SUSE Linux Start-Up

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Start-Up

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Please direct suggestions and comments to `documentation@suse.de`.

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About This Guide

This guide will see you through your initial contact with SUSE Linux. Whether you are a first time user or an experienced administrator, check out the various parts of this manual to learn how to use and enjoy your SUSE Linux system.

Setup
Learn how to install and maintain your SUSE Linux system.

Basics
Get an introduction to the Linux desktop and to the most important software options for SUSE Linux. In addition to that, learn how to find help or additional documentation in case you need more in-depth information on your system.

Desktop
Learn more about the desktop of your choice, either GNOME or KDE.

Troubleshooting
Check out a compilation of the most frequent problems and annoyances and learn how to solve these problems on your own.

1 Feedback

We want to hear your comments and suggestions about this manual and the other documentation included with this product. Please use the User Comments feature at the bottom of each page of the online documentation, or go to http://www.novell.com/documentation/feedback.html and enter your comments there.

2 Additional Documentation

There are other manuals available on this SUSE Linux product, either online at http://www.novell.com/documentation/ or in your installed system under /usr/share/doc/manual/:

SUSE Linux *Reference*

This guide covers advanced system administration tasks with SUSE Linux. An online version of this document can be found at `http://www.novell.com/documentation/suse10/`.

Novell AppArmor Powered by Immunix 1.2 Installation and QuickStart Guide

This guide outlines the initial installation procedure for the *AppArmor* product. An online version of this document can be found at `http://www.novell.com/documentation/apparmor/`.

Novell AppArmor Powered by Immunix 1.2 Administration Guide

This guide contains in-depth information on the use of *AppArmor* in your environment. An online version of this document can be found at `http://www.novell.com/documentation/apparmor/`.

3 Documentation Conventions

The following typographical conventions are used in this manual:

- `/etc/passwd`: filenames and directory names
- *`placeholder`*: replace *`placeholder`* with the actual value
- `PATH`: the environment variable PATH
- `ls`, `--help`: commands, options, and parameters
- `user`: users or groups
- [Alt], [Alt] + [F1]: a key to press or a key combination
- *File*, *File* → *Save As*: menu items, buttons
- *Dancing Penguins* (Chapter Penguins, ↑*Reference*): This is a reference to a chapter in another book.

4 Acknowledgment

With a lot of voluntary commitment, the developers of Linux cooperate on a global scale to promote the development of Linux. We thank them for their efforts—this distribution would not exist without them. Furthermore, we thank Frank Zappa and Pawar. Special thanks, of course, go to Linus Torvalds.

Have a lot of fun!

Your SUSE Team

Part I Setup

1 Installation with YaST

This chapter systematically guides you through the installation of the SUSE Linux system with the system assistant YaST. The description of the preparation of the installation process is accompanied by background information to assist you in making the right decisions in the individual configuration stages.

1.1 System Start-Up for Installation

Insert the first SUSE Linux CD or the DVD into the drive. Then reboot the computer to start the installation program from the medium in the drive.

1.2 The Boot Screen

The boot screen displays a number of options for the installation procedure. *Boot from Hard Disk* boots the installed system. This item is selected by default, because the CD is often left in the drive. To install the system, select one of the installation options with the arrow keys. The relevant options are:

Installation
The normal installation mode. All modern hardware functions are enabled.

Installation—ACPI Disabled

If the normal installation fails, this might be due to the system hardware not supporting ACPI (advanced configuration and power interface). If this seems to be the case, use this option to install without ACPI support.

Installation—Safe Settings

Boots the system with the DMA mode (for CD-ROM drives) and power management functions disabled. Experts can also use the command line to enter or change kernel parameters.

Use the function keys indicated in the bar at the bottom of the screen to change a number of installation settings.

F1

Context-sensitive help for the active element of the boot screen.

F2

Select the display language for the installation.

F3

See other options that can be set for installation.

After pressing F3 some other options can be set:

F3

Selection of various graphical display modes for the installation. The text mode can be selected if the graphical installation causes problems.

F4

Normally, the installation is performed from the inserted installation medium. Other sources, like FTP or NFS servers, can be selected here. If the installation is carried out in a network with an SLP server, one of the installation sources available on the server can be selected with this option. Information about SLP is available in Chapter *SLP Services in the Network* (↑Reference).

F5

Use this to tell the system that you have an optional disk with a driver update for SUSE Linux. You will be asked to insert the update disk at the appropriate point in the installation process.

A few seconds after starting the installation, SUSE Linux loads a minimal Linux system to run the installation procedure. If you want to know what is going on during the boot process, press ESC to see messages and copyright notices scroll by. At the end of the loading process, the YaST installation program starts. After a few more seconds, the screen should display the graphical installer.

The actual installation of SUSE Linux begins at this point. All YaST screens have a common layout. All buttons, entry fields, and lists can be accessed with the mouse or the keyboard. If your mouse pointer does not move, the mouse has not been autodetected. In this case, use the keyboard for the time being. The navigation with the keyboard is similar to the description in Section 3.9.1, "Navigation in Modules" (page 96).

1.3 Language Selection

YaST and SUSE Linux in general can be configured to use different languages according to your needs. The language selected here is also used for the keyboard layout. In addition, YaST uses the language setting to guess a time zone for the system clock. These settings can be modified later along with the selection of secondary languages to install on your system. If your mouse does not work, select the language with the arrow keys and press Tab until *Next* is highlighted. Then press Enter to confirm your language selection.

1.4 License Agreement

Read thoroughly the license agreement that is displayed on screen. If you agree to the terms, choose *Yes, I agree to the License Agreement* and click *Next* to confirm your selection. If you do not agree to the license agreement, you are not allowed to install SUSE Linux and the installation terminates.

1.5 Installation Mode

Select *New installation* or *Update an existing system*. Updating is only possible if a SUSE Linux system is already installed. When a SUSE Linux system is already installed, use *Other* to access two advanced options: boot the installed system with *Boot installed system* or, if the installed system fails to boot, you can try to fix the problem with *Repair*

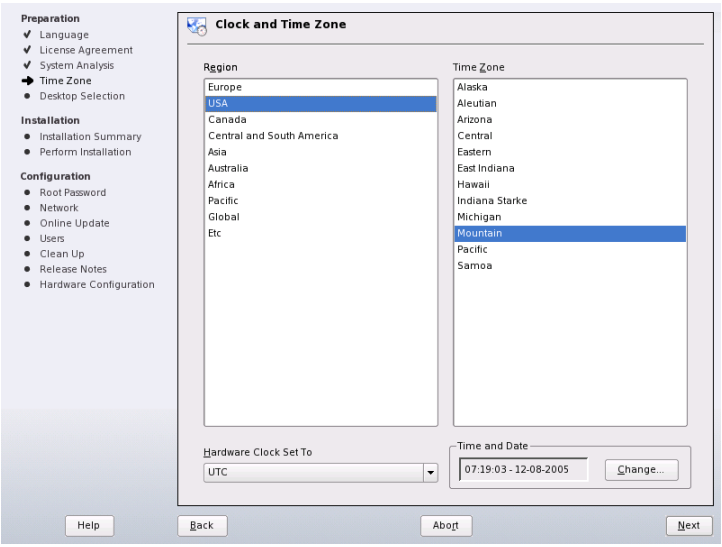
installed system. If no SUSE Linux system is installed, you can only perform the new installation.

The following sections describe the procedure of installing a new system. Find detailed instructions for a system update in Section 3.2.5, “Updating the System” (page 62). Find a description of the system repair options in Section “Using YaST System Repair” (page 247).

1.6 Time Zone

In this dialog, shown in Figure 1.1, “Selecting the Time Zone” (page 6), select your region and time zone from the lists. During installation both are preset according to the selected installation language. Choose between *Local Time* and *UTC* (`GMT`) under *Hardware Clock Set To*. The selection depends on how the BIOS hardware clock is set on your machine. If it is set to `GMT`, which corresponds to `UTC`, your system can rely on SUSE Linux to switch from standard time to daylight saving time and back automatically. Click *Change* to set the current date and time. When you are satisfied with the settings, click *Next* to proceed.

Figure 1.1 *Selecting the Time Zone*



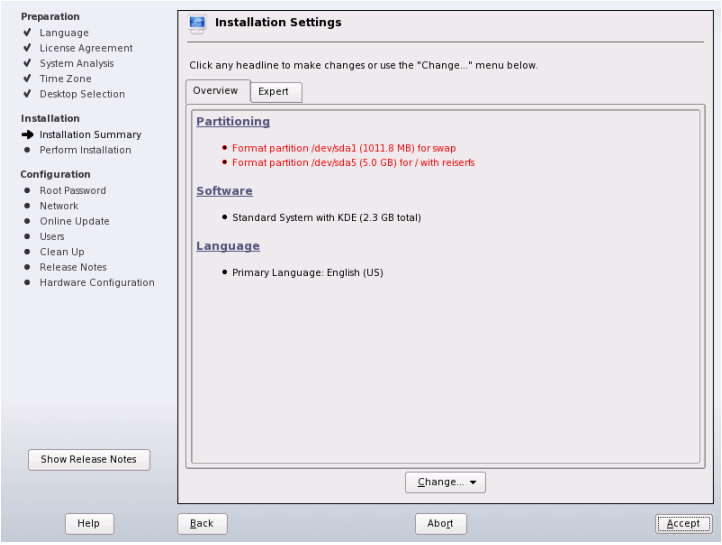
1.7 Desktop Selection

In SUSE Linux, you can choose from various desktops. *KDE* and *GNOME* are powerful graphical desktop environments similar to Windows©. Find information about these in Chapter 7, *The KDE Desktop* (page 173) and Chapter 8, *The GNOME Desktop* (page 201). If you do not want either, choose *Other* and click *Select* for more options. With *Minimal Graphical System*, install a graphical window manager that allows for running stand-alone X applications and console windows but does not provide the usual integrated desktop functionality. In *Text Mode*, only console terminals are available.

1.8 Installation Settings

After a thorough system analysis, YaST presents reasonable suggestions for all installation settings. The options that sometimes need manual intervention in most common installation situations are presented under the *Overview* tab. Find more special options in the *Expert* tab. After configuring any of the items presented in these dialogs, you are always returned to the settings window, which is updated accordingly. The individual settings are discussed in the following sections.

Figure 1.2 *Installation Settings*



1.8.1 Partitioning

In most cases, YaST proposes a reasonable partitioning scheme that can be accepted without change. YaST can also be used to customize the partitioning. This section describes the necessary steps.

Partition Types

Every hard disk has a partition table with space for four entries. An entry in the partition table can correspond to a primary partition or an extended partition. Only one extended partition entry is allowed, however.

A primary partition simply consists of a continuous range of cylinders (physical disk areas) assigned to a particular operating system. With primary partitions only, you would be limited to four partitions per hard disk, because more do not fit in the partition table. This is why extended partitions are used. Extended partitions are also continuous ranges of disk cylinders, but an extended partition may itself be subdivided into *logical partitions*. Logical partitions do not require entries in the partition table. In other words, an extended partition is a container for logical partitions.

If you need more than four partitions, create an extended partition as the fourth partition or earlier. This extended partition should span the entire remaining free cylinder range. Then create multiple logical partitions within the extended partition. The maximum number of logical partitions is 15 on SCSI, SATA, and Firewire disks and 63 on (E)IDE disks. It does not matter which types of partitions are used for Linux. Primary and logical partitions both work fine.

TIP: Hard Disks with a GPT Disk Label

For architectures using the GPT disk label, the number of primary partitions is not restricted. Consequently, there are no logical partitions in this case.

Required Disk Space

YaST normally proposes a reasonable partitioning scheme with sufficient disk space. If you want to implement your own partitioning scheme, consider the following recommendations concerning the requirements for different system types.

Minimal System: 500 MB
No graphical interface (X Window System) is installed, which means that only console applications can be used. Also, only a very basic selection of software is installed.

Minimal System with Graphical Interface: 700 MB
This includes the X Window System and some applications.

Default System: 2.5 GB
This includes a modern desktop environment, like KDE or GNOME, and also provides enough space for large application suites, such as OpenOffice.org and Netscape or Mozilla.

The partitions to create depend on the available space. The following are some basic partitioning guidelines:

Up to 4 GB:
One partition for the swap space and one root partition (/). In this case, the root partition must allow for those directories that often reside on their own partitions if more space is available.

4 GB or More:

A swap partition, a root partition (1 GB), and one partition each for the following directories as needed: `/usr` (4 GB or more), `/opt` (4 GB or more), and `/var` (1 GB). If you do not want to have separate partitions for these directories, add the suggested disk space to the root partition. The rest of the available space can be used for `/home`.

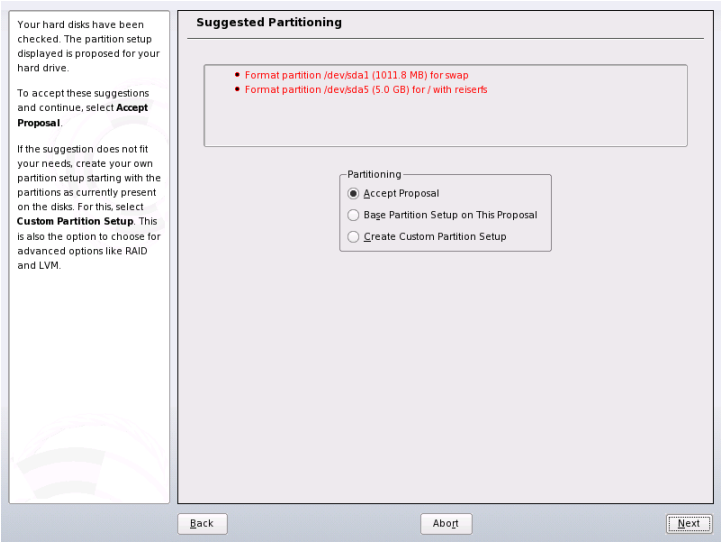
Depending on the hardware, it might also be useful to create a boot partition (`/boot`) to hold the boot mechanism and the Linux kernel. This partition should be located at the start of the disk and should be at least 8 MB or one cylinder. As a rule of thumb, always create such a partition if it was included in YaST's original proposal. If you are unsure about this, create a boot partition to be on the safe side.

You should also be aware that some (mostly commercial) programs install their data in `/opt`. Therefore, either create a separate partition for `/opt` or make the root partition large enough. KDE and GNOME are also installed in `/opt`.

Partitioning with YaST

When you select the partitioning item in the suggestion window for the first time, the YaST partitioning dialog displays the partition settings as currently proposed. Accept these current settings as they are or change them before continuing. Alternatively, discard all the settings and start over from scratch.

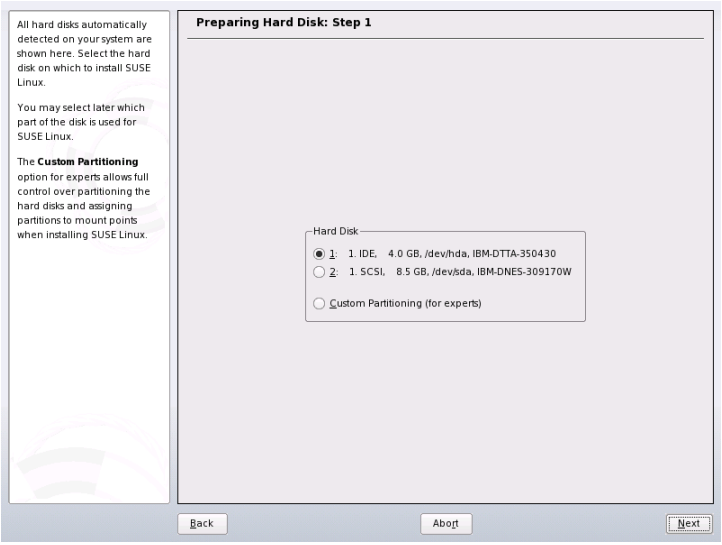
Figure 1.3 *Editing the Partitioning Setup*



Nothing in the partitioning setup is changed if you select *Accept Proposal*. If you select *Base Partition Setup on This Proposal*, the *Expert Partitioner* opens. It allows tweaking the partition setup in every detail. This dialog is explained in Section 3.7.5, "Partitioner" (page 86). The original setup as proposed by YaST is offered there as a starting point.

Selecting *Create Custom Partition Setup* opens the dialog as shown in Figure 1.4, "Selecting the Hard Disk" (page 12). Use the list to choose among the existing hard disks on your system. SUSE Linux will be installed on the disk selected in this dialog.

