compresses all source files in a .zip archive –>"-e" encrypts archive with a password that is entered on the terminal in response to a prompt
unzip archive_name	Decompresses .zip archive

A.8. Disk operations

Figure A.8

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
df	Displays total, used and free space of mounted partitions –>"-h" displays data in byte units, KB, MB, GB –>"-m" displays data in MB units
du [file]	Displays blocks that file occupies –>"—block size=SIZE" sets the block size wanted –>"-h" displays data in byte units, KB, MB, GB
mkfs	Creates a new file system. Reading and comprehension of command manual is recommended given the nature of this command
dumpe2fs device	Displays file system info of device
fsck device	Checks file system consistency and interactively repairs the file system. The device must be unmounted when running this command
sync	Synchs cache and hard disk files
badblocks device	Searches for bad blocks on the device –>"-s" displays the progress of the scan by writing out the block numbers as they are checked

A.9. Users and groups

Figure A.9

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
whoami	Displays the effective username of the current user
groups	Displays the groups of which the user is a member
who	Displays a list of all users currently logged in –>"-T" tells whether reception of messages is allowed for each user
w [user_name]	Displays extended information about current users in the system. By default, it displays information about all users currently logged in
write user_name [console]	Used to send a message to the specified user. To determine the console, the "who" or "w" commands can be used
talk user_name [console]	Opens a chat session with the specified user if he or she accepts
mesg [y-n]	When used without parameters, it displays whether message reception is active. Parameter "y" turns reception on, "n" turns it off
adduser [user_name]	Creates a new user in the system
userdel user_name	Deletes the specified user from the system
addgroup [group_name]	Creates a new group
groupdel group_name	Deletes the specified group from the system

A.10. Manage processes

Figure A.10

COMMAND SYNTAX	RESULT AND USEFUL PARAMETERS
ps	Displays a snapshot of current processes –>"-A" displays all processes currently being run in the system (similar to "-e") –>"-H" displays process hierarchy –>"-l" displays detailed information about processes
top	Interactively displays processes being run
kill PID(s)	Sends a process termination signal –>"-9" ensures execution of termination signal
killall program_name(s)	Terminates all processes associated with the programs whose names are provided as arguments
nice [command]	When no command is specified, it displays default priority level. When the command and desired priority is specified, it adjusts command to the specified priority –>"-n new_level" runs the command with the specified priority
renice priority PID	Changes the priority of the specified PID
at time	Schedules job to be run once at the specified time –>"-f command" specifies command to be run
atq	Lists all scheduled jobs waiting to be run
atrm process_number	Removes a process from waiting queue. The process number is the one returned by the "atq" command
batch	Runs commands or processes when the system load level is low –>"-f command" specifies command to be run

2. Appendix B. Editor vi

B.1. Introduction

Knowing how to use a text editor is essential for users who want to edit or modify the system's files. Although there are hundreds of different editors, editor vi has always been the default editor in systems like UNIX. Although editor vi can seem like a very simple editor at first, as we get used to its commands, we will find that it has very many utilities that make it extremely easy to handle the files. Although there are other editors that are more useful for long painstaking tasks (such as programming), most system administrators use editor vi for many of the administration tasks. The fact that it is a text editor (which means that it can be used in the system's console) and the fact that it is available for all systems make editor vi the ideal editor in UNIX environments.

Vim

In GNU/Linux, it is more common to use vim (Vi IMproved), which is 99.9% compatible with vi but adds a few more functionalities.

To call up vi, we can use any of the methods shown in the following table:

Figure B.1

vi file	Edits file in full screen mode
vi −r file	Recovers last saved version of file (for cases in which editor is not correctly exited and a swap file is left)
vi + file	Edits file and places cursor on last line
vi + line_number file	Edits file and places cursor on specified line
vi file-1 ...file_N	Edits all specified files. In order to save one file at a time we should type ":n" on the command line. If we type ":n:" modifications are not saved
vi +/string file	Edits file and places cursor at first occurrence of string

B.2. Modes of editor vi

Editor vi can be used in two ways: normal mode and insert mode. In normal mode, everything that we write will be interpreted by the editor to carry out specific actions, whereas insert mode is used to modify the contents of the file. When we open vi, the default mode is normal mode. To change to the insert mode, we can use any of the keys on the following table:

Figure B.2

a	Appends text after current cursor position
i	Inserts text before selected current cursor position
A	Appends text to end of current line
I	Inserts text at beginning of current line
R	Switches to replacing mode to replace characters
o	Adds a new line below current line and switches to insertion mode
O	Adds a new line above current line and switches to insertion mode

We can use the Esc key to return to normal mode. In the insert mode, the only thing that we can do is write text, delete it or move along the text using the PgDn and PgUp keys. We can carry out all sorts of operations in normal mode. The following table shows some of the most common ones:

Figure B.3

MOVING ABOUT THE FILE	
j	Next line
k	Previous line
l	Next character
h	Previous character
[[	Start of file
]]	End of file
nG	Goes to n line
G	Goes to end of file
RETURN	Next line
CTRL+F	Next screen
CTRL+B	Previous screen
CTRL+D	Next half screen
CTRL+U	Previous half screen

Figure B.4

OPERATING WITH FILES	
w	Saves file
:w file_name	Saves file with specified file name
:wq	Saves file and exits editor
:x	Saves file and exits editor
zz	Saves file and exits editor
:q	Exits if file has not been modified
:q!	Exits editor without saving changes
:e file	Edits specified file if there are no changes in current file
:e! file	Edits specified file without saving any changes in current file
:r file	Appends specified file to current line
:Nr file	Appends specified file to N line
:sh	Runs a shell without exiting the editor; to exit shell "exit" must be typed
:N, Mw!	Saves from N to M line ignoring the rest
:N, M>>file	Appends text from N to M line to specified file
:=	Displays current line
CTRL+G	Displays file status