Figure 1.4 *Selecting the Hard Disk*



The next step is to determine whether the entire disk should be used (*Use Entire Hard Disk*) or whether to use any existing partitions (if available) for the installation. If a Windows operating system was found on the disk, you are asked whether to delete or resize the partition. Before doing so, read Section "Resizing a Windows Partition" (page 13). If desired, go to the *Expert Partitioner* dialog to create a custom partition setup as described in Section 3.7.5, "Partitioner" (page 86).

WARNING: Using the Entire Hard Disk for Installation

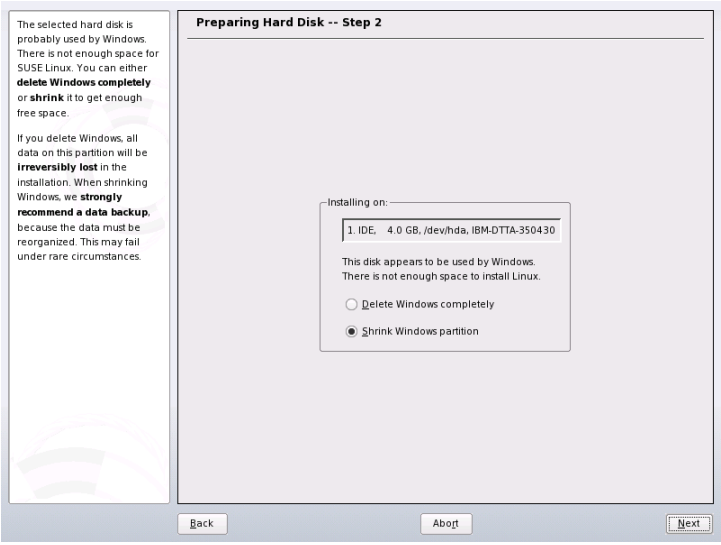
If you choose *Use Entire Hard Disk*, all existing data on that disk is completely erased later in the installation process and is then lost.

YaST checks during the installation whether the disk space is sufficient for the software selection made. If not, YaST automatically changes the software selection. The proposal dialog displays a notice to inform you about this. As long as there is sufficient disk space available, YaST simply accepts your settings and partitions the hard disk accordingly.

Resizing a Windows Partition

If a hard disk containing a Windows FAT or NTFS partition was selected as the installation target, YaST offers to delete or shrink this partition. In this way, you can install SUSE Linux even if there is currently not enough space on the hard disk. This functionality is especially useful if the selected hard disk contains only one Windows partition that covers the entire hard disk. This is sometimes the case on computers where Windows comes preinstalled. If YaST sees that there is not enough space on the selected hard disk, but that space could be made available by deleting or shrinking a Windows partition, it presents a dialog in which to choose one of these two options.

Figure 1.5 *Possible Options for Windows Partitions*



If you select *Delete Windows Completely*, the Windows partition is marked for deletion and the space is used for the installation of SUSE Linux.

WARNING: Deleting Windows

If you delete Windows, all data will be lost beyond recovery as soon as the formatting starts.

To shrink the Windows partition, interrupt the installation and boot Windows to prepare the partition from there. Although this step is not strictly required for FAT partitions, it speeds up the resizing process and also makes it safer. These steps are vital for NTFS partitions.

FAT File System

In Windows, first run scandisk to make sure that the FAT partition is free of lost file fragments and crosslinks. After that, run defrag to move files to the beginning of the partition. This accelerates the resizing procedure in Linux.

If you have optimized virtual memory settings for Windows so a contiguous swap file is used with the same initial (minimum) and maximum size limit, consider another step. With these Windows settings, the resizing might split the swap file into many small parts scattered all over the FAT partition. Also, the entire swap file would need to be moved during the resizing, which makes the process rather slow. It is therefore useful to disable these Windows optimizations for the time being and reenable them after the resizing has been completed.

NTFS File System

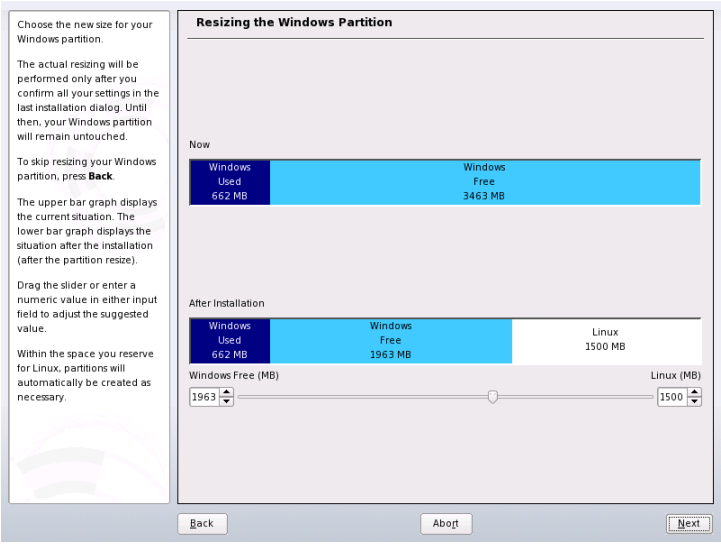
In Windows, run scandisk and defrag to move the files to the beginning of the hard disk. In contrast to the FAT file system, you must perform these steps. Otherwise the NTFS partition cannot be resized.

IMPORTANT: Disabling the Windows Swap File

If you operate your system with a permanent swap file on an NTFS file system, this file may be located at the end of the hard disk and remain there despite defrag. Therefore, it may be impossible to shrink the partition sufficiently. In this case, temporarily deactivate the swap file (the virtual memory in Windows). After the partition has been resized, reconfigure the virtual memory.

After these preparations, return to the Linux partitioning setup and select *Shrink Windows Partition*. After a quick check of the partition, YaST opens a dialog with a suggestion for resizing the Windows partition.

Figure 1.6 *Resizing the Windows Partition*



The first bar graph shows how much disk space is currently occupied by Windows and how much space is still available. The second bar graph shows how the space would be distributed after the resizing, according to YaST's current proposal. See Figure 1.6, “Resizing the Windows Partition” (page 15). Accept the proposed settings or use the slider to change the partition sizing (within certain limits).

If you leave this dialog by selecting *Next*, the settings are stored and you are returned to the previous dialog. The actual resizing takes place later, before the hard disk is formatted.

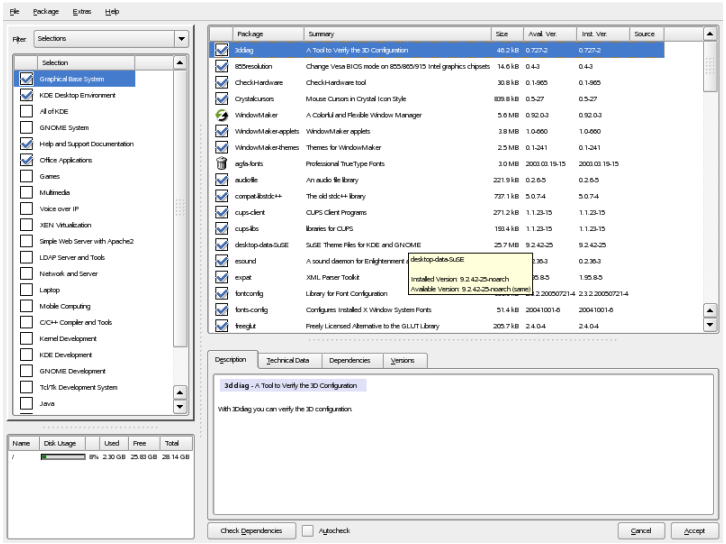
IMPORTANT: Windows Systems Installed on NTFS Partitions

By default, the Windows versions NT, 2000, and XP use the NTFS file system. Unlike FAT file systems, NTFS file systems can only be read from Linux. This means you can read your Windows files from Linux, but you cannot edit them. If you want write access to your Windows data and do not need the NTFS file system, reinstall Windows on a FAT32 file system. In this case, you will have full access to your Windows data from SUSE Linux.

1.8.2 Software

SUSE Linux contains a number of software packages for various application purposes. Click *Software* in the suggestion window to start the software installation module (package manager) and modify the installation scope according to your needs. See Figure 1.7, “Installing and Removing Software with the YaST Package Manager” (page 16).

Figure 1.7 *Installing and Removing Software with the YaST Package Manager*



Changing the Installation Scope

If you install one of the default systems, there is usually no need to add or remove individual packages. It consists of a software selection that meets most requirements without any changes. If you have specific needs, modify this selection with the package manager, which greatly eases this task. The package manager offers various filter criteria to simplify selection from the numerous packages in SUSE Linux.

The filter selection box is located at the top left under the menu bar. After starting, the active filter is *Selections*. This filter sorts program packages by application purpose, such as multimedia or office applications. These groups are listed under the filter selec-

tion box. The packages included in the current system type are preselected. Click the check boxes to select or deselect entire selections or groups for installation.

The right part of the window displays a table listing the individual packages included in the current selection. The table column furthest to the left shows the current status of each package. Two status flags are especially relevant for the installation: *Install* (the box in front of the package name is checked) and *Do Not Install* (the box is empty). To select or deselect individual software packages, click the status box until the desired status is displayed. Alternatively, right-click the package line to access a pop-up menu listing all the possible status settings. To learn more about them, read the detailed description of this module in Section 3.2.1, "Installing and Removing Software" (page 51).

Other Filters

Click the filter selection box to view the other possible filters. The selection according to *Package Groups* can also be used for the installation. This filter sorts the program packages by subjects in a tree structure to the left. The more you expand the branches, the more specific the selection of packages is and the fewer packages are displayed in the list of associated packages to the right.

Use *Search* to search for a specific package. This is explained in detail in Section 3.2.1, "Installing and Removing Software" (page 51).

Package Dependencies and Conflicts

You cannot simply install any combination of software packages. The different software packages must be compatible. Otherwise they might interfere with each other and cause conflicts that affect the system as a whole. Therefore, you may see alerts about unresolved package dependencies or conflicts after selecting or deselecting software packages in this dialog. If you install SUSE Linux for the first time or if you do not understand the alerts, read Section 3.2.1, "Installing and Removing Software" (page 51), which provides detailed information about the operation of the package manager and a brief summary of the software organization in Linux.

WARNING

The software preselected for installation is based on long-standing experience and is usually suitable for the needs of most newcomers and advanced home users. In general, there is no need to change anything here. However, if you

decide to select or deselect any packages, you should be aware of the consequences. In particular, observe any warnings and avoid deselecting any packages of the base system.

Exiting the Software Selection

When satisfied with your software selection and all package dependencies or conflicts are resolved, click *Accept* to apply your changes and exit the module. During the installation, the changes are recorded internally and applied later when the actual installation starts.

1.8.3 Language

The language was selected at the beginning of the installation as described in Section 1.3, "Language Selection" (page 5). However, you can change this setting here and also select any additional languages to install on your system. In the upper part of this dialog, select the primary language. This is the language that will be activated after installation. Adapt your keyboard and time zone settings to the selected primary language by selecting those options, if desired. Optionally, use *Details* to set the language for the user `root`. There are three options:

ctype only
: The value of the variable `LC_CTYPE` in the file `/etc/sysconfig/language` is adopted for the user `root`. This sets the localization for language-specific function calls.

yes
: The user `root` has the same language settings as the local user.

no
: The language settings for the user `root` are not affected by the language selection. All `locale` variables will be unset.

Additionally the setting for the `Locale` can be set explicitly with *Detailed Locale Setting*.

The list in the lower part of the language dialog allows for selecting additional languages to install. For all the languages selected in this list, YaST checks if there are any lan-

guage-specific packages for any packages in your current software selection. If so, these packages are installed.

Click *Accept* to complete the configuration.

1.8.4 System

This dialog presents all the hardware information YaST could obtain about your computer. Select any item in the list and click *Details* to see detailed information about the selected item. You may also add PCI IDs to device drivers with this dialog.

1.8.5 Keyboard Layout

Select the keyboard layout from the list. By default, the layout corresponds to the selected language. After changing the layout, test the characters that are special to the selected language layout to make sure that the selection is correct. If you want to set special options regarding keyboard behavior, click *Expert Settings*. Find more information about that in Section 3.3.10, "Keyboard Layout" (page 69). When finished, click *Accept* to return to the installation settings dialog.

1.8.6 Booting

During the installation, YaST proposes a boot configuration for your system. Normally, you can leave these settings unchanged. However, if you need a custom setup, modify the proposal for your system.

One possibility is to configure the boot mechanism to rely on a special boot floppy. Although this has the disadvantage that it requires the floppy to be in the drive when booting, it leaves an existing boot mechanism untouched. Normally this should not be necessary, however, because YaST can configure the boot loader to boot other existing operating systems as well. Another possibility with the configuration is to change the location of the boot mechanism on the hard disk.

To change the boot configuration proposed by YaST, select *Booting* to open a dialog in which to change many details of the boot mechanism. For information, read Section "Configuring the Boot Loader with YaST" (Chapter 29, *The Boot Loader*, ↑Reference). The boot method should only be changed by experienced computer users.

1.8.7 Default Runlevel

SUSE Linux can boot to different runlevels. Normally there should be no need to change anything here, but if necessary set the default runlevel with this dialog. Refer to Section 3.7.8, "System Services (Runlevel)" (page 91) for more information about runlevel configuration.

1.8.8 Starting the Installation

After making all installation settings, click *Accept* in the suggestion window to begin the installation. Confirm with *Install* in the dialog that opens. The installation usually takes between 15 and 30 minutes, depending on the system performance and the software selected. As soon as all packages are installed, YaST boots into the new Linux system, after which you can configure the hardware and set up system services.

1.9 Finishing the Installation

After completing the basic system setup and the installation of all selected software packages, provide a password for the account of the system administrator (the `root` user). You can then configure your Internet access and network connection. With a working Internet connection, you can perform an update of the system as part of the installation. You can also configure an authentication server for centralized user administration in a local network. Finally, configure the hardware devices connected to the machine.

1.9.1 root Password

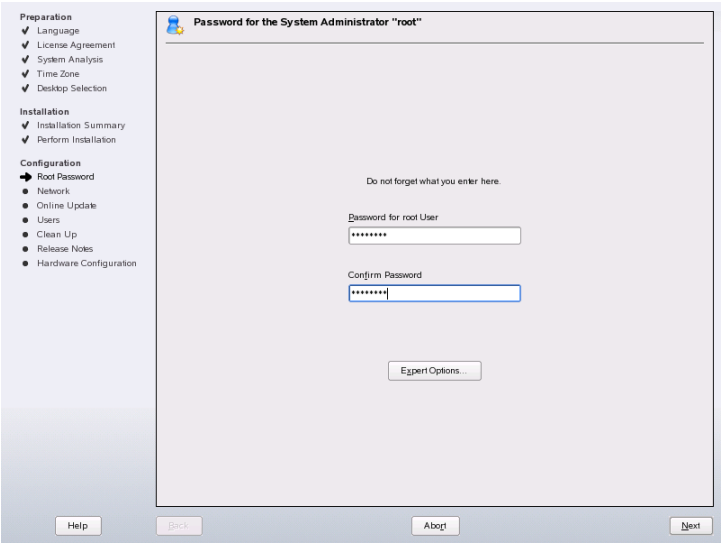
root is the name of the superuser, the administrator of the system. Unlike regular users, which may or may not have permission to do certain things on the system, `root` has unlimited power to do anything: change the system configuration, install programs, and set up new hardware. If users forget their passwords or have other problems with the system, `root` can help. The `root` account should only be used for system administration, maintenance, and repair. Logging in as `root` for daily work is rather risky: a single mistake could lead to irretrievable loss of many system files.

For verification purposes, the password for `root` must be entered twice, as shown in Figure 1.8, “Setting the root Password” (page 21). Do not forget the `root` password. Once entered, this password cannot be retrieved.

WARNING: The root User

The user `root` has all the permissions needed to make changes to the system. To carry out such tasks, the `root` password is required. You cannot carry out any administrative tasks without this password.

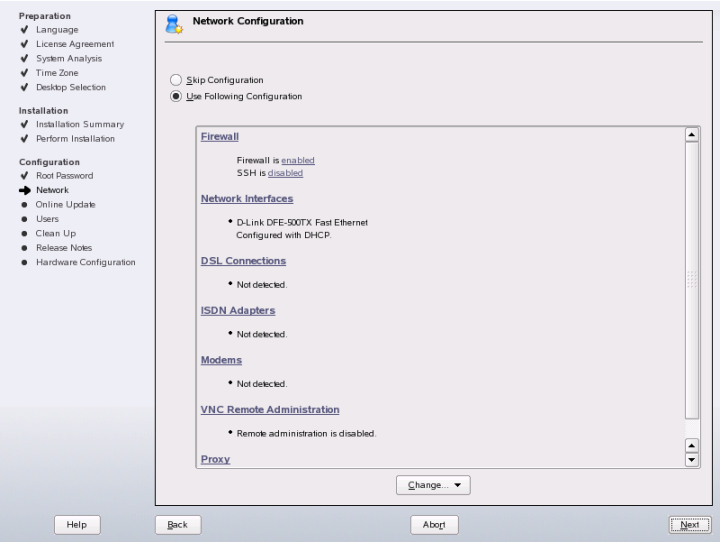
Figure 1.8 *Setting the root Password*



1.9.2 Network Configuration

You can now configure any network devices for a connection to the outside world, such as network cards, modems, and ISDN or DSL hardware. If you have such devices, it is a good idea to configure them now, because an Internet connection allows YaST to retrieve any available SUSE Linux updates and include them in the installation.

Figure 1.9 *Configuring the Network Devices*



To configure your network hardware at this stage, refer to Section “Configuring a Network Connection with YaST” (Chapter 38, *Basic Networking*, ↑Reference). Otherwise, select *Skip Configuration* and click *Next*. The network hardware can also be configured after the system installation has been completed.

1.9.3 Firewall Configuration

When you connect to a network, a firewall is started automatically on the configured interface. The firewall settings are displayed in the network configuration dialog. The configuration proposal for the firewall is updated automatically every time the configuration of the interfaces or services is modified. To adapt the automatic settings to your own preferences, click *Change* → *Firewall*. In the new dialog, determine whether the firewall should be started. If you do not want the firewall to be started, select the appropriate option and exit the dialog. To start and configure the firewall, click *Next* for a series of dialogs similar to those described in Section “Configuring with YaST” (Chapter 23, *Security in Linux*, ↑Reference).

1.9.4 Testing the Internet Connection

If you have configured an Internet connection, you can test it now. For this purpose, YaST establishes a connection to the SUSE server and checks if any product updates are available for your version of SUSE Linux. If there are such updates, they can be included in the installation. Also, the latest release notes are downloaded. You can read them at the end of the installation.

If you do not want to test the connection at this point, select *Skip Test* then *Next*. This also skips downloading product updates and release notes.

1.9.5 Loading Software Updates

If YaST was able to connect to the SUSE servers, select whether to perform a YaST online update. If there are any patched packages available on the servers, download and install them now to fix known bugs or security issues.

IMPORTANT: Downloading Software Updates

The download of updates might take quite some time, depending on the bandwidth of the Internet connection and the size of the update files.

To perform a software update immediately, select *Perform Update Now* and click *OK*. This opens YaST's online update dialog with a list of the available patches (if any), which can be selected and loaded. To learn about the process, read Section 3.2.3, "Updating Software Online" (page 61). This kind of update can be performed at any time after the installation. If you prefer not to update now, select *Skip Update* then click *OK*.

1.9.6 User Authentication

If the network access was configured successfully during the previous steps of the installation, you now have four possibilities for managing user accounts on your system.

Local User Administration

Users are administered locally on the installed host. This is a suitable option for stand-alone workstations. The user data is managed by the local file `/etc/passwd`.

LDAP
Users are administered centrally on an LDAP server for all systems in the network.

NIS
Users are administered centrally on a NIS server for all systems in the network.

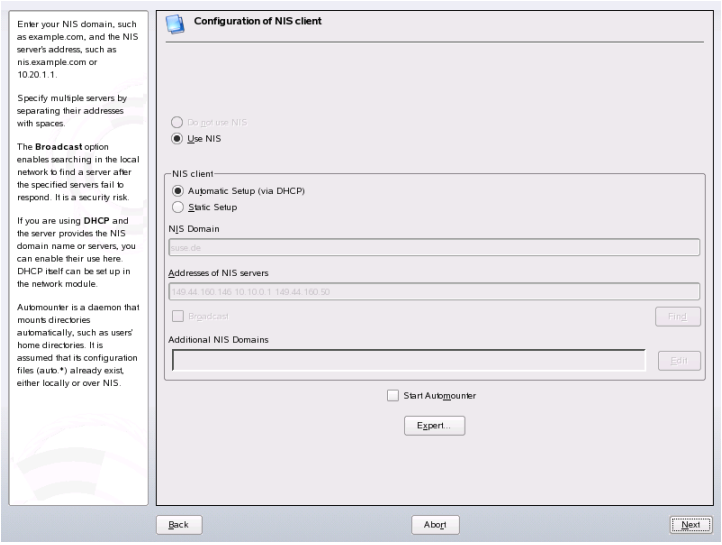
Samba
SMB authentication is often used in mixed Linux and Windows networks.

If all requirements are met, YaST opens a dialog in which to select the user administration method. If you do not have the necessary network connection, create local user accounts.

1.9.7 Configuring the Host as a NIS Client

To implement the user administration via NIS, configure a NIS client in the next step. This section only describes the configuration of the client side. Configuration of a NIS server with YaST is described in Chapter *Using NIS* (↑Reference).

Figure 1.10 *NIS Client Configuration*



In the dialog shown in Figure 1.10, “NIS Client Configuration” (page 24), first select whether the host has a static IP address or gets one via DHCP. If you select DHCP, you cannot specify a NIS domain or NIS server address, because these are provided by the DHCP server. Information about DHCP is available in Chapter *DHCP* (↑Reference). If a static IP address is used, specify the NIS domain and the NIS server manually.

To search for NIS servers broadcasting in the network, check the relevant option. You can also specify several NIS domains and set a default domain. For each domain, select *Edit* to specify several server addresses or enable the broadcast function on a per-domain basis.

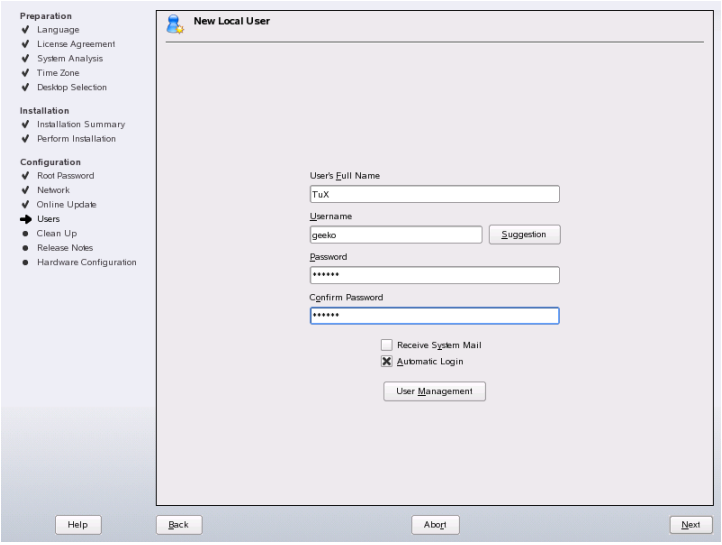
In the expert settings, use *Answer Remote Hosts* to allow other network hosts to query which server your client is using. If you activate *Broken Server*, responses from servers on unprivileged ports are also accepted. For more information, refer to the man page of `ypbind`.

1.9.8 Creating Local User Accounts

If you decide against using an authentication server for user authentication, create local users. Any data related to user accounts (name, login, password, etc.) is stored and managed on the installed system.

Linux is an operating system that allows several users to work on the same system at the same time. Each user needs a user account to log in to the system. By having user accounts, the system gains a lot in terms of security. For instance, regular users cannot change or delete files needed for the system to work properly. At the same time, the personal data of a given user cannot be modified, viewed, or tampered with by other users. Users can set up their own working environments and always find them unchanged when logging back in.

Figure 1.11 *Entering the Username and Password*



A user account can be created using the dialog shown in Figure 1.11, "Entering the Username and Password" (page 26). After entering the first name and last name, specify a username (login). Click *Suggestion* for the system to generate a username automatically.

Finally, enter a password for the user. Reenter it for confirmation (to ensure that you did not type something else by mistake). The username tells the system who a user is and the password is used to verify this identity.

WARNING: Username and Password

Remember both your username and the password because they are needed each time you log in to the system.

To provide effective security, a password should be between five and eight characters long. The maximum length for a password is 128 characters. However, if no special security modules are loaded, only the first eight characters are used to discern the password. Passwords are case-sensitive. Special characters like umlauts are not allowed. Other special characters (7-bit ASCII) and the digits 0 to 9 are allowed.

Two additional options are available for local users:

Receive System Messages via E-Mail
Checking this box sends the user messages created by the system services. These are usually only sent to `root`, the system administrator. This option is useful for the most frequently used account, because it is highly recommended to log in as `root` only in special cases.

Automatic Login
This option is only available if KDE is used as the default desktop. It automatically logs the current user into the system when it starts. This is mainly useful if the computer is operated by only one user.

WARNING: Automatic Login

With the automatic login enabled, the system boots straight into your desktop with no authentication at all. If you store sensitive data on your system, you should not enable this option if the computer can also be accessed by others.

Click *User Management* to create more than one user. Refer to Section 3.6.1, "User Management" (page 79) for more information about user management.

1.9.9 Release Notes

After completing the user authentication setup, YaST displays the release notes. Reading them is advised because they contain important up-to-date information that was not available when the manuals were printed. If you have installed update packages, read the most recent version of the release notes, as fetched from SUSE's servers.

1.10 Hardware Configuration

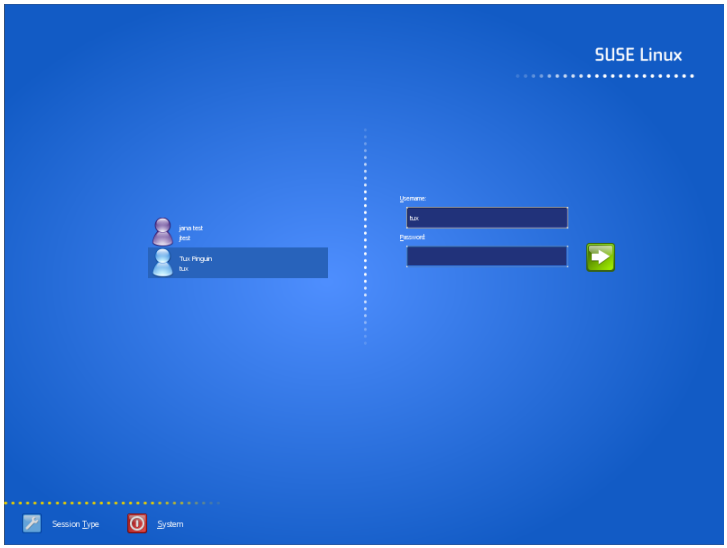
At the end of the installation, YaST opens a dialog for the configuration of the graphics card and other hardware components connected to the system, such as printers or sound cards. Click the individual components to start the hardware configuration. For the most part, YaST detects and configures the devices automatically.

You can skip any peripheral devices and configure them later. However, you should configure the graphics card right away. Although the display settings as autoconfigured by YaST should be generally acceptable, most users have very strong preferences as far as resolution, color depth, and other graphics features are concerned. To change these settings, select the respective item and set the values as desired. The configuration is further explained in Section 3.11.1, “Card and Monitor Properties” (page 101). Finish the installation of SUSE Linux with *Finish* in the final dialog.

1.11 Graphical Login

SUSE Linux is now installed. Start without logging in if you enabled the automatic login in the local user administration module. If not, you should see the graphical login on your screen, as shown in Figure 1.12, “The Login Screen of KDM” (page 28). Enter your login and password to log in to the system.

Figure 1.12 *The Login Screen of KDM*



Updating the System and Package Management

2

SUSE Linux provides the option of updating an existing system without completely reinstalling it. There are two types of updates: *updating individual software packages* and *updating the entire system*. Packages can also be installed by hand using the package manager RPM.

2.1 Updating SUSE Linux

Software tends to "grow" from version to version. Therefore, take a look at the available partition space with `df` before updating. If you suspect you are running short of disk space, secure your data before updating and repartition your system. There is no general rule of thumb regarding how much space each partition should have. Space requirements depend on your particular partitioning profile, the software selected, and the version numbers of SUSE Linux.

2.1.1 Preparations

Before updating, copy the old configuration files to a separate medium, such as streamer, removable hard disk, USB stick, or ZIP drive, to secure the data. This primarily applies to files stored in `/etc` as well as some of the directories and files in `/var` and `/opt`. You may also want to write the user data in `/home` (the `HOME` directories) to a backup medium. Back up this data as `root`. Only `root` has read permission for all local files.

Before starting your update, make note of the root partition. The command `df /` lists the device name of the root partition. In Example 2.1, "List with `df -h`" (page 30), the root partition to write down is `/dev/hda3` (mounted as `/`).

Example 2.1 *List with df -h*

```
Filesystem      Size  Used Avail Use% Mounted on
/dev/hda3        74G   22G   53G  29% /
tmpfs           506M     0  506M   0% /dev/shm
/dev/hda5       116G  5.8G  111G   5% /home
/dev/hda1        39G  1.6G   37G   4% /windows/C
/dev/hda2       4.6G  2.6G  2.1G  57% /windows/D
```

2.1.2 Possible Problems

If you update a default system from the previous version to this version, YaST works out necessary changes and performs them. Depending on your customizations, some steps or the entire update procedure may fail and you must resort to copying back your backup data. Here, we point out more issues to check before starting the system update.

Checking passwd and group in /etc

Before updating the system, make sure that `/etc/passwd` and `/etc/group` do not contain any syntax errors. For this purpose, start the verification utilities `pwck` and `grpck` as `root` and eliminate any reported errors.

PostgreSQL

Before updating PostgreSQL (`postgres`), dump the databases. See the manual page of `pg_dump`. This is only necessary if you actually used PostgreSQL prior to your update.

2.1.3 Updating with YaST

Following the preparation procedure outlined in Section 2.1.1, "Preparations" (page 29), you can now update your system:

1 Boot the system as for the installation, described in Section 1.1, "System Start-Up for Installation" (page 3). In YaST, choose a language and select *Update* in the *Installation Mode* dialog. Do not select *New Installation*.

2 YaST determines whether there are multiple root partitions. If there is only one, continue with the next step. If there are several, select the right partition and confirm with *Next* (`/dev/hda3` was selected in the example in Section 2.1.1, "Preparations" (page 29)). YaST reads the old `fstab` on this partition to analyze and mount the file systems listed there.

3 In the *Installation Settings* dialog, adjust the settings according to your requirements. Normally, you can leave the default settings untouched, but if you intend to enhance your system, check the packages offered in the *Software Selection* submenus or add support for additional languages.

   You also have the possibility to make backups of various system components. Selecting backups slows down the update process. Use this option if you do not have a recent system backup.

4 In the following dialog, choose to update only the software that is already installed or to add new software components to the system (upgrade mode). It is advisable to accept the suggested composition, for example, *Update Based on Selection "Standard System with KDE"* or *"Standard System with GNOME"*. Adjustments can be made later with YaST.

2.1.4 Updating Individual Packages

Regardless of your overall updated environment, you can always update individual packages. From this point on, however, it is your responsibility to ensure that your system remains consistent. Update advice can be found at `http://www.novell.com/linux/download/updates/`.

Select components from the YaST package selection list according to your needs. If you select a package essential for the overall operation of the system, YaST issues a warning. Such packages should be updated only in the update mode. For example, many packages contain *shared libraries*. If you update these programs and applications in the running system, things might malfunction.

2.2 Software Changes from Version to Version

The individual aspects changed from version to version are outlined in the following in detail. This summary indicates, for example, whether basic settings have been completely reconfigured, whether configuration files have been moved to other places, or whether common applications have been significantly changed. Significant modifications that affect the daily use of the system at either the user level or the administrator level are mentioned here.

Problems and special issues of the respective versions are published online as they are identified. See the links listed below. Important updates of individual packages can be accessed at `http://www.novell.com/products/linuxprofessional/downloads/` using the YaST Online Update (YOU)—see Section 3.2.3, "Updating Software Online" (page 61).