Figure B.5

Copying, deleting, cutting, finding and replacing	
yy	Copies current line
Nyy	Copies N lines from cursor position
p	Pastes copied lines below current line
P	Pastes copied lines above current line
x	Deletes character underneath cursor
dw	Deletes word underneath cursor
dd	Deletes current line
D	Deletes characters from cursor position to end of line
/string	Searches forward for string from current position. To continue searching, "n" and "N" can be used to search backward or forward respectively
?string	Searches backward for string from current position
:set ic	Searches ignoring case
:set noic	Searches respecting case
:g/HELLO/s//GOODBYE	Replaces all occurrences of "HELLO" for "GOODBYE"

We will see the commands that we write, which will run when we press the Return key, in the line under the editor. In addition, most of these commands can be repeated: all we have to do is write the number of times that we want

them to run before the command. For example, `dd` deletes the current line; If we were to use `3dd` instead of the existing line, the three following lines would be deleted.

3. Appendix C. The Fedora 7 installation process

C.1. Introduction

The purpose of this appendix is to provide a general idea of the basic steps that must be taken in order to install Fedora 7. We assume that readers have the basic knowledge gained throughout the module and that they are familiar with the installation of Debian Etch. The theoretical knowledge that one must have in order to install either of these systems is practically identical; Consequently, this appendix focuses only on putting the theoretical knowledge into practice and we will only highlight the differences between the two installation processes.

C.2. Starting the installation

As this distribution is very recent, only the English version of the installation was available at the time, which is why the screenshots are in English, but the process of the installation would be the same in any other language.

The first thing we have to do is download the DVD iso image from http://mirrors.fedoraproject.org/publiclist/Fedora/7, record it to a DVD and reboot the computer, telling it to boot up from the DVD. We must use the startup prompt to indicate that we wish to carry out an installation or update an existing system:
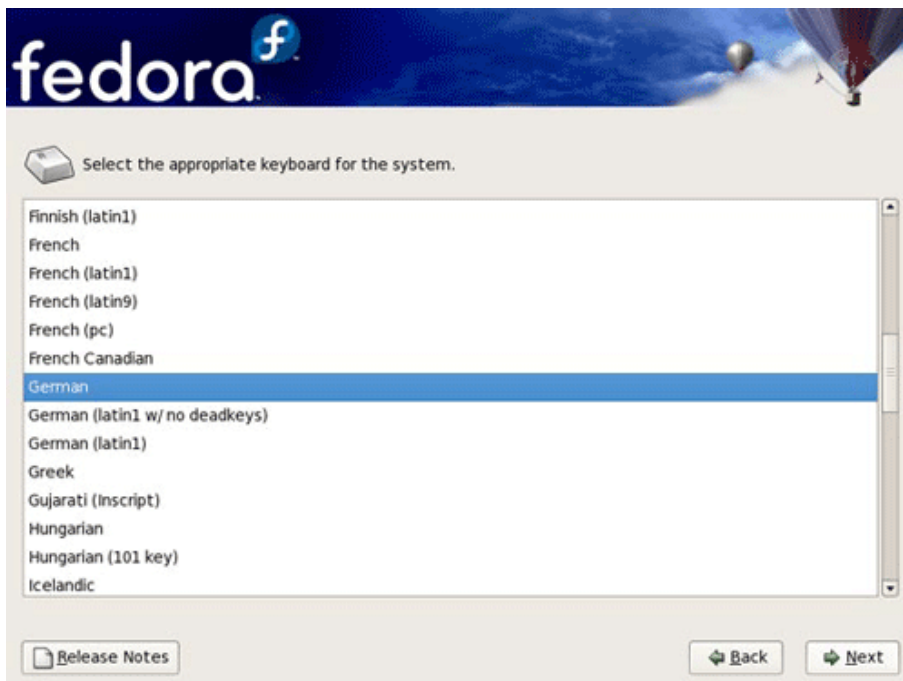
Figure C.1

We would then highlight the correct language and click Next:

Figure C.2

We would then set the keyboard layout:

Figure C.3

C.3. Hard disk partition

The installation system will then propose partitioning the hard drive by default. Alternatively, we have the option of using Disk Druid to carry out this operation ourselves. This option is advisable, as the program is easy to use and