2.2.1 From 9.0 to 9.1

Refer to the article "Known Problems and Special Features in SUSE Linux 9.1" in the SUSE Support Database at `http://portal.suse.com` under the keyword *special features*. These articles are published for every SUSE Linux version.

Upgrading to Kernel 2.6

SUSE Linux is now based entirely on kernel 2.6. The predecessor version 2.4 cannot be used any longer, because the enclosed applications do not work with kernel 2.4. Note the following details:

- The loading of modules is configured by means of the file `/etc/modprobe.conf`. The file `/etc/modules.conf` is obsolete. YaST tries to convert the file (also see script `/sbin/generate-modprobe.conf`).
- Modules have the suffix `.ko`.
- The module `ide-scsi` is no longer needed for burning CDs.
- The prefix `snd_` has been removed from the ALSA sound module options.

- `sysfs` now complements the `/proc` file system.
- Power management (especially ACPI) has been improved and can be configured by means of a YaST module.

Mounting VFAT Partitions

When mounting VFAT partitions, the parameter `code` must be changed to `codepage`. If you have difficulties mounting a VFAT partition, check if the file `/etc/fstab` contains the old parameter name.

Standby and Suspend with ACPI

The kernel 2.6 supports standby and suspend with ACPI. This function is still in an experimental stage and may not be supported by some hardware components. To use this function, you need the `powersave` package. Information about this package is available in `/usr/share/doc/packages/powersave`. A graphical front-end is available in the `kpowersave` package.

Input Devices

Regarding the changes in connection with the input devices, refer to the already-mentioned portal article "Known Problems and Special Features in SUSE LINUX 9.1" in the Support Database at `http://portal.suse.com` under the keyword *special features*.

Native POSIX Thread Library and glibc 2.3.x

Applications linked against NGPT (Next Generation POSIX Threading) do not work with glibc 2.3.x. All affected applications that are not shipped with SUSE Linux must be compiled with linuxthreads or with NPTL (Native POSIX Thread Library). NPTL is preferred, because this is the standard for the future.

If NPTL causes difficulties, the older linuxthreads implementation can be used by setting the following environment variable (replace *`kernel-version`* with the version number of the respective kernel):

```
LD_ASSUME_KERNEL=kernel-version
```

The following version numbers are possible:

2.2.5 (i386, i586):
linuxthreads without floating stacks

2.4.1 (AMD64, i586, i686):
linuxthread with floating stacks

Notes regarding the kernel and linuxthreads with floating stacks: Applications using `errno`, `h_errno`, and `_res` must include the header files (`errno.h`, `netdb.h`, and `resolv.h`) with `#include`. For C++ programs with multithread support that use *thread cancellation*, the environment variable `LD_ASSUME_KERNEL=2.4.1` must be used to prompt the use of the linuxthreads library.

Adaptations for *Native POSIX Thread Library*

NPTL is included in SUSE Linux 9.1 as the thread package. NPTL is binary-compatible with the older linuxthreads library. However, areas in which linuxthreads violates the POSIX standard require NPTL adaptions. This includes the following: signal handling, `getpid` returning the same value in all threads, and thread handlers registered with pthread_atfork not working if `vfork` is used.

Network Interface Configuration

The configuration of the network interface has changed. Formerly, the hardware was initialized following the configuration of a nonexistent interface. Now, the system searches for new hardware and initializes it immediately, enabling the configuration of the new network interface.

New names have been introduced for the configuration files. Because the name of a network interface is generated dynamically and the use of hotplug devices is increasing steadily, a name like `eth0` or `eth1` is no longer suitable for configuration purposes. For this reason, unique designations, like the MAC address or the PCI slot, are used for naming interface configurations. You can use interface names as soon as they appear. Commands like `ifup eth0` or `ifdown eth0` are still possible.

The device configurations are located in `/etc/sysconfig/hardware`. The interfaces provided by these devices are usually located in `/etc/sysconfig/network`

(with different names). See the detailed description in `/usr/share/doc/packages/sysconfig/README`.

Sound Configuration

Following an update, the sound cards must be reconfigured. This can be done with the YaST sound module. As `root`, enter `/sbin/yast2 sound`.

Top-Level Domain `.local` as "link-local" Domain

The resolver library treats the top-level domain `.local` as "link-local" domain and sends multicast DNS queries to the multicast address `224.0.0.251`, port `5353`, instead of normal DNS queries. This is an incompatible change. If the domain `.local` is already used in the name server configuration, use a different domain name. For more information about multicast DNS, see http://www.multicastdns.org.

Systemwide UTF-8 Encoding

The default encoding for the system is `UTF-8`. Thus, when performing a standard installation, a locale is set with `UTF-8` encoding, such as `en_US.UTF-8`. For more information, see http://www.suse.de/~mfabian/suse-cjk/locales.html.

Converting Filenames to UTF-8

Files in previously created file systems do not use UTF-8 encoding for the filenames (unless specified otherwise). If these filenames contain non-ASCII characters, they will be garbled. To correct this, use the `convmv` script, which converts the encoding of filenames to UTF-8.

Shell Tools Compatible with POSIX Standard of 2001

In the default setting, shell tools from the `coreutils` package (`tail`, `chown`, `head`, `sort`, etc.) no longer comply with the POSIX standard of 1992 but with the POSIX standard of 2001 (*Single UNIX Specification, version 3 == IEEE Std 1003.1-2001 == ISO/IEC 9945:2002*). The old behavior can be forced with an environment variable:

```
_POSIX2_VERSION=199209
```

The new value is 200112 and is used as the default for `_POSIX2_VERSION`. The SUS standard can be reviewed (free of charge, but registration is required) at http://www.unix.org.

TIP

Third-party software may not yet comply with the new standard. In this case, set the environment variable as described above.

/etc/gshadow Obsolete

`/etc/gshadow` has been abandoned and removed, because this file is superfluous for the following reasons:

- It is not supported by glibc.
- There is no official interface for this file. Even the shadow suite does not contain such an interface.
- Most tools that check the group password do not support the file and ignore it for the said reasons.

OpenLDAP

Because the database format has changed, the databases must be regenerated. During the update, the system attempts to perform this conversion automatically. However, there will certainly be cases in which the conversion fails.

The schema check has undergone substantial improvement. Therefore, a number of standard-noncompliant operations that were possible with the former LDAP server are no longer possible.

The syntax of the configuration file has partly changed with a view to ACLs. Following the installation, information regarding the update is available in the file `/usr/share/doc/packages/openldap2/README.update`.

Apache 1.3 Replaced with Apache 2

The Apache Web server (version 1.3) has been replaced with Apache 2. Detailed documentation for version 2.0 is available at the Web page http://httpd.apache.org/docs-2.0/en/. On a system with an HTTP server installation, an update removes the Apache package and installs Apache 2. Subsequently, the system must be adapted with YaST or manually. The configuration files in /etc/httpd are now located in /etc/apache2.

Either threads or processes can be selected for handling multiple concurrent queries. The process management has been moved to an independent module, the multiprocessing module (MPM). Accordingly, Apache 2 needs the apache2-prefork package (recommended for stability) or the apache2-worker package. Depending on the MPM, Apache 2 reacts differently to queries. This affects the performance as well as the use of modules. These characteristics are discussed in detail in Section "Multiprocessing Modules" (Chapter 46, *The Apache Web Server*, ↑Reference).

Apache 2 now supports the next-generation Internet protocol IPv6.

A mechanism has been implemented that enables module programmers to specify the desired loading sequence of the modules, relieving users of this task. The sequence in which modules are executed is often important. In earlier versions, it was determined by means of the loading sequence. For instance, a module that only gives authenticated users access to certain resources must be loaded first to prevent users without access permissions from seeing the pages.

Queries to and responses from Apache can be processed with filters.

From Samba 2.x to Samba 3.x

Following the update from Samba 2.x to Samba 3.x, winbind authentication is no longer available. The other authentication methods can still be used. For this reason, the following programs have been removed:

```
/usr/sbin/wb_auth
/usr/sbin/wb_ntlmauth
/usr/sbin/wb_info_group.pl
```

See also http://www.squid-cache.org/Doc/FAQ/FAQ-23.html#ss23.5.

OpenSSH Update (Version 3.8p1)

`gssapi` support has been replaced with `gssapi-with-mic` to prevent potential MITM attacks. These two versions are not compatible. This means that you cannot authenticate with Kerberos tickets from older distributions, because other authentication methods are used.

SSH and Terminal Applications

When establishing a connection from a remote host (especially via SSH, telnet, and RSH) between version 9 (standard configuration with activated UTF-8) and older systems (SUSE Linux 9.0 and earlier versions in which UTF-8 is not activated by default or not supported), terminal applications may display faulty characters.

This is because OpenSSH does not forward local settings. Therefore, the default system settings that may not match the remote terminal settings are used. This affects YaST in text mode and applications executed from a remote host as a normal user (not `root`). The applications started by `root` are only affected if the user changes the standard locales for `root` (only `LC_CTYPE` is set by default).

libiodbc Discarded

Users of FreeRADIUS must now link against unixODBC, because libiodbc has been discarded.

XML Resources in `/usr/share/xml`

XML resources (DTDs, stylesheets, etc.) are installed in `/usr/share/xml`. Therefore, some directories are no longer available in `/usr/share/sgml`. If you encounter problems, modify your scripts and makefiles or use the official catalogs (especially `/etc/xml/catalog` or `/etc/sgml/catalog`).

Removable Media with subfs

Removable media are now integrated with subfs. Media no longer need to be mounted manually with `mount`. To mount the medium, simply change to the respective device directory in `/media`. Media cannot be ejected as long as they are accessed by a program.

2.2.2 From 9.1 to 9.2

Refer to the article “Known Problems and Special Features in SUSE LINUX 9.2” in the SUSE Support Database at `http://portal.suse.com` under the keyword *special features*.

Activation of the Firewall in the Proposal Dialog During the Installation

To increase the security, the enclosed firewall solution SuSEFirewall2 is activated at the end of the installation in the proposal dialog. This means that all ports are closed initially and can be opened in the proposal dialog if necessary. By default, you cannot log in from remote systems. It also interferes with network browsing and multicast applications, such as SLP, Samba ("Network Neighborhood"), and some games. You can fine-tune the firewall settings using YaST.

If network access is required during the installation or configuration of a service, the respective YaST module opens the needed TCP and UDP ports of all internal and external interfaces. If this is not desired, the user can close the ports in the YaST module or specify other detailed firewall settings.

KDE and IPv6 Support

By default, IPv6 support is not enabled for KDE. You can enable it using the `/etc/sysconfig` editor of YaST. The reason for disabling this feature is that IPv6 addresses are not properly supported by all Internet service providers and, as a consequence, this would lead to error messages while browsing the Web and delays while displaying Web pages.

YaST Online Update and Delta Packages

The YaST Online Update now supports a special kind of RPM package that only stores the binary difference from a given base package. This technique significantly reduces the package size and download time at the expense of higher CPU load for reassembling the final package. In `/etc/sysconfig/onlineupdate`, configure whether YOU should use these delta packages. See `/usr/share/doc/packages/deltarpm/README` for technical details.

Print System Configuration

At the end of the installation (proposal dialog), the ports needed for the print system must be open in the firewall configuration. Port 631/TCP and port 631/UDP are needed for CUPS and should not be closed for normal operation. Port 515/TCP (for the old LPD protocol) and the ports used by Samba must also be open for printing via LPD or SMB.

Change to X.Org

The change from XFree86 to X.Org is facilitated by compatibility links that enable access to important files and commands with the old names.

Table 2.1 *Commands*

XFree86	X.Org
`XFree86`	`Xorg`
`xf86config`	`xorgconfig`
`xf86cfg`	`xorgcfg`

Table 2.2 *Log Files in /var/log*

XFree86	X.Org
`XFree86.0.log`	`Xorg.0.log`
`XFree86.0.log.old`	`Xorg.0.log.old`

In the course of the change to X.Org, the packages were renamed from `XFree86*` to `xorg-x11*`.

Terminal Emulators for X11

We have removed a number of terminal emulators because they are either no longer maintained or do not work in the default environment, especially by not supporting

UTF-8. SUSE Linux offers standard terminals, such as xterm, the KDE and GNOME terminals, and mlterm (Multilingual Terminal Emulator for X), which might be a replacement for aterm and eterm.

Changes in the powersave Package

The configuration files in `/etc/sysconfig/powersave` have changed:

Table 2.3 *Split Configuration Files in /etc/sysconfig/powersave*

Old	Now split into
`/etc/sysconfig/powersave/common`	`common`
	`cpufreq`
	`events`
	`battery`
	`sleep`
	`thermal`

`/etc/powersave.conf` has become obsolete. Existing variables have been moved to the files listed in Table 2.3, "Split Configuration Files in /etc/sysconfig/powersave" (page 41). If you changed the "event" variables in `/etc/powersave.conf`, these must now be adapted in `/etc/sysconfig/powersave/events`.

The names of sleep states have changed from:

- suspend (ACPI S4, APM suspend)
- standby (ACPI S3, APM standby)

To:

- suspend to disk (ACPI S4, APM suspend)

- suspend to ram (ACPI S3, APM suspend)
- standby (ACPI S1, APM standby)

OpenOffice.org (OOo)

Directories:

OOo is now installed in `/usr/lib/ooo-1.1` instead of `/opt/OpenOffice.org`. The default directory for user settings is now `~/.ooo-1.1` instead of `~/OpenOffice.org1.1`.

Wrapper:

There are some new wrappers for starting the OOo components. The new names are shown Table 2.4, "Wrapper" (page 42).

Table 2.4 *Wrapper*

Old	New
`/usr/X11R6/bin/OOo-calc`	`/usr/bin/oocalc`
`/usr/X11R6/bin/OOo-draw`	`/usr/bin/oodraw`
`/usr/X11R6/bin/OOo-impress`	`/usr/bin/ooimpress`
`/usr/X11R6/bin/OOo-math`	`/usr/bin/oomath`
`/usr/X11R6/bin/OOo-padmin`	`/usr/sbin/oopadmin`
`/usr/X11R6/bin/OOo-setup`	–
`/usr/X11R6/bin/OOo-template`	`/usr/bin/oofromtemplate`
`/usr/X11R6/bin/OOo-web`	`/usr/bin/ooweb`
`/usr/X11R6/bin/OOo-writer`	`/usr/bin/oowriter`
`/usr/X11R6/bin/OOo`	`/usr/bin/ooffice`

Old	New
`/usr/X11R6/bin/OOo-wrapper`	`/usr/bin/ooo-wrapper`

The wrapper now supports the option `--icons-set` for switching between KDE and GNOME icons. The following options are no longer supported: `--default-configuration`, `--gui`, `--java-path`, `--skip-check`, `--lang` (the language is now determined by means of locales), `--messages-in-window`, and `--quiet`.

KDE and GNOME Support:
KDE and GNOME extensions are available in the `OpenOffice_org-kde` and `OpenOffice_org-gnome` packages.

Sound Mixer kmix

The sound mixer kmix is preset as the default. For high-end hardware, there are other mixers, like QAMix. KAMix, envy24control (only ICE1712), or hdspmixer (only RME Hammerfall).

DVD Burning

In the past, a patch was applied to the `cdrecord` binary from the `cdrecord` package to support burning DVDs. Instead, a new binary `cdrecord-dvd` is installed that has this patch.

The `growisofs` program from the `dvd+rw-tools` package can now burn all DVD media (DVD+R, DVD-R, DVD+RW, DVD-RW, DVD+RL). Try using that one instead of the patched `cdrecord-dvd`.

Multiple Kernels

It is possible to install multiple kernels side by side. This feature is meant to allow administrators to upgrade from one kernel to another by installing the new kernel, verifying that the new kernel works as expected, then uninstalling the old kernel. While YaST does not yet support this feature, kernels can easily be installed and uninstalled from the shell using `rpm -i` *`package`*`.rpm`.

The default boot loader menus contain one kernel entry. Before installing multiple kernels, it is useful to add an entry for the extra kernels, so that they can easily be selected. The kernel that was active before installing a new kernel can be accessed as `vmlinuz.previous` and `initrd.previous`. By creating a boot loader entry similar to the default entry and having this entry refer to `vmlinuz.previous` and `initrd.previous` instead of `vmlinuz` and `initrd`, the previously active kernel can be accessed. Alternatively, GRUB and LILO support wild card boot loader entries. Refer to the GRUB info pages (`info grub`) and to the `lilo.conf` (5) manual page for details.

2.2.3 From 9.2 to 9.3

Refer to the article "Known Problems and Special Features in SUSE Linux 9.3" in the SUSE Support Database at `http://portal.suse.com` under the keyword *special features*.

Starting Manual Installation at the Kernel Prompt

The *Manual Installation* mode is gone from the boot loader screen. You can still get linuxrc into manual mode using `manual=1` at the boot prompt. Normally this is not necessary because you can set installation options at the kernel prompt directly, such as `textmode=1` or a URL as the installation source.

Kerberos for Network Authentication

`Kerberos` is the default for network authentication instead of `heimdal`. Converting an existing heimdal configuration automatically is not possible. During a system update, backup copies of configuration files are created as shown in Table 2.5, "Backup Files" (page 44).

Table 2.5 *Backup Files*

Old File	Backup File
`/etc/krb5.conf`	`/etc/krb5.conf.heimdal`
`/etc/krb5.keytab`	`/etc/krb5.keytab.heimdal`

The client configuration (`/etc/krb5.conf`) is very similar to the one of heimdal. If nothing special was configured, it is enough to replace the parameter `kpasswd_server` with `admin_server`.

It is not possible to copy the server-related (kdc and kadmind) data. After the system update, the old heimdal database is still available under `/var/heimdal`. MIT kerberos maintains the database under `/var/lib/kerberos/krb5kdc`.

JFS: Not Supported Anymore

Due to technical problems with JFS, it is no longer supported. The kernel file system driver is still there, but YaST does not offer partitioning with JFS.

AIDE as a Tripwire Replacement

As an intrusion detection system, use AIDE (package name `aide`), which is released under the GPL. Tripwire is no longer available on SUSE Linux.

X.Org Configuration File

The configuration tool SaX2 writes the X.Org configuration settings into `/etc/X11/xorg.conf`. During an installation from scratch, no compatibility link from `XF86Config` to `xorg.conf` is created.

XView and OpenLook Support Dropped

The packages `xview`, `xview-devel`, `xview-devel-examples`, `olvwm`, and `xtoolpl` were dropped. In the past, we just provided the XView (OpenLook) base system. The XView libraries are no longer provided after the system update. Even more important, OLVWM (OpenLook Virtual Window Manager) is no longer available.

PAM Configuration

New Configuration Files (containing comments for more information)

`common-auth`
: Default PAM configuration for auth section

common-account
Default PAM configuration for account section

common-password
Default PAM configuration for password changing

common-session
Default PAM configuration for session management

You should include these default configuration files from within your application-specific configuration file, because it is easier to modify and maintain one file instead of the approximately forty files that used to exist on the system. If you install an application later, it inherits the already applied changes and the administrator is not required to remember to adjust the configuration.

The changes are simple. If you have the following configuration file (which should be the default for most applications):

```
#%PAM-1.0
auth     required       pam_unix2.so
account  required       pam_unix2.so
password required       pam_pwcheck.so
password required       pam_unix2.so    use_first_pass use_authtok
#password required      pam_make.so     /var/yp
session required        pam_unix2.so
```

you can change it to:

```
#%PAM-1.0
auth     include        common-auth
account  include        common-account
password include        common-password
session  include        common-session
```

Stricter tar Syntax

The `tar` usage syntax is stricter now. The `tar` options must come before the file or directory specifications. Appending options, like `--atime-preserve` or `--numeric-owner`, after the file or directory specification makes `tar` fail. Check your backup scripts. Commands such as the following no longer work:

```
tar czf etc.tar.gz /etc --atime-preserve
```

See the `tar` info pages for more information.

2.2.4 From 9.3 to 10.0

Refer to the article "Known Problems and Special Features in SUSE Linux 10" in the SUSE Support Database at `http://portal.suse.com` under the keyword *special features*.

Becoming the Superuser Using `su`

By default, calling `su` to become `root` does not set the `PATH` for `root`. Either call `su -` to start a login shell with the complete environment for `root` or set `ALWAYS_SET_PATH` to `yes` in `/etc/default/su` if you want to change the default behavior of `su`.

Powersave Configuration Variables

Names of the powersave configuration variables are changed for consistency, but the sysconfig files are still the same. Find more information in Section "Configuring the powersave Package" (Chapter 21, *Power Management*, ↑Reference).

PCMCIA

`cardmgr` no longer manages PC cards. Instead, as with Cardbus cards and other subsystems, a kernel module manages them. All necessary actions are executed by `hotplug`. The `pcmcia` start script has been removed and `cardctl` is replaced by `pccardctl`. For more information, see `/usr/share/doc/packages/pcmciautils/README.SUSE`.

TEI XSL Stylesheets

Find the TEI XSL stylesheets (`tei-xsl-stylesheets`) with a new directory layout at `/usr/share/xml/tei/stylesheet/rahtz/current`. From there, for example, use `base/p4/html/tei.xsl` to produce HTML output. For more information, see `http://www.tei-c.org/Stylesheets/teic/`

3 System Configuration with YaST

YaST, the setup tool used for installation, is also the configuration tool for SUSE Linux. This chapter covers the configuration of your system with YaST. This includes most of the hardware, the graphical user interface, Internet access, security settings, user administration, installation of software, system updates, and system information. Both graphical and text modes of YaST are available and provide the same functionality.

Configure the system with YaST using various YaST modules. Depending on the hardware platform and the installed software, there are different ways to access YaST in the installed system.

In KDE or GNOME, start the YaST Control Center from the SUSE menu (*System → YaST*). The individual YaST configuration modules are also integrated in the KDE Control Center. Before YaST starts, you are prompted to enter the root password, because YaST needs system administrator permissions to change the system files.

To start YaST from the command line, enter the commands `su` (for changing to the user `root`) and `yast2`. To start the text version, enter `yast` instead of `yast2`. Also use the command `yast` to start the program from one of the virtual consoles.

TIP

To change the language of YaST, select *System → Language Selection* in the YaST Control Center. Choose a language, exit the YaST Control Center, log out of the system, then log in again. The next time you start YaST, the new language setting is used.

For hardware platforms that do not support a display device of their own and for remote administration on other hosts, run YaST remotely. First, open a console on the host on which to display YaST and enter the command `ssh -X root@<system-to-configure>` to log in to the system to configure `root` and redirect the X server output to your terminal. Following the successful SSH login, enter `yast2` to start YaST in graphical mode.

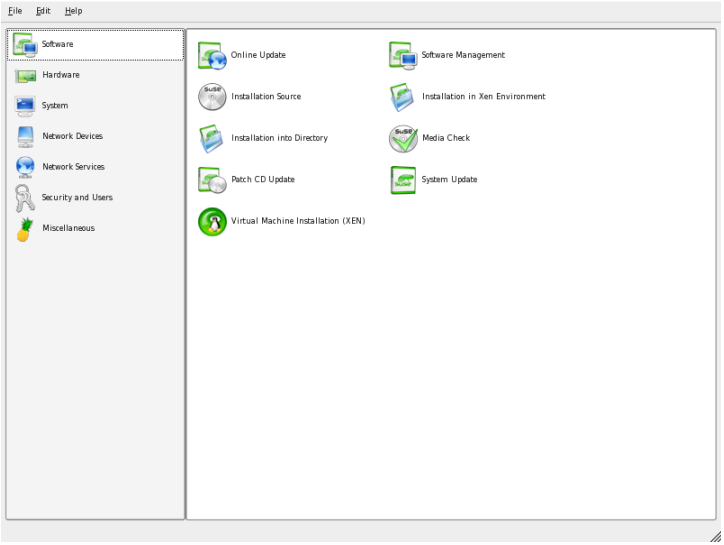
To start YaST in text mode on another system, use `ssh root@<system-to-configure>` to open the connection. Then start YaST with `yast`.

3.1 The YaST Control Center

When you start YaST in the graphical mode, the YaST Control Center, as shown in Figure 3.1, "The YaST Control Center" (page 51), opens. The left frame contains the available categories. When you click a category, its contents are listed in the right frame. Then select the desired module. For example, if you select *Hardware* and click *Sound* in the right frame, a configuration dialog opens for the sound card. The configuration of the individual items usually consists of several steps. Press *Next* to proceed to the following step.

The left frame of most modules displays the help text, which offers suggestions for configuration and explains the required entries. To get help in modules without a help frame, press F1 or choose *Help*. After selecting the desired settings, complete the procedure by pressing *Accept* on the last page of the configuration dialog. The configuration is then saved.

Figure 3.1 *The YaST Control Center*



3.2 Software

3.2.1 Installing and Removing Software

To install, uninstall, and update software on your machine, use *Software Management*. In Linux, software is available in the form of packages. Normally, a package contains everything needed for a program: the program itself, the configuration files, and all documentation. A package containing the source files for the program is also normally available. The sources are not needed for running the program, but you may want to install the sources to compile a custom version of the program.

Some packages depend on other packages. This means that the software of the package only works properly if another package is also installed. The installation of some packages is only possible if certain other packages are installed, perhaps because the installation routine requires specific tools. Such packages must be installed in the correct sequence. There are some packages with identical or similar functionalities. If these packages use the same system resource, they should not be installed at the same time (package conflict). Dependencies and conflicts can occur between two or more packages

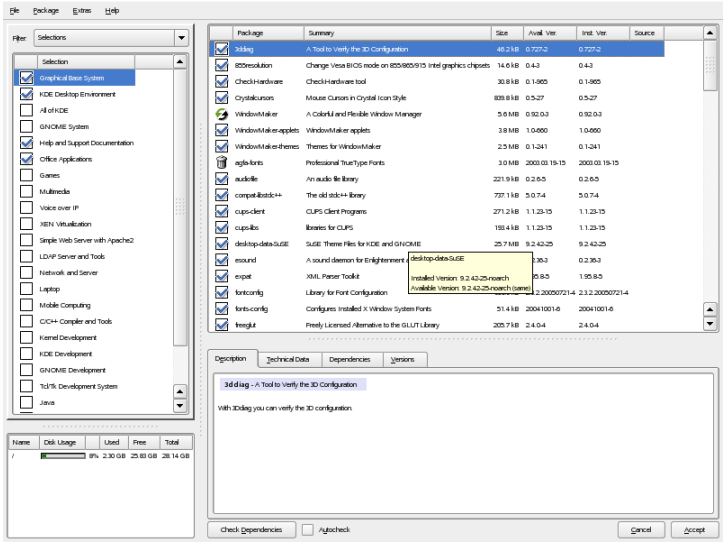
and are sometimes very complex. The fact that a specific package version may be required for smooth interaction can make things even more complicated.

All these factors must be taken into consideration when installing, uninstalling, and updating software. YaST provides an extremely efficient tool for this purpose: the software installation module, usually referred to as the package manager. When the package manager starts, it examines the system and displays installed packages. If you select additional packages for installation, the package manager automatically checks the dependencies and selects any other required packages (resolution of dependencies). If you select conflicting packages, the package manager indicates this and submits suggestions for solving the problem (resolution of conflicts). If a package required by other installed packages is marked for deletion, the package manager issues an alert with detailed information and alternative solutions.

Also use the package manager for the well-structured overview of the range of packages in SUSE Linux that it provides. The packages are arranged by subject and you can restrict display of these groups with filters.

To start the package manager, select *Software Manager*. This opens a dialog as shown in Figure 3.2, “YaST Package Manager” (page 53). Modify the frame sizes by clicking and moving the borders separating the areas. The contents of the frames and their uses are described in the following sections.

Figure 3.2 *YaST Package Manager*



The Filter Window

Arrange the packages in categories and limit the number of packages displayed with the filters. View the filters in the left frame. The frame displays the settings for the current filter method. Choose the desired filter from the list in *Filter*.

Selections

Initially, the *Selections* filter is active. It groups the program packages according to their application purpose, such as multimedia or office applications. The various groups of the *Selections* filter are listed with the installed packages preselected. Click the status box at the beginning of a line to change the status flags of a selection. Select a status directly by right-clicking the selection and using the context menu. From the individual package overview to the right, which displays the packages included in the current selection, select and deselect individual packages.

Package Groups

Package Groups provides a more technical overview of the range of packages and is suitable if you are familiar with the package structure of SUSE Linux. This filter sorts the program packages by subjects, such as applications, development, and hardware, in a tree structure to the left. The more you expand the branches, the more

specific the selection is. This means fewer packages are displayed in the individual package window.

Additionally, this filter lets you display all packages in alphabetic order without any categorization. To do this, select *zzz All* at the bottom of the tree. SUSE Linux contains a number of packages and it might take some time to display this long list.

Search

Find a specific package with *Search*. By specifying various search criteria, restrict the search to display a few or even only one package. Enter a search string and use the check boxes to determine where to search for this string (in the name, in the description, or in the package dependencies). You can define special search patterns using wild cards and regular expressions and search the package dependencies in the *Provides* and *Requires* fields.

TIP: Quick Search

In addition to the *Search* filter, all lists of the package manager feature a quick search. Simply enter a letter to move the cursor to the first package in the list whose name begins with this letter. The cursor must be in the list (by clicking the list).

Languages

To find language-specific packages, such as translated texts for the user interface of programs, documentation, and fonts, use *Language*. This filter shows a list of all languages supported by SUSE Linux. If you select one of these, the right frame shows all packages available for this language. Among these, all packages applying to your current software selection are automatically tagged for installation.

NOTE

Because language-specific packages may depend on other packages, the package manager may select additional packages for installation.

Installation Summary

After selecting the packages for installation, update, or deletion, view the installation summary with *Installation Summary*. It shows how packages will be affected when you click *Accept*. Use the check boxes to the left to filter the packages to view in the individual package window. For example, to check which packages are already installed, start the package manager and deactivate all check boxes except *Keep*.

The package status in the individual package window can be changed as usual. However, the respective package may no longer meet the search criteria. To remove such packages from the list, update the list with *Update List*.

The Individual Package Window

As already mentioned, a list of individual packages is displayed to the right in the individual package window. The content of this list is determined by the currently selected filter. If, for example, the *Selection* filter is selected, the individual package window displays all packages of the current selection.

In the package manager, each package has a status that determines what to do with the package, such as “Install” or “Delete.” This status is shown by a symbol in a status box at the beginning of the line. Toggle the status by clicking or selecting the desired status from the menu that opens when the item is right-clicked. Depending on the current situation, some of the possible status flags may not be available for selection. For example, a package that has not yet been installed cannot be set to “Delete.” View the available status flags with *Help* → *Symbols*.

The package manager offers the following package status flags:

Do Not Install
This package is not installed and will not be installed.

Install
This package is not yet installed but will be installed.

Keep
This package is already installed and will not be changed.

Update
This package is already installed and will be replaced by the version on the installation medium.

Delete
This package is already installed and will be deleted.

Taboo—Never Install

This package is not installed and will never be installed. It is treated as if it does not exist on any of the installation media. If a package would automatically be selected to resolve dependencies, the “Taboo” setting prevents this. However, this may result in inconsistencies that must be resolved manually (dependency check). “Taboo” is mainly intended for expert users.

Protected

This package is installed and should not be modified. Third-party packages (packages without a SUSE signature) are automatically assigned this status to prevent them from being overwritten by later versions existing on the installation media. This may cause package conflicts that must be resolved manually.

Automatic Installation

This package has been automatically selected for installation because it is required by another package (resolution of package dependencies). To deselect such a package, the status “Taboo” may be necessary.

Automatic Update

This package is already installed. However, because another package requires a newer version of this package, the installed version will automatically be updated.

Delete Automatically

This package is already installed, but existing package conflicts require that this package be deleted. For example, this may be the case if the current package has been replaced by a different package.

Automatic Installation (after selection)

This package has been automatically selected for installation because it is part of a predefined selection, such as “Multimedia” or “Development.”

Automatic Update (after selection)

This package is already installed, but a newer version exists on the installation media. This package is part of a predefined selection, such as “Multimedia” or “Development,” selected for update and will automatically be updated.

Delete Automatically (after selection)
This package is already installed, but a predefined selection (such as “Multimedia” or “Development”) requires that this package be deleted. This does not happen very often.

Additionally, you can decide whether to install the sources for a package. This information complements the current package status and cannot be toggled with the mouse or selected directly from the context menu. Instead, mark a check box at the end of the package line. This option can also be accessed under *Package*.

Install Source
Also install the source code.

Do Not Install Source
The sources will not be installed.