it will help us to structure the partition in accordance with our needs. If we already have a swap partition, even if it is from another system, we will not have to create a new one for this installation, as we can use the existing one, because only volatile-type information is stored on swap partitions.
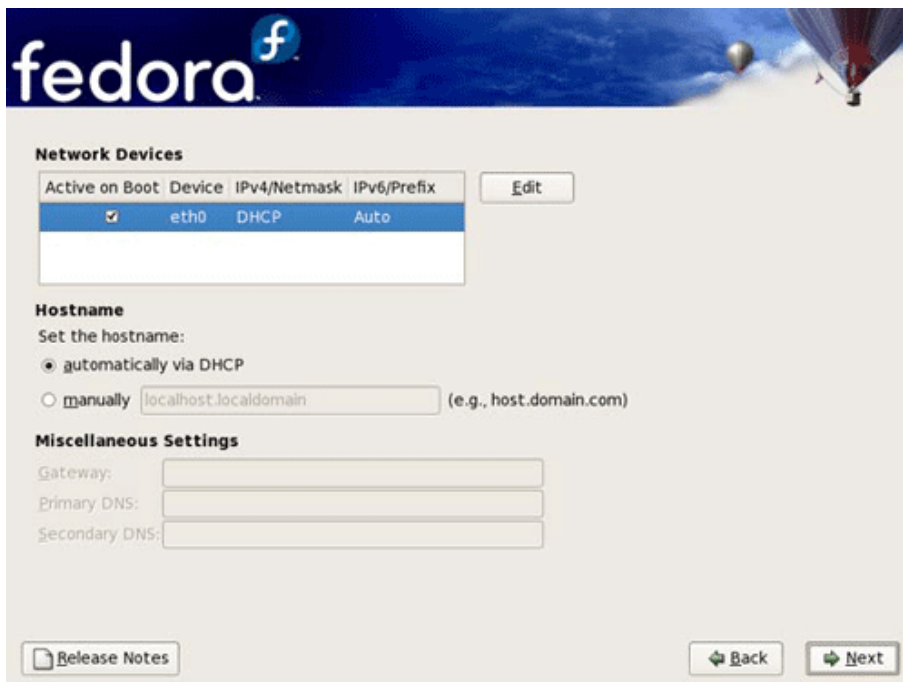
We will then see a screen with the proposed layout for the partition:

Figure C.4

C.4. Network configuration

Figure C.5

C.5. Selecting a time zone

A map will then appear, on which we can specify our geographical position using the mouse.

Figure C.6

We will then be asked to set the root user password:

Figure C.7

C.6. Selecting the software that we want to install

We must then select the families of the applications that we wish to install and, within these, which applications we want to be installed in our system. Once again, we would urge users to refrain from installing massive applications, as these will clearly have a negative effect on the system's performance; we should only install the ones we know that we will use for certain, and we will gradually install the rest of the applications, as and when the need arises. It is advisable to leave the selections that are made for the graphical system enabled, if it is going to be used.
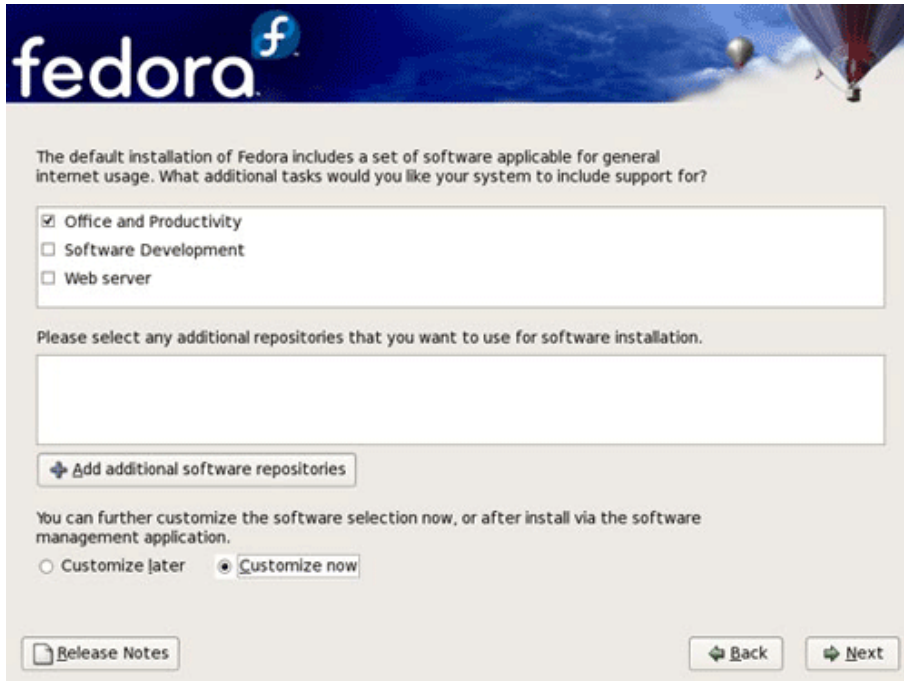
Figure C.8

Figure C.9

Once the selection process has finished, we will proceed with the installation of the whole system: formatting partitions, configuring devices and installing packages, using the information that has been provided. If we do not have enough space on the hard drive to install all the applications, we will be directed back to the configuration screen where we will either deselect some of the applications or allocate more space to the appropriate partition (this is normally located in the /home directory, which is where most of the data for repartitioning the disk are located and we will have to restart the installation process).

Figure C.10

Figure C.11

C.7. Installation of the boot loader

When the data transfer process has finished, the post-installation process will automatically run and the boot loader will be installed, if applicable, and once these automatic processes have taken place, we will be asked if we want to create a boot disk, that will then be used to startup any new installation, if we have not installed the boot loader or we have not configured the one that was already installed properly.

Figure C.12

Completion of the installation:

Figure C.13

C.8. First system boot

Figure C.14
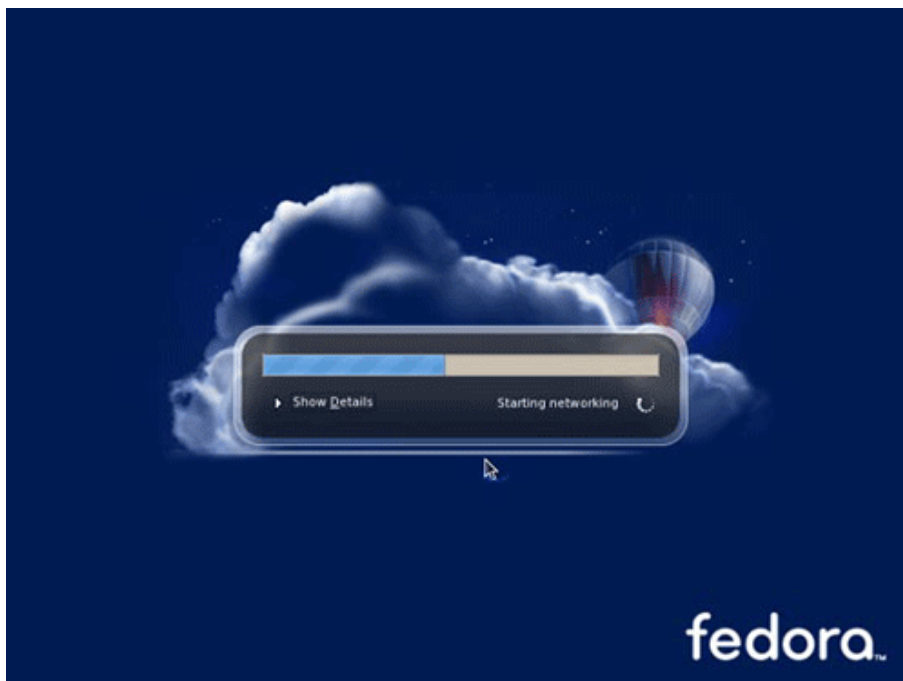
Before booting fully for the first time, we will have to use a setup agent to configure elements such as: The firewall, SELinux (a Fedora security feature), the date and time, the soundcard and the new system user account:

Figure C.15

Figure C.16
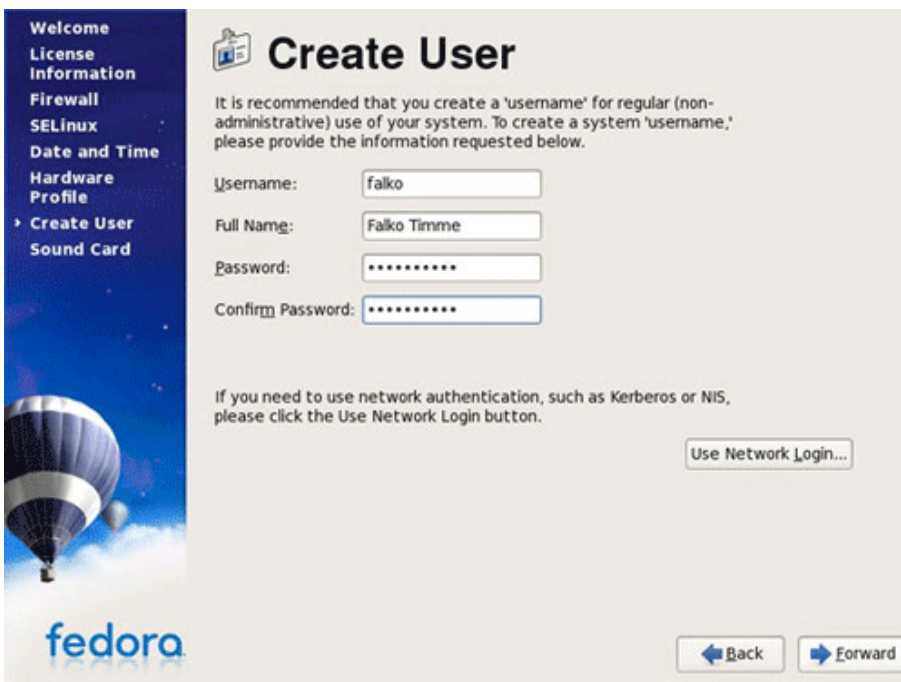
After rebooting the computer, we will be asked to enter the user name and password, before we can enter the system:

Figure C.17

Figure C.18

We recommend reading the website of the Fedora project to learn how the package system works and so that you can check all of the available documentation.