The font color used for various packages in the individual package window provides additional information. Installed packages for which a newer version is available on the installation media are displayed in blue. Installed packages whose version numbers are higher than those on the installation media are displayed in red. However, because the version numbering of packages is not always linear, the information may not be perfect, but should be sufficient to indicate problematic packages. If necessary, check the version numbers in the information window.

The Information Window

Get information about the selected package in the tabs in the bottom right frame. The description of the selected package is automatically active. Click the other tabs to view technical data (package size, group, etc.), the list of other packages on which it depends, or the version information.

The Resource Window

During the selection of the software, the resource window at the bottom left of the module displays the prospective usage of all mounted file systems. The colored bar graph grows with every selection. As long as it remains green, there is sufficient space. The bar color slowly changes to red as you approach the limit of disk space. If you select too many packages for installation, an alert is displayed.

The Menu Bar

You can also use the menu bar at the top left of the window to access most of the functions already described. Find important functions in the following four menus:

File

Select *File → Export* to save a list of all installed packages in a text file. This is recommended if you want to replicate a specific installation scope at a later date or on another system. Import a file generated in this way with *Import* to have the same package selection as was saved. In both cases, define the location of the file or accept the suggestion.

To exit the package manager without saving changes to the package selection, click *Exit—Discard Changes*. To save your changes, select *Quit—Save Changes*. In this case, all changes are applied and the program is terminated.

Package

The items in the *Package* menu always refer to the package currently selected in the individual package window. Although all status flags are displayed, you can only select those possible for the current package. Use the check boxes to specify whether to install the sources of the package. *All in This List* opens a submenu listing all package status flags that then affect all packages in this list.

Extras

The *Extras* menu offers options for handling package dependencies and conflicts. If you have manually selected packages for installation, click *Show Automatic Package Changes* to view the list of packages that the package manager has automatically selected to resolve dependencies. If there are still unresolved package conflicts, an alert is displayed and solutions suggested.

If you set package conflicts to *Ignore*, this information is saved permanently in the system. To unignore dependencies, click *Reset Ignored Dependency Conflicts*.

Help

Help → Overview provides a brief explanation of the package manager functionality. A detailed description of the various package flags is available under *Symbols*. If you prefer to operate programs without using the mouse, click *Keys* to view a list of keyboard shortcuts.

Dependency Check

Check Dependencies and *Autocheck* are located under the information window. If you click *Check Dependencies*, the package manager checks if the current package selection results in any unresolved package dependencies or conflicts. In the event of unresolved dependencies, the required additional packages are selected automatically. For package conflicts, the package manager opens a dialog that shows the conflict and offers various options for solving the problem.

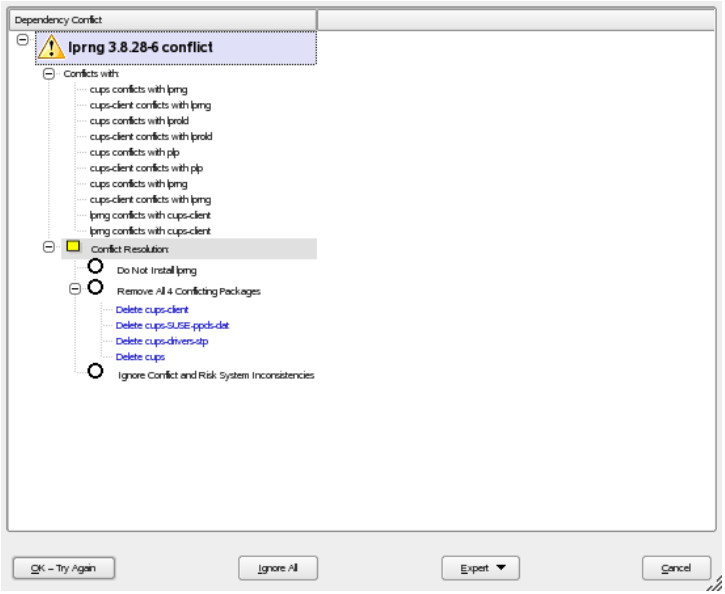
If you activate *Autocheck*, any change of a package status triggers an automatic check. This is a useful feature, because the consistency of the package selection is monitored permanently. However, this process consumes resources and can slow down the package manager. For this reason, the autocheck is not activated by default. In either case, a consistency check is performed when you confirm your selection with *Accept*.

For example, `sendmail` and `postfix` may not be installed concurrently. Figure 3.3, "Conflict Management of the Package Manager" (page 60) shows the conflict message prompting you to make a decision. `postfix` is already installed. Accordingly, you can refrain from installing `sendmail`, remove `postfix`, or take the risk and ignore the conflict.

WARNING: Handling Package Conflicts

Unless you are very experienced, follow the suggestions of YaST when handling package conflicts, because otherwise the stability and functionality of your system could be endangered by the existing conflict.

Figure 3.3 *Conflict Management of the Package Manager*



3.2.2 Selecting the Installation Source

You can use multiple installation sources of several types. Select them and enable their use for installation or update using *Installation Source*. When started, it displays a list of all previously registered sources. Following a normal installation from CD, only the installation CD is listed. Click *Add* to include additional sources in this list. Sources can be CDs, DVDs, or network sources, such as NFS and FTP servers. Even directories on the local hard disk can be selected as the installation medium. See the detailed YaST help text for more details.

All registered sources have an activation status in the first column of the list. Enable or disable individual installation sources by clicking *Activate or Deactivate*. During the installation of software packages or updates, YaST selects a suitable entry from the list of activated installation sources. When you exit the module with *Close*, the current settings are saved and applied to the configuration modules *Software Management* and *System Update*.

3.2.3 Updating Software Online

Install important updates and improvements with the YaST Online Update (YOU). These patches are available for download on the SUSE FTP server and various mirror servers.

Under *Installation Source*, select one of the various servers. When you select a server, its URL is copied to the input field, where it can be edited. You can also specify local URLs in the format `file:/my/path` or `/my/path`. Expand the existing list with additional servers using *New Server*. Click *Edit Server* to modify the settings of the currently selected server.

When the module starts, *Manual Selection of Patches* is active, enabling selection of the patches to fetch. To apply all available recommended and security patches, deactivate this option. However, depending on the bandwidth of the connection and the amount of data to transmit, this can result in long download times.

If you activate *Download All Patches Again*, all available patches, installable packages, and descriptions are downloaded from the server. If this is not activated (default), only patches not yet installed on your system are retrieved.

To configure a process that automatically looks for updates and applies them on a regular basis, click *Configure Fully Automatic Update* . This procedure is fully automated. The system must be able to connect to the update server at the scheduled time.

To perform the update, click *Next*. For a manual update, this loads a list of all available patches and starts the package manager, described in Section 3.2.1, "Installing and Removing Software" (page 51). In the package manager, the filter for YOU patches is activated, enabling selection of updates to install. At start-up, the available security patches and recommended patches are preselected, if the applicable software is installed on the system. This proposal should be accepted.

After making your selection, click *Accept* in the package manager. All selected updates are then downloaded from the server and installed on your machine. Depending on the connection speed and hardware performance, this may take some time. Any errors are displayed in a window. If necessary, skip a problematic package. Prior to the installation, some patches open a window displaying details.

While the updates are downloaded and installed, you can track all actions in the log window. Following the successful installation of all patches, exit YOU with *Close*. If

you do not need the update files after the installation, select *Remove Source Packages after Update* for them to be deleted after the update. Finally, SuSEconfig is executed to adjust the system configuration as needed.

3.2.4 Updating from a Patch CD

Patch CD Update installs patches from CD, not from an FTP server. The advantage lies in a much faster update with CD. After the patch CD is inserted, all patches on the CD are displayed in the dialog. Select the desired packages for installation from the list of patches. The module issues an error message if no patch CD is present. Insert the patch CD then restart the module.

3.2.5 Updating the System

Update the version of SUSE Linux installed on your system with *System Update*. During operation, you can only update application software, not the base system. To update the base system, boot the computer from an installation medium, such as CD. When selecting the installation mode in YaST, select *Update an Existing System*.

The procedure for updating the system is similar to a new installation. Initially, YaST examines the system, determines a suitable update strategy, and presents the results in a suggestion dialog. Click *Change* or the individual items to change any details.

Update Options

Set the update method for your system. Two options are available.

Update with Installation of New Software
: To update the entire system to the latest versions of software, select one of the predefined selections. These selections are the same as those offered during the installation. They ensure that packages that did not exist previously are also installed.

Only Update Installed Packages
: This option merely updates packages that already exist on the system. No new features are installed.

Additionally, you can use *Delete Outdated Packages* to remove packages that do not exist in the new version. By default, this option is preselected to prevent outdated packages from unnecessarily occupying hard disk space.

Packages

Click *Packages* to start the package manager and select or deselect individual packages for update. Any package conflicts should be resolved with the consistency check. The use of the package manager is covered in detail in Section 3.2.1, "Installing and Removing Software" (page 51).

Backup

During the update, the configuration files of some packages may be replaced by those of the new version. Because you may have modified some of the files in your current system, the package manager normally makes backup copies of the replaced files. With this dialog, determine the scope of these backups.

IMPORTANT: Scope of the Backup

This backup does not include the software. It only contains configuration files.

Language

Primary and other languages currently installed on the system are listed here. Change them by clicking *Language* in the displayed configuration or with *Change* → *Language*. You can choose to adapt the keyboard layout and time zone to the region where the primary language is spoken. More about language selection can be found in Section 3.7.11, "Language" (page 92).

Important Information about Updates

The system update is a very complex procedure. For each program package, YaST must first check which version is installed on the computer then determine what needs to be done to replace the old version with the new version correctly. YaST also tries to adopt any personal settings of the installed packages. Some configurations may cause problems

because the old configuration cannot handle the new program version as expected or because unexpected inconsistencies arise between various configurations.

The older the existing version is and the more the configuration of the packages to update differs from the standard, the more problematic an update is. Sometimes, the old configuration cannot be adopted correctly. In this case, reconfigure. Before starting the update, save the existing configuration.

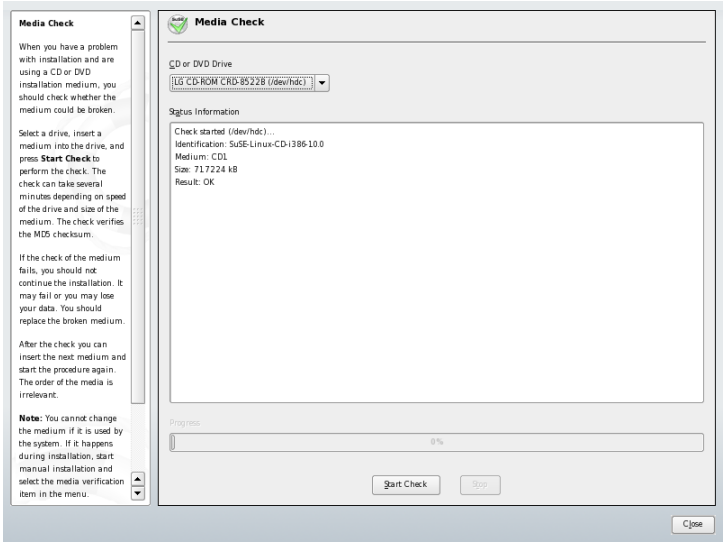
3.2.6 Installing into a Directory for Xen

Install packages into a directory for Xen with *Installation into a Directory for Xen*. Xen is a virtual machine monitor (VMM) for x86-compatible computers that enables you to run more than one virtual machine, each with its own OS, on a single physical system and with excellent performance. After selecting this module, YaST determines the system settings and lists the default directory, installation instructions, and software to install. Edit the defaults by clicking *Change*. Confirm all changes by clicking *Accept*. After all changes have been made, click *Next* until you are informed that the installation is complete. Click *Finish* to exit the dialog. Find detailed information about Xen in Chapter *Virtualization with Xen* (↑Reference).

3.2.7 Checking Media

If you encounter any problems using the SUSE Linux installation media, you can check the CDs or DVDs with *Media Check*. Media problems are more likely to occur with media you burn yourself. To check that a SUSE Linux CD or DVD is error-free, insert the medium into the drive and run this module. Click *Start* for YaST to check the MD5 checksum of the medium. This may take several minutes. If any errors are detected, you should not use this medium for installation.

Figure 3.4 *Checking Media*



3.3 Hardware

New hardware must first be installed or connected as directed by the vendor. Turn on external devices, such as the printer or the modem, and start the appropriate YaST module. Most devices are automatically detected by YaST and the technical data is displayed. If the automatic detection fails, YaST offers a list of devices (model, vendor, etc.) from which to select the suitable device. Consult the documentation enclosed with your hardware for more information.

IMPORTANT: Model Designations

If your model is not included in the device list, try a model with a similar designation. However, in some cases the model must match exactly, because similar designations do not always indicate compatibility.

3.3.1 Bluetooth

Configure Bluetooth devices with *Bluetooth*. Click *Enable Bluetooth Services* to begin configuration. Bluetooth configuration is covered in detail in Section "Configuring Bluetooth with YaST" (Chapter 22, *Wireless Communication*, ↑Reference).

3.3.2 Infrared Device

Configure an infrared device with *Infrared Device*. Click *Start IrDa* to begin configuration. Find information about infrared devices in Section "Infrared Data Transmission" (Chapter 22, *Wireless Communication*, ↑Reference).

3.3.3 CD-ROM and DVD Drives

During installation, all detected CD-ROM drives are integrated in the installed system with entries in `/etc/fstab`. Subdirectories for each device are created in `/media`. Use *CD-ROM Drives* to integrate additional drives in the system.

When the module is started, a list of all detected drives is displayed. Select the device to integrate then click *Add*. Delete a device with *Remove*.

3.3.4 Graphics Card and Monitor

Configure graphics cards and monitors with *Graphics Card and Monitor*. It uses the the SaX2 interface, described in Section 3.11, "SaX2" (page 101).

3.3.5 Printer

Configure a printer with *Printer*. If a printer is properly connected to the system, it should be detected automatically. Find detailed instructions for configuring printers with YaST in Section "Configuring the Printer" (Chapter 31, *Printer Operation*, ↑Reference).

3.3.6 Hard Disk Controller

Normally, the hard disk controller of your system is configured during the installation. If you add controllers, integrate these into the system with *Disk Controller*. You can also modify the existing configuration, but this is generally not necessary.

The dialog presents a list of detected hard disk controllers and enables assignment of the suitable kernel module with specific parameters. Use *Test Loading of Module* to check if the current settings work before they are saved permanently in the system.

WARNING: Configuration of the Hard Disk Controller

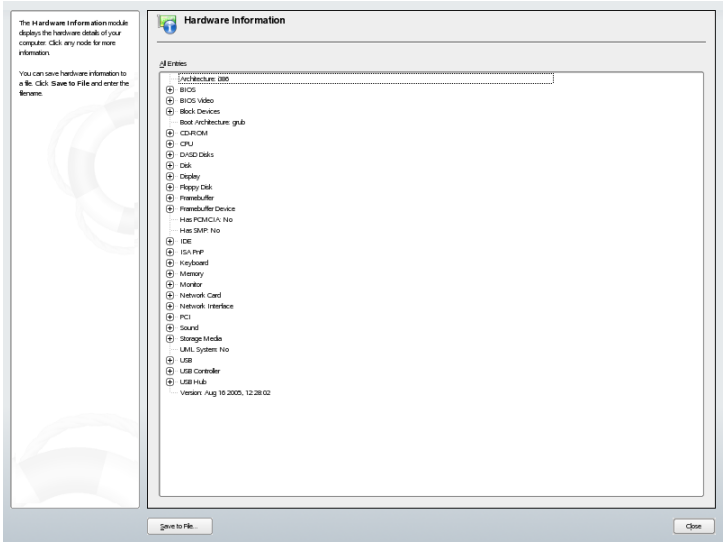
This is an expert tool. Your system may no longer boot if you make incorrect settings. If you make changes, use the test option.

3.3.7 Hardware Information

Display detected hardware and technical data using *Hardware Information*. Click any node of the tree for more information about a device. This module is especially useful, for example, when submitting a support request for which you need information about your hardware.

Save the hardware information displayed to file by clicking *Save to File*. Select the desired directory and filename then click *Save* to create the file.

Figure 3.5 *Displaying Hardware Information*



3.3.8 IDE DMA Mode

Activate and deactivate the DMA mode for your IDE hard disks and your IDE CD and DVD drives in the installed system with *IDE DMA Mode*. This module does not have any effect on SCSI devices. DMA modes can substantially increase the performance and data transfer speed in your system.

During installation, the current SUSE Linux kernel automatically activates DMA for hard disks but not for CD drives, because default DMA activation for all drives often causes problems with CD drives. Use the DMA module to activate DMA for your drives. If the drive supports the DMA mode without any problems, the data transfer rate of your drive can be increased by activating DMA.

NOTE

DMA (direct memory access) means that your data can be transferred directly to the RAM, bypassing the processor control.

3.3.9 Joystick

Configure a joystick connected to the sound card with *Joystick*. Select your joystick type in the list provided. If your joystick is not listed, select *Generic Analog Joystick*. After selecting your joystick, make sure that it is connected then click *Test* to test the functionality. Click *Continue* and YaST installs the required files. After the *Joystick Test* window appears, test the joystick by moving it in all directions and pressing all buttons. Each movement should be displayed in the window. If you are satisfied with the settings, click *OK* to return to the module and *Finish* to complete configuration.

If you have a USB device, this configuration is not necessary. Plug in the joystick and start using it.

3.3.10 Keyboard Layout

To configure the keyboard for the console, run YaST in text mode then use *Keyboard Layout*. After clicking the module, the current layout is displayed. To choose another keyboard layout, select the desired layout from the list provided. Test the layout in *Test* by pressing keys on the keyboard.

You can fine-tune the settings by clicking *Expert Settings*. You can adjust the key repeat rate and delay and configure the start-up state by choosing the desired settings in *Start-Up States*. For *Devices to Lock*, enter a space-separated list of devices to which to apply the Scroll Lock, Num Lock, and Caps Lock settings. Click *OK* to complete the fine-tuning. Finally, after all selections have been made, click *Accept* for your changes to take effect.

To set up the keyboard for the graphical environment, run the graphical YaST then select *Keyboard Layout*. Find information about the graphical configuration in Section 3.11.3, “Keyboard Properties” (page 106).

3.3.11 Mouse Model

When configuring the mouse in the graphical environment, click *Mouse Model* to access the SaX2 mouse configuration. Refer to Section 3.11.2, “Mouse Properties” (page 105) for details.

To configure your mouse for the text environment, use YaST in text mode. After entering text mode and selecting *Hardware* → *Mouse Model*, use the keyboard arrow keys to

choose your mouse from the provided list. Then click *Accept* to save the settings and exit the module.

3.3.12 Scanner

Connect and turn on your scanner then select *Scanner* to configure it. Most supported scanners are detected automatically. Select the scanner to configure and click *Edit*. If your scanner is not listed, click *Add* to open the manual configuration dialog. Select the appropriate vendor and model from the list and click *Next* to proceed with the installation. To modify a configured scanner, select it then click *Edit*.

After the scanner has been determined by either automatic detection or user selection, installation is carried out. Click *Finish* to complete the installation. If the installation is successful, a corresponding message appears. To test your scanner after installation, insert a document into your scanner and click *Other* → *Test*.

Scanner Not Detected

Only supported scanners can be automatically detected. Scanners connected to another network host cannot be detected. The manual configuration distinguishes three types of scanners: USB scanners, SCSI scanners, and network scanners.

USB Scanner
After the scanner is selected, YaST attempts to load the USB modules. If your scanner is very new, the modules may not be loaded automatically. In this case, continue automatically to a dialog in which to load the USB module manually. Refer to the YaST help text for more information.

SCSI Scanner
SCSI devices are normally detected. Specify the device, such as `/dev/sg0`. If problems arise, refer to the YaST help text. Remember always to shut down the system before connecting or disconnecting a SCSI scanner.

Network Scanner
Enter the IP address or the hostname. To configure a network scanner, refer to the Support Database article *Scanning in Linux* (`http://portal.suse.com/sdb/en/index.html`, keyword *scanner*).

If your scanner is not detected, the device is probably not supported. However, sometimes even supported scanners are not detected. If this is the case, proceed with the manual scanner selection. If you can identify your scanner in the list of vendors and models, select it. If not, select *Cancel*. Information about scanners that work with Linux is provided at `http://cdb.suse.de/` and `http://www.sane-project.org/`.

WARNING: Assigning a Scanner Manually

Assign the scanner manually only if you are absolutely sure. An incorrect selection could damage your hardware.

Troubleshooting

Your scanner may not have been detected for one of the following reasons:

- The scanner is not supported. Check `http://cdb.suse.de/` for a list of Linux-compatible devices.
- The SCSI controller was not installed correctly.
- There were termination problems with your SCSI port.
- The SCSI cable is too long.
- The scanner has a SCSI light controller that is not supported by Linux.
- The scanner is defective.

WARNING

SCSI scanners should not be connected or disconnected while the system is running. Shut the system down first.

For more information about scanning, see Chapter *Kooka—A Scanning Application* (↑Reference).

3.3.13 Sound

Use *Sound* to configure a sound card. Most sound cards are detected automatically and listed. Select the one to configure or modify then click *Edit*.

If YaST is unable to detect your sound card automatically, click *Add* to open a dialog in which to select a sound card vendor and model. Refer to your sound card documentation for the information required. Find a reference list of sound cards supported by ALSA with their corresponding sound modules in `/usr/share/doc/packages/alsa/cards.txt` and at http://www.alsa-project.org/~goemon/. After making your selection, click *Next*.

Setup Dialog

Choose the configuration level in the first setup screen. With *Quick Automatic Setup*, you are not required to go through any of the further configuration steps and no sound test is performed. The sound card is configured automatically. With *Normal Setup*, you can adjust the output volume and play a test sound. *Advanced setup with possibility to change options* allows you to customize the sound card options manually.

In this dialog, there is also a shortcut to joystick configuration. Click the respective box and select the joystick type in the following dialog. Click *Next* to continue.

Sound Card Volume

Here, test your sound configuration and make adjustments to the volume. You should start at about ten percent to avoid damage to your speakers or hearing. A test sound should be audible when you click *Test*. If you cannot hear anything, increase the volume. Press *Continue* to complete the sound configuration. The volume setting is then saved.

Sound Configuration

Use *Delete* to remove a sound card. This deactivates existing entries of configured sound cards in `/etc/modprobe.d/sound`. Click *Other* to open a dialog in which to customize the sound module options manually. Under *Add*, configure additional sound cards. If YaST detects another sound card, select it then use *Edit*. If YaST does not detect a sound card, you are automatically directed to *Manual Sound Card Selection*.

If you use a `Creative Soundblaster Live` or `AWE` sound card, copy SF2 sound fonts to your hard disk from the original Soundblaster driver CD-ROM with *Install Sound Fonts*. The sound fonts are saved in the directory `/usr/share/sfbank/creative/`.

For playback of MIDI files, check *Start Sequencer*. This way, the modules for sequencer support are loaded along with the sound modules.

The volume and configuration of all sound cards installed are saved when you click *Finish*. The mixer settings are saved to the file `/etc/asound.conf` and the ALSA configuration data is appended at the end of the files `/etc/modprobe.d/sound` and `/etc/sysconfig/hardware`.

3.3.14 TV and Radio Cards

Configure TV and radio cards with *TV Card*. If your card was automatically detected, it is displayed in the list. In this case, select the card and click *Edit*. If your card was not detected, click *Add*. If you have already configured TV or radio cards, select a card to modify then click *Edit*.

During the automatic hardware detection, YaST attempts to assign the correct tuner to your card. If you are not sure, simply keep the setting *Default (recognized)* and check whether it works. If you cannot set all channels, click *Select Tuner* and select the correct tuner type from the list.

If you are familiar with the technical details, you can use the expert dialog to make settings for a TV or radio card. Select a kernel module and its parameters in this dialog. Also check all parameters of your TV card driver. To do this, select the respective parameters and enter the new value in the parameter line. Confirm the new values with *Apply* or restore the default values with *Reset*.

Configure audio settings if your TV or radio card is connected to the installed sound card. Make the connection with a cable from output of the TV or radio card to the external audio input of the sound card. If you have not yet configured your sound card, select *Configure Sound Card* to configure it as described in Section 3.3.13, “Sound” (page 72).

If your TV or radio card has speaker jacks, you can also connect the speakers directly without using the sound card. There are also TV cards without any sound function, which do not require an audio configuration, such as those for CCD cameras.

When editing a configuration, you can also configure the TV stations by clicking *TV Channel*. Set the proper *TV Standard* and *Frequency Table* for you area and click *Scan the Channels*. A list of stations appears. After scanning has been completed, click *OK* to return to the configuration dialog.

3.4 Network Devices

All network devices connected to the system must be initialized before they can be used by a service. The detection and configuration of these devices is done in the module group *Network Devices*.

3.4.1 DSL, ISDN, Modem, or Network Card

To configure a DSL, ISDN, or network interface or a modem, select the appropriate module. For a device that is detected automatically, select it from the list then click *Edit*. If your device has not been detected, click *Add* and select it manually. To edit an existing device, select it then click *Edit*. For more detailed information, see Section "Configuring a Network Connection with YaST" (Chapter 38, *Basic Networking*, ↑Reference). For wireless network interfaces, see Chapter *Wireless Communication* (↑Reference).

3.4.2 Fax

Configure a fax system with *Fax*. Set up the fax system for one or more users, but each user must have a unique fax number. When adding or editing users, configure the username, fax numbers, outgoing MSN, station ID, headline, and desired action.

3.4.3 Phone Answering Machine

Configure your SUSE Linux system to function as a telephone answering machine with *Phone Answering Machine*. You can configure it for one or more users, but each user must have a unique telephone number. When adding or editing users, configure the

username, telephone numbers, delay, duration, and desired action. Assign a PIN (personal identification number) to provide the user with remote access to the machine.

3.5 Network Services

This group contains tools to configure all kinds of services in the network. These include name resolution, user authentication, and file services.

3.5.1 Mail Transfer Agent

You can configure your mail settings in *Mail Transfer Agent* if you send your e-mail with sendmail, postfix, or the SMTP server of your provider. You can fetch mail via the fetchmail program, for which you can also enter the details of the POP3 or IMAP server of your provider. Alternatively, use a mail program of your choice, such as KMail or Evolution, to set your access data. In this case, you do not need this module.

To configure your mail with YaST, specify the type of your connection to the Internet in the first dialog. Choose one of the following options:

Permanent
: Select this option if you have a dedicated line to the Internet. Your machine is online permanently, so no dial-up is required. If your system is part of a local network with a central e-mail server, select this option to ensure permanent access to your e-mail messages.

Dial-Up
: This item is relevant for users who have a computer at home, are not located in a network, and occasionally connect to the Internet.

No Connection
: If you do not have access to the Internet and are not located in a network, you cannot send or receive e-mail.

Activate virus scanning for your incoming and outgoing e-mail with AMaViS by selecting that option. The package is installed automatically as soon as you activate the mail filtering feature. In the following dialogs, specify the outgoing mail server (usually the SMTP server of your provider) and the parameters for incoming mail. Set the diverse POP or IMAP servers for mail reception by various users. Using this dialog, you can

also assign aliases, use masquerading, or set up virtual domains. Click *Finish* to exit the mail configuration.

3.5.2 Other Available Services

Many other network modules are available in YaST.

DHCP Server

Use this to set up a custom DHCP server in only a few steps. Chapter *DHCP* (↑Reference) provides basic knowledge about the subject and a step-by-step description of the configuration process.

DNS Server

Configuring a DNS server that is responsible for name resolution is recommended for larger networks. You can use *DNS Server* for this as described in Section "Configuration with YaST" (Chapter 40, *The Domain Name System*, ↑Reference). Chapter *The Domain Name System* (↑Reference) provides background information about DNS.

DNS and Hostname

Use this module to configure the hostname and DNS, if these settings were not already made while configuring the network devices. Also use it to change the hostname and domain name. If the provider has been configured correctly for DSL, modem, or ISDN access, the list of name servers contains the entries that were extracted automatically from the provider data. If you are located in a local network, you might receive your hostname via DHCP, in which case you should not modify the name.

HTTP Server

To run your own Web server, configure Apache in *HTTP Server*. Find more information in Chapter *The Apache Web Server* (↑Reference).

Hostnames

When booting and in small networks, you can use *Hostnames* for hostname resolution instead of DNS. The entries in this module reflect the data of the file `/etc/hosts`.

For more information, read Section " `/etc/hosts` " (Chapter 38, *Basic Networking*, ↑Reference).

LDAP Client

If using LDAP for user authentication in the network, configure the client in *LDAP Client*. Information about LDAP and a detailed description of the client configuration with YaST are available in Chapter *LDAP—A Directory Service* (↑Reference).

NFS Client and NFS Server

With NFS, run a file server that all members of your network can access. This file server can be used to make certain applications, files, and storage space available to users. In *NFS Server*, you can configure your host as an NFS server and determine the directories to export for general use by the network users. All users with the appropriate permissions can mount these directories in their own file trees. Use *NFS Client* to configure your system to access an NFS server in the network. A description of the YaST modules and background information about NFS are provided in Chapter *Sharing File Systems with NFS* (↑Reference).

NIS Client and NIS Server

If you run more than one system, local user administration (using the files `/etc/passwd` and `/etc/shadow`) is impractical and requires a lot of maintenance. In this case, administer user data on a central server and distribute it to the clients from there. NIS is one option for this. Detailed information about NIS and the configuration with YaST is available in Chapter *Using NIS* (↑Reference).

NTP Client

NTP (network time protocol) is a protocol for synchronizing hardware clocks over a network. Information about NTP and instructions for configuring it with YaST are available in Chapter *Time Synchronization with xntp* (↑Reference).

Network Services (xinetd)

Configure the network services (such as finger, talk, and ftp) to start when SUSE Linux boots using *Network Services*. These services enable external hosts to connect to your computer. Various parameters can be configured for every service. By default, the master service that manages the individual services (inetd or xinetd) is not started.

When this module starts, choose whether to start inetd or xinetd. The selected daemon can be started with a standard selection of services. Alternatively, compose your own selection of services with *Add*, *Delete*, and *Edit*.

WARNING: Configuring Network Services (xinetd)

The composition and adjustment of network services on a system is a complex procedure that requires a comprehensive understanding of the concept of Linux services. The default settings are usually sufficient.

Proxy

Configure Internet proxy client settings in *Proxy*. Click *Enable Proxy* then enter the desired proxy settings. You can test these settings by clicking *Test Proxy Settings*. A small window informs you whether your proxy settings work correctly. After your settings have been entered and tested, save them by clicking *Accept*.

Remote Administration

To administer your machine remotely from another machine, use *Remote Administration*. To maintain your system remotely, use a VNC client, such as krdc, or a Java-enabled browser. Although remote administration using VNC is simple and fast, it is less secure than using SSH, so you should always keep this in mind when using a VNC server. Find detailed information about installing with a VNC client in Section "Simple Remote Installation via VNC—Static Network Configuration" (Chapter 1, *Remote Installation*, ↑Reference).

Allow remote administration by selecting *Allow Remote Administration* in *Remote Administration Settings*. Selecting *Do Not Allow Remote Administration* disables this function. Click *Open Port in Firewall* to allow access to your computer. Clicking *Firewall Details* displays network interfaces with open ports in the firewall. Select the desired interface and click *OK* to return to the main dialog. Click *Accept* to complete the configuration.

The YaST *Remote Administration* module is highly recommended for configuring VNC on your machine. Although the SaX2 interface also allows you to set remote access properties, it is not a substitute for YaST. It only enables you to configure your X server as a host for VNC sessions. For more information, refer to Section 3.11.6, "Remote Access Properties" (page 107).

Routing

Use *Routing* to configure the paths data takes over the network. In most cases, only enter the IP address of the system through which to send all data in *Default Gateway*. To create more complicated configurations, use *Expert Configuration*.

Samba Server and Client

In a heterogeneous network consisting of Linux and Windows hosts, Samba controls the communication between the two worlds. Information about Samba and the configuration of clients and servers is provided in Chapter *Samba* (↑Reference).

TFTP Server

TFTP (Trivial File Transfer Protocol) is a simple form of the file transfer protocol (FTP). It is often used by servers to boot diskless workstations, X terminals, and routers. Set up a TFTP server with *TFTP Server*. Click *Enable* to start the process. Open a port in the firewall to allow remote access to the server then specify the directory where served files are located. Click *Accept* to complete setup. You are then asked if the directory specified should be created.