4. Appendix D. Administration tools

D.1. Introduction

When administrating a GNU/Linux system, it is necessary to be familiar with a large variety of different programs and applications. Although it is absolutely essential to read all the documents related to any application that we wish to install before installing it, in some cases, t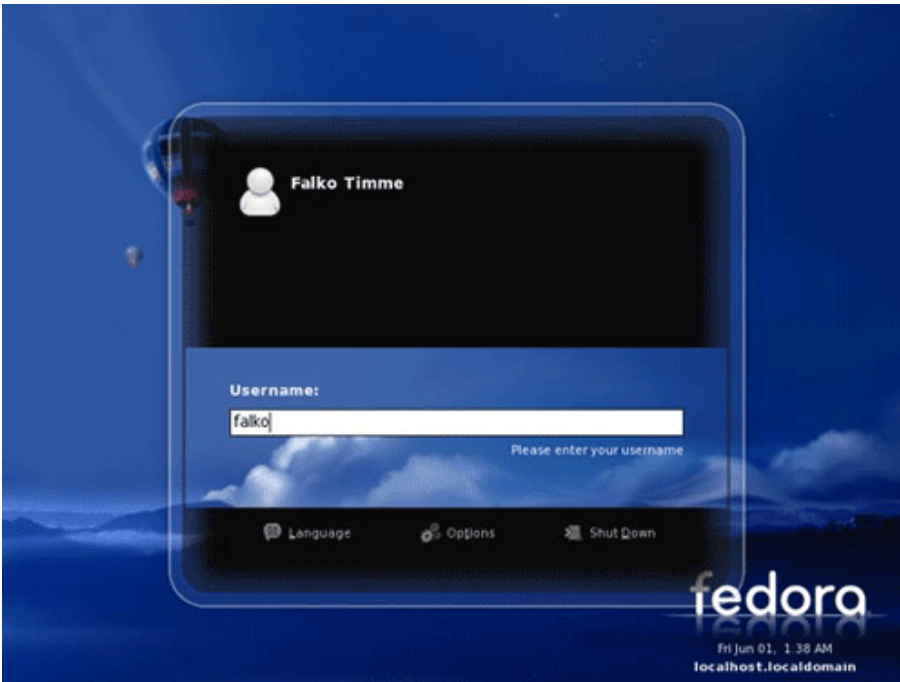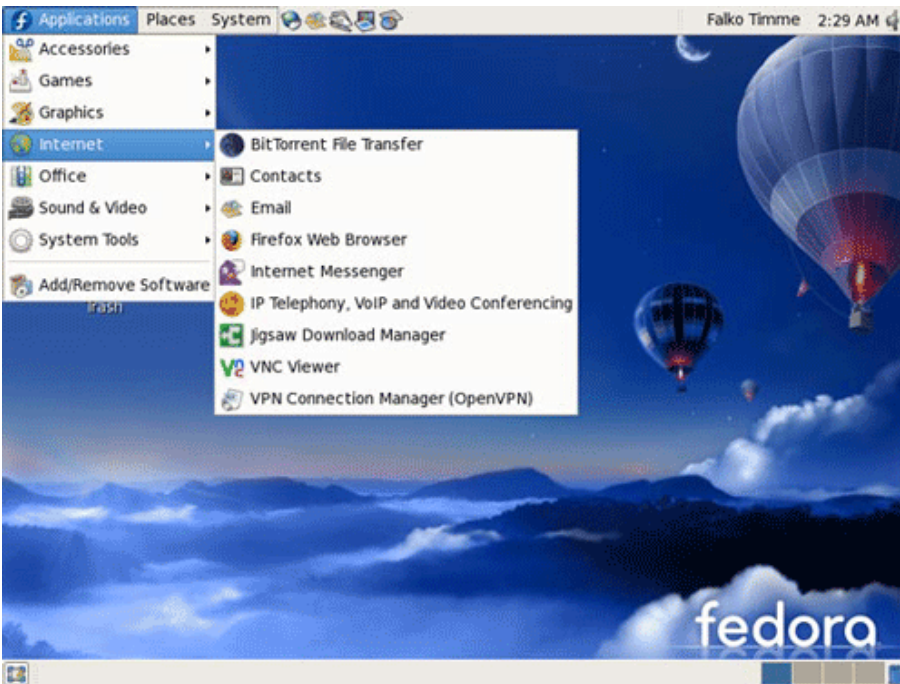he configurations may be very, very complex. For this reason, certain administrative tools have been appearing over recent years, which are more intuitive and user-friendly and that allow us to handle many applications and services, in an easier way.

Generally, these global administration tools incorporate mechanisms for configuring and managing the basic aspects of the system and configuration files for the applications that we use. Although it is interesting to know that these tools exist, we should not rely on them when setting up the whole configuration of a server, for various reasons. Firstly, we need to remember that these programs do not always take into account all the possibilities available for these servers. This could mean that we might leave some option that is important for our needs without the proper configuration, that we could fail to take some security system into account etc. Secondly, we should not forget that, although the configuration environment may be more user-friendly and, generally, easier to use and manage, we should be aware of what is actually happening when we enable the options of the different programs and services that we are configuring. Although the environment is very intuitive, this does not mean that we should not know what each option means exactly. If we do not have extensive knowledge of the service that we are managing, it is very easy to create bugs that will lead to the system not working properly, security vulnerabilities etc. Finally, another reason for not using only these applications is that the system may fail or have bugs at some point, which will mean that we cannot use them; we may also have to administrate a system that simply does not have the applications. If we do not know some of the details of the configuration files of the applications that we use, we will have no way of dealing with any small problem that arises.

Security of the administrative tools

When we install some general administration tool, it is important to limit its use and ensure that it can only be accessed by the system's root user account; otherwise, any other user could modify some aspect of the system. Furthermore, we should also be very alert to any possible security vulnerabilities that may appear in them, as, because they have to manage the programs installed in the system, most of these tools may run with the root user's permissions, with the dangers that this involves.

For all these reasons, these tools should be used very carefully and by someone that knows exactly what they are modifying. In some cases, they can be very useful for us to see how some form of complicated configuration should be

carried out or for detecting any bugs we have created. We should use them as additional tools, which assist our administrative tasks, but never rely only on them.

All GNU/Linux distributions usually incorporate their own automatic administration tools. This feature clearly differentiates the different GNU/Linux distributions. In SuSE, for example, there is an application called Yast2, which allows us to carry out almost any operation that configures the system; RedHat incorporates very many different programs for configuring the network, the daemons, the application servers etc.; when installing a package in Debian, we are already able to startup a configuration based on the answers that we provide over various dialogue screens; some applications have their own scripts that make it possible to have faster standard configurations etc. Nevertheless, if we know what these applications are really doing and what files contain their configurations, it is much easier to solve any problems that arise with the system. Apart from these tools, which are unique to the distribution that we use, there are other more general tools that we can install in most existing distributions. Although there are a few dozens and each administrator must choose the one that they most like or that is most appropriate for their needs, we will discuss some of the most versatile and popular of these tools in this appendix. `linuxconf` and `webmin`.

D.2. Linuxconf

The general administration application `linuxconf` is based on an environment of text menus that we can use from any console in the system. The following figure shows the main menu:

Figure D.1

```
───────── Linuxconf ─────────
This is the main entry to Linux configuration.

Use the TAB key to navigate between the field
section and the button bar at the bottom.
Check out the help for this screen. It is an
introduction to Linuxconf

          ┌──────────Config──────────┐
          │ Networking                │
          │ Users                     │
          │ File systems              │
          │ Miscellaneous             │
          │ Peripherals               │
          │ Boot                      │
          │ cluster administration    │
          │ ─────────Control──────────│
          │ Control panel             │
          │ Linuxconf management      │
          │ Date & time               │
          │ ─────────Status───────────│
          │ Logs                      │
          │ System status             │
          │ ──────────Tasks───────────│
          │ Friendly helpers (Gurus)  │
          └───────────────────────────┘

          ┌──────┐              ┌──────┐
          │ Quit │              │ Help │
          └──────┘              └──────┘
```
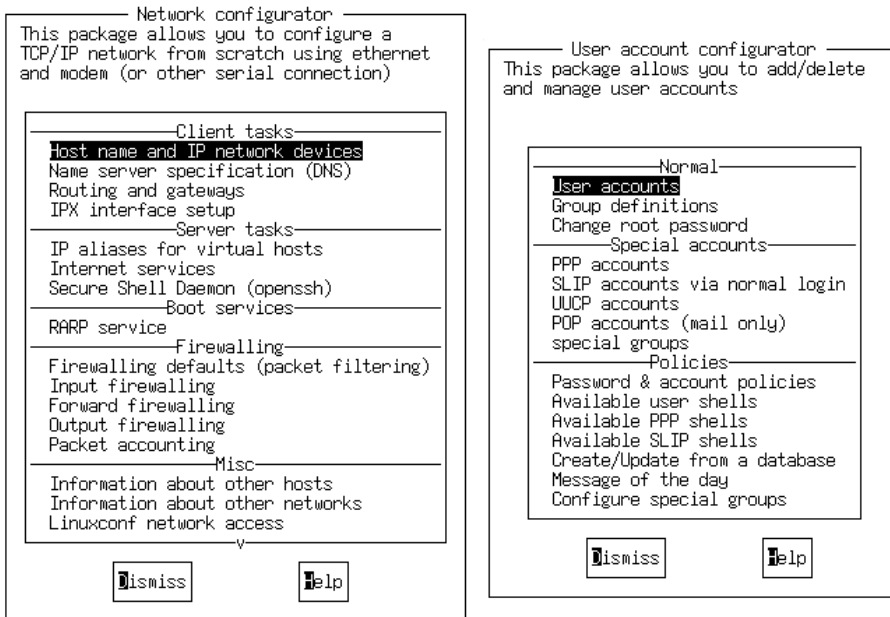
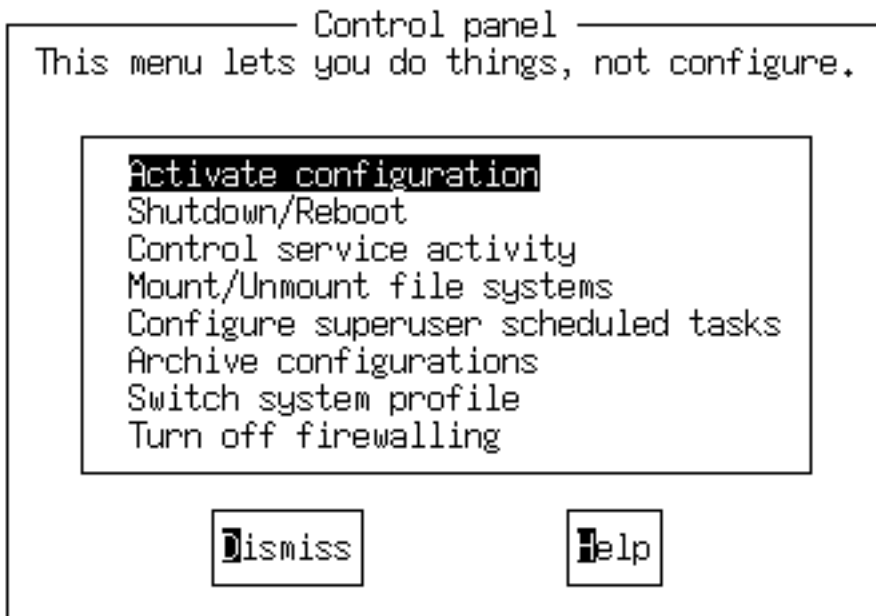As the image shows, `linuxconf` divides its operations into the following sections:

- Configuration: this is the main section within `linuxconf`, where we can configure most of the system's aspects, such as the network, the users, the installed peripheral devices etc. The following figures show how the network configuration and user dialogue screens work:

Figure D.2

```
┌──── Network configurator ────┐        ┌──── User account configurator ────┐
│ This package allows you to configure a │ This package allows you to add/delete │
│ TCP/IP network from scratch using ethernet │ and manage user accounts │
│ and modem (or other serial connection) │                            │
│                                         │                            │
│  ┌──────Client tasks──────┐             │  ┌──────────Normal──────────┐  │
│  │ Host name and IP network devices     │  │ User accounts            │  │
│  │ Name server specification (DNS)      │  │ Group definitions        │  │
│  │ Routing and gateways                 │  │ Change root password     │  │
│  │ IPX interface setup                  │  │ ──────Special accounts──────│  │
│  │ ──────Server tasks──────             │  │ PPP accounts             │  │
│  │ IP aliases for virtual hosts         │  │ SLIP accounts via normal login │
│  │ Internet services                    │  │ UUCP accounts            │  │
│  │ Secure Shell Daemon (openssh)        │  │ POP accounts (mail only) │  │
│  │ ──────Boot services──────            │  │ special groups           │  │
│  │ RARP service                         │  │ ──────Policies──────      │  │
│  │ ──────Firewalling──────              │  │ Password & account policies │
│  │ Firewalling defaults (packet filtering) │ Available user shells    │  │
│  │ Input firewalling                    │  │ Available PPP shells     │  │
│  │ Forward firewalling                  │  │ Available SLIP shells    │  │
│  │ Output firewalling                   │  │ Create/Update from a database │
│  │ Packet accounting                    │  │ Message of the day       │  │
│  │ ──────Misc──────                     │  │ Configure special groups │  │
│  │ Information about other hosts        │  └──────────────────────────┘  │
│  │ Information about other networks     │                                │
│  │ Linuxconf network access            │    ┌────────┐    ┌──────┐      │
│  └──────────────────v──────────┘       │    │Dismiss │    │Help  │      │
│                                         │    └────────┘    └──────┘      │
│    ┌────────┐      ┌──────┐             └────────────────────────────────┘
│    │Dismiss │      │Help  │
│    └────────┘      └──────┘
└─────────────────────────────┘
```

- Control: this section is used to carry out specific actions in the system, such as mounting or unmounting units, changing the system's date and time, personalising the menus etc. The following figure shows some of the actions that can be performed contained in the control panel's menu:

Figure D.3

```
┌─────────────────── Control panel ───────────────────┐
│  This menu lets you do things, not configure.        │
│                                                      │
│     ┌──────────────────────────────────────┐         │
│     │ Activate configuration               │         │
│     │ Shutdown/Reboot                      │         │
│     │ Control service activity             │         │
│     │ Mount/Unmount file systems           │         │
│     │ Configure superuser scheduled tasks  │         │
│     │ Archive configurations               │         │
│     │ Switch system profile                │         │
│     │ Turn off firewalling                 │         │
│     └──────────────────────────────────────┘         │
│                                                      │
│        ┌────────────┐        ┌──────────┐            │
│        │ Dismiss    │        │ Help     │            │
│        └────────────┘        └──────────┘            │
│                                                      │
└──────────────────────────────────────────────────────┘
```

- Status: if we want to look at the logs or the status of any of the system's aspects, we can use the menus in this section. Many of the system's basic commands for seeing the status of the disk, the amount of memory used etc. are used in these.

- Tasks: other configuration dialogues for starting up a modem properly, the network etc.

Another way of using this program is as a web browser. By default, network access is not available for the browser and therefore, before using it we will have to enable it using the menu `Networking, Linuxconf network access` and enable the `Enable network access option`. If we open the browser and go to `http://localhost:98/` we will have the same dialogue screens and menu options of `linuxconf` in html format. By default, we will only have access to this service from the same machine, although it is advisable to only enable it when we want to use it.

Finally, another project that is related to `linuxconf` is `gnome-linuxconf`, which has the same functions as described above, but can be used in X systems. The following figure shows how it looks:

Figure D.4
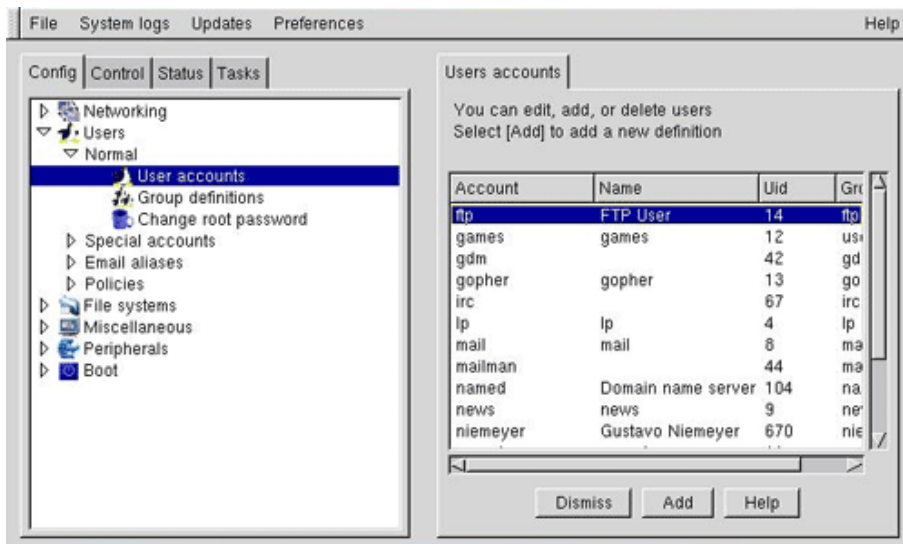
D.3. Webmin

As the name indicates, `webmin` is a tool for carrying out a configuration using the internet. It is very well designed and most of the configuration methods have been thought out carefully. When properly used, it can be a very useful tool. By default, when it is installed it will open port 10000 (https://localhost:10000) so that we will be able to access it using any browser we want. Before we can start using the tool, we will be asked for the system administrator's password, although it also has a very useful system for administrating the actual users with which we can specify the actions that can be performed by each user. This option is very interesting because it allows us to configure more than one system administrator account, creating accounts that are specialised according to the tasks that each users needs to perform.

We will now provide a series of screenshots of the different sections, to provide an idea of what the application looks like:

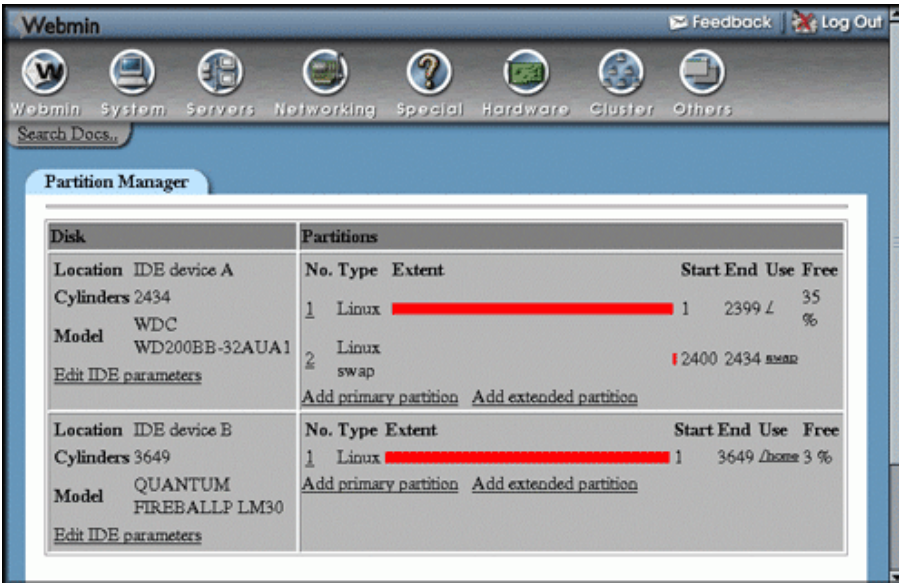- System user administration:

Figure D.5
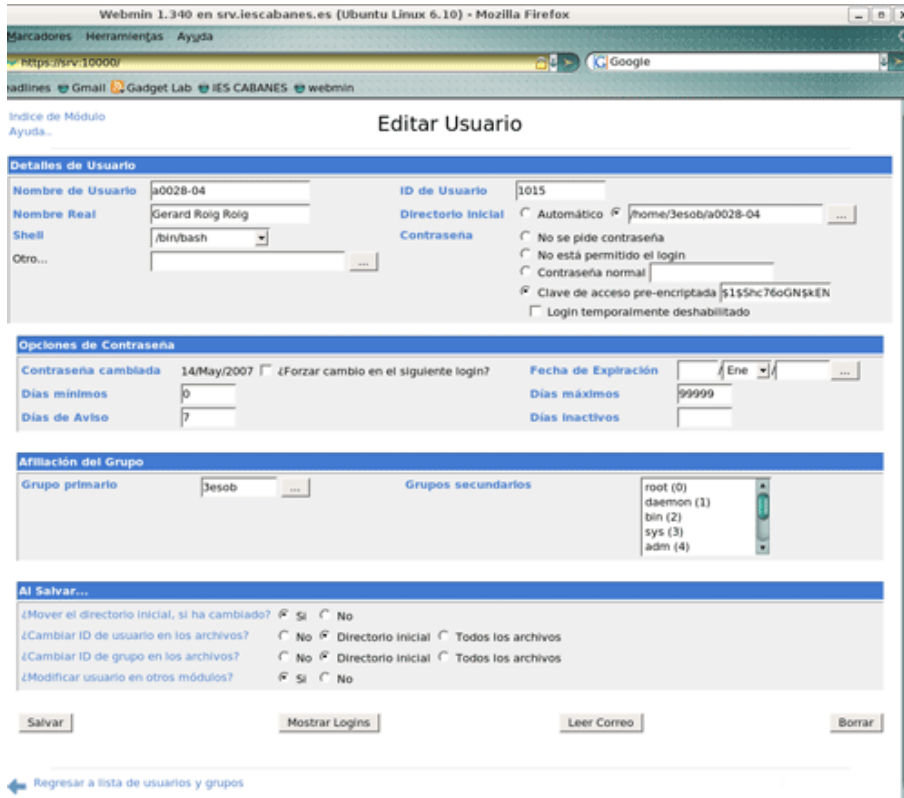
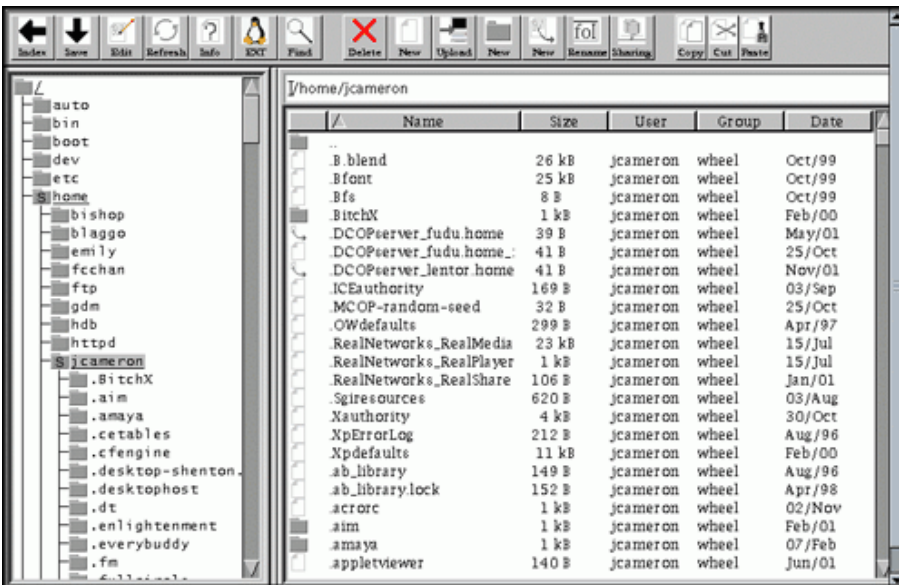- Configuring the system's boot process:

Figure D.6

- Information on the disk:

Figure D.7

- File browser:

Figure D.8

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