3.6 Security and Users

A basic aspect of Linux is its multiuser capability. Consequently, several users can work independently on the same Linux system. Each user has a user account identified by a login name and a personal password for logging in to the system. All users have their own home directories where personal files and configurations are stored.

3.6.1 User Management

Create and edit users with *User Management*. It provides an overview of users in the system, including NIS and LDAP users if requested. If you are part of an extensive network, click *Set Filter* to list all users categorically (for example, `root` or NIS users). You can also customize filter settings by clicking *Customize Filter*.

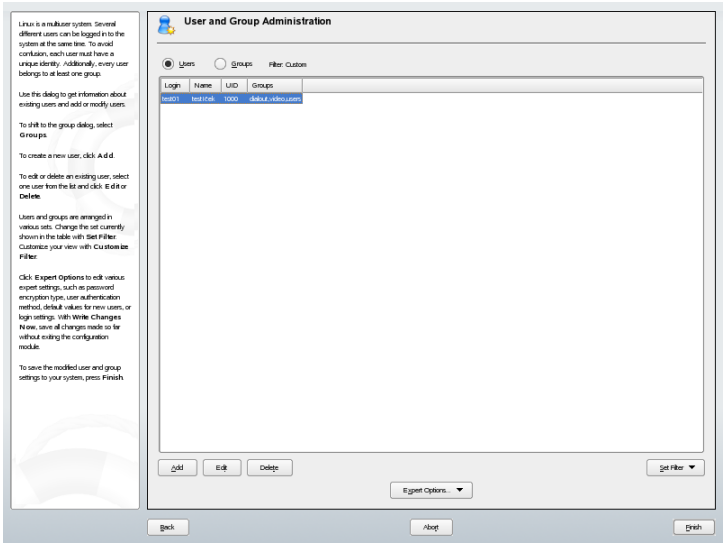
To add new users, click *Add* and enter the appropriate data. Complete the addition by clicking *Accept*. The new user can immediately log in using the newly created login name and password.

Disable user login with the corresponding option. Fine-tune user profiles in *Details*. Here, manually set the user ID, home directory, default login shell, and assign the new user to specific groups. Configure the validity of the password in *Password Settings*. Click *Accept* to save all changes.

To delete a user, select the user from the list and click *Delete*. Then mark whether to delete the home directory and click *Yes* to confirm.

For advanced user administration, use *Expert Options* to define the default settings for the creation of new users. Select the user authentication method (such as NIS, LDAP, Kerberos, or Samba), login settings (only with KDM or GDM), and the algorithm for password encryption. *Default for New Users* and *Password Encryption* apply only to local users. *Authentication and User Sources* provides a configuration overview and the option to configure the client. Advanced client configuration is also possible using this module. After accepting the configuration, return to the initial configuration overview. Click *Write Changes Now* if you want to save all changes without exiting the configuration module.

Figure 3.6 *User Management*



3.6.2 Group Management

To create and edit groups, select *Group Management* or click *Groups* in the user administration module. Both dialogs have the same functionality, allowing you to create, edit, or delete groups.

The module gives an overview of all groups. As in the user management dialog, change filter settings by clicking *Set Filter*.

To add a group, click *Add* and fill in the appropriate data. Select group members from the list by checking the corresponding box. Clicking *Accept* to create the group. To edit a group, select the group to edit from the list and click *Edit*. Make all necessary changes then save them with *Accept*. To delete a group, simply select it from the list and click *Delete*.

Click *Expert Options* for advanced group management. Find more about these options in Section 3.6.1, "User Management" (page 79).

3.6.3 Local Security

To apply a set of security settings to your entire system, use *Local Security*. These settings include security for booting, login, passwords, user creating, and file permissions. SUSE Linux offers three preconfigured security sets: *Home Workstation*, *Networked Workstation*, and *Networked Server*. Modify the defaults with *Details*. To create your own scheme, use *Custom Settings*.

The detailed or custom settings include:

Password Settings

To have new passwords checked by the system for security before they are accepted, click *Check New Passwords* and *Test for Complicated Passwords*. Set the minimum password length for newly created users. Define the period for which the password should be valid and how many days in advance an expiration alert should be issued when the user logs in to the text console.

Boot Settings

Set how the key combination Ctrl + Alt + Del should be interpreted by selecting the desired action. Normally, this combination, when entered in the text console, causes the system to reboot. Do not modify this setting unless your machine or

server is publicly accessible and you are afraid someone could carry out this action without authorization. If you select *Stop*, this key combination causes the system to shut down. With *Ignore*, this key combination is ignored.

If you use the KDE login manager (KDM), set permissions for shutting down the system in *Shutdown Behavior of KDM*. Give permission to *Only root* (the system administrator), *All Users*, *Nobody*, or *Local Users*. If *Nobody* is selected, the system can only be shut down from the text console.

Login Settings

Typically, following a failed login attempt, there is a waiting period lasting a few seconds before another login is possible. This makes it more difficult for password sniffers to log in. Optionally activate *Record Successful Login Attempts* and *Allow Remote Graphical Login*. If you suspect someone is trying to discover your password, check the entries in the system log files in `/var/log`. To grant other users access to your graphical login screen over the network, enable *Allow Remote Graphical Login*. Because this access possibility represents a potential security risk, it is inactive by default.

User Addition

Every user has a numerical and an alphabetical user ID. The correlation between these is established using the file `/etc/passwd` and should be as unique as possible. Using the data in this screen, define the range of numbers assigned to the numerical part of the user ID when a new user is added. A minimum of 500 is suitable for users. Automatically generated system users start with 1000. Proceed in the same way with the group ID settings.

Miscellaneous Settings

To use predefined file permission settings, select *Easy*, *Secure*, or *Paranoid*. *Easy* should be sufficient for most users. The setting *Paranoid* is extremely restrictive and can serve as the basic level of operation for custom settings. If you select *Paranoid*, remember that some programs might not work correctly or even at all, because users no longer have permission to access certain files.

Also set which user should launch the `updatedb` program, if installed. This program, which automatically runs on a daily basis or after booting, generates a database (locatedb) in which the location of each file on your computer is stored. If you select *Nobody*, any user can find only the paths in the database that can be seen by any other (unprivileged) user. If `root` is selected, all local files are indexed, because the user `root`, as superuser, may access all directories. Make sure that the options

Current Directory in root's Path and *Current Directory in Path of Regular Users* are deactivated. Only advanced users should consider using these options because these settings may pose a significant security risk if used incorrectly. To have some control over the system even if it crashes, click *Enable Magic SysRq Keys*.

Click *Finish* to complete your security configuration.

3.6.4 Firewall

SuSEfirewall2 can protect your machine against attacks from the Internet. Configure it with *Firewall*. Find detailed information about SuSEfirewall2 in Section "Masquerading and Firewalls" (Chapter 23, *Security in Linux*, ↑Reference).

TIP: Automatic Activation of the Firewall

YaST automatically starts a firewall with suitable settings on every configured network interface. Start this module only if you want to reconfigure the firewall with custom settings or deactivate it.

3.7 System

This group of modules is designed to help you manage your system. All modules in this group are system-related and serve as valuable tools for ensuring that your system runs properly and your data is managed efficiently.

3.7.1 Backup

Create a backup of both your system and data using *System Backup*. However, the backup created by the module does not include the entire system. The system is backed up by saving important storage areas on your hard disk that may be crucial when trying to restore a system, such as the partition table or master boot record (MBR). It can also include the XML configuration acquired from the installation of the system, which is used for AutoYaST. Data is backed up by saving changed files of packages accessible on installation media, entire packages that are unaccessible (such as online updates), and files not belonging to packages, such as many of the configuration files in `/etc` or the directories under `/home`.

3.7.2 Restoration

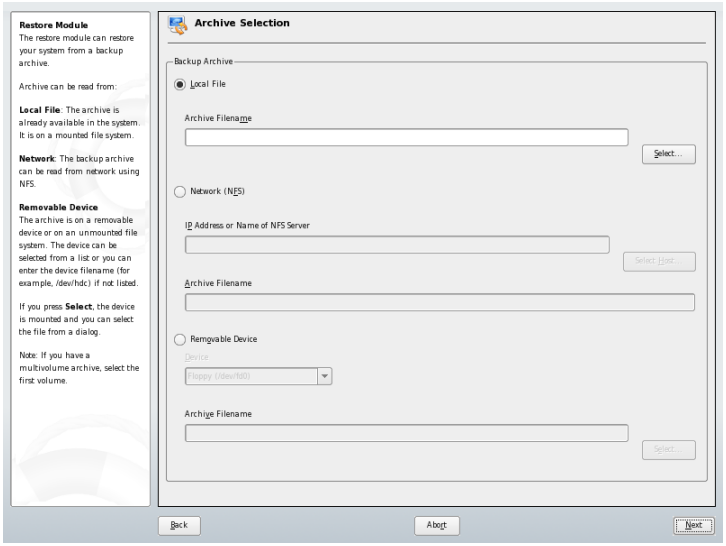
With *System Restoration*, shown in Figure 3.7, “Start Window of the Restore Module” (page 84), restore your system from a backup archive created with *System Backup*. First, specify where the archives are located (removable media, local hard disks, or network file systems). Click *Next* to view the description and contents of the individual archives and select what to restore from the archives.

You can also uninstall packages that were added since the last backup and reinstall packages that were deleted since the last backup. These two steps enable you to restore the exact system state at the time of the last backup.

WARNING: System Restoration

Because this module normally installs, replaces, or uninstalls many packages and files, use it only if you have experience with backups. Otherwise you may lose data.

Figure 3.7 *Start Window of the Restore Module*



3.7.3 Boot and Rescue Disks

Create boot and rescue disks with *Boot or Rescue Floppy*. These floppy disks are helpful if the boot configuration of your system is damaged. The rescue disk is especially necessary if the file system of the root partition is damaged.

The following options are available:

Standard Boot Floppy
Use this option to create the standard boot floppies with which to boot an installed system. Depending on the architecture, the actual number of boot disks may vary, but you should create all the boot disks presented in the dialog because all these disks are necessary for booting. They are also needed for starting the rescue system.

Rescue Floppy
This disk contains a special environment that allows you to perform maintenance tasks in your installed system, such as checking and repairing the file system and updating the boot loader. To start the rescue system, boot with the standard boot disks then select *Manual Installation* → *Start Installation or System* → *Rescue System*. Insert the rescue disk when prompted.

Custom Floppy
Use this to write any existing floppy disk image from the hard disk to a floppy disk.

Download Floppy Image
With this, enter a URL and authentication data to download a floppy disk image from the Internet.

To create one of these floppy disks, select the corresponding option and click *Next*. Insert a floppy disk when prompted. Click *Next* again to create the floppy disk.

3.7.4 LVM

The logical volume manager (LVM) is a tool for custom partitioning of hard disks with logical drives. Find information about LVM in Section “LVM Configuration” (Chapter 2, *Advanced Disk Setup*, ↑Reference).

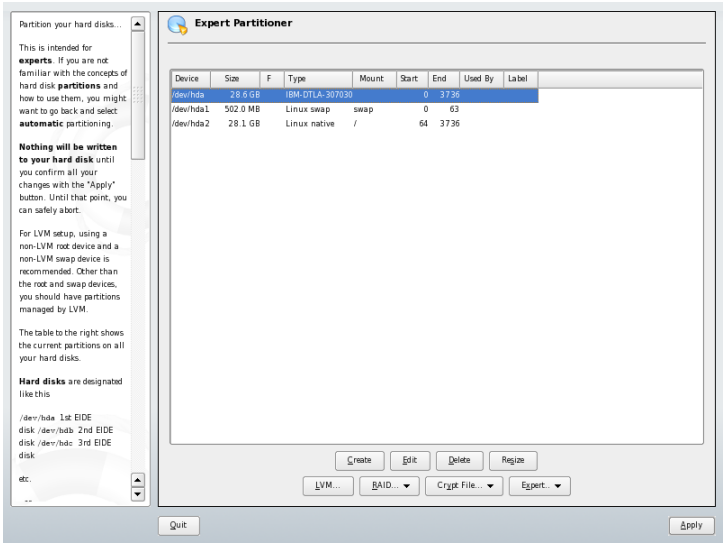
3.7.5 Partitioner

With the expert dialog, shown in Figure 3.8, “The YaST Partitioner” (page 86), manually modify the partitioning of one or several hard disks. Partitions can be added, deleted, resized, and edited. Also access the soft RAID and LVM configuration from this YaST module.

WARNING

Although it is possible to modify the partitions in the installed system, this should be handled only by experts. Otherwise the risk of making a mistake that causes data loss is very high. If you repartition a hard disk in use, reboot the system right afterwards. It is safer to use the rescue system than repartition the system while running.

Figure 3.8 *The YaST Partitioner*



All existing or suggested partitions on all connected hard disks are displayed in the list of the YaST Expert Partitioner dialog. Entire hard disks are listed as devices without numbers, such as `/dev/hda` or `/dev/sda`. Partitions are listed as parts of these devices, such as `/dev/hda1` or `/dev/sda1`. The size, type, file system, and mount

point of the hard disks and their partitions are also displayed. The mount point describes where the partition appears in the Linux file system tree.

If you run the expert dialog during installation, any free hard disk space is also listed and automatically selected. To provide more disk space to SUSE Linux, free the needed space starting from the bottom toward the top of the list (starting from the last partition of a hard disk toward the first). For example, if you have three partitions, you cannot use the second exclusively for SUSE Linux and retain the third and first for other operating systems.

Creating a Partition

Select *Create*. If several hard disks are connected, a selection dialog appears in which to select a hard disk for the new partition. Then, specify the partition type (primary or extended). Create up to four primary partitions or up to three primary partitions and one extended partition. Within the extended partition, create several logical partitions (see Section "Partition Types" (page 8)).

Select the file system to use and a mount point, if necessary. YaST suggests a mount point for each partition created. Details of the parameters are provided in the next section. Select *OK* to apply your changes. The new partition is then listed in the partition table. If you click *Next*, the current values are adopted. During installation you are then returned to the suggestion screen.

Partitioning Parameters

When you create a new partition or modify an existing partition, set various parameters. For new partitions, suitable parameters are set by YaST and usually do not require any modification. To perform manual settings, proceed as follows:

1. Select the partition.

2. Click *Edit* to edit the partition and set the parameters:

   File System ID
   Even if you do not want to format the partition at this stage, assign it a file system ID to ensure that the partition is registered correctly. Possible values include *Linux*, *Linux swap*, *Linux LVM*, and *Linux RAID*. For LVM and RAID details, refer to Section "LVM Configuration" (Chapter 2, *Advanced Disk*

Setup, ↑Reference) and Section "Soft RAID Configuration" (Chapter 2, *Advanced Disk Setup*, ↑Reference).

File System

To format the partition immediately within the scope of the installation, specify one of the following file systems for the partition: *Swap*, *Ext2*, *Ext3*, *ReiserFS*, or *JFS*. Refer to Chapter *File Systems in Linux* (↑Reference) for details on the various file systems.

Swap is a special format that allows the partition to be used as virtual memory. ReiserFS is the default file system for the Linux partitions. ReiserFS, JFS, and Ext3 are journaling file systems. These file systems are able to restore the system very quickly after a system crash, because write processes are logged during the operation. Furthermore, ReiserFS is very fast in handling lots of small files. Ext2 is not a journaling file system. However, it is rock solid and good for smaller partitions, because it does not require much disk space for management.

File System Options

Set various parameters for the selected file system here. Depending on the file system used, various options are offered for experts.

Encrypt File System

If you activate the encryption, all data is written to the hard disk in encrypted form. This increases the security of sensitive data, but slightly reduces the system speed, because the encryption takes some time. More information about the encryption of file systems is provided in Section "Encrypting Partitions and Files" (Chapter 23, *Security in Linux*, ↑Reference).

Fstab Options

Here, specify various parameters for the administration file of the file systems (`/etc/fstab`).

Mount Point

Specifies the directory at which the partition should be mounted in the file system tree. Select from various YaST proposals or enter any other name.

3. Select *Next* to activate the partition.

If you partition manually, create a swap partition of at least 256 MB. The swap partition is used to free the main memory of data that is not used at the present moment. This keeps the main memory free for the most frequently-used important data.

Expert Options

Expert opens a menu containing the following commands:

Reread Partition Table
Rereads the partitioning from disk. For example, you need this after manual partitioning in the text console.

Delete Partition Table and Disk Label
This completely overwrites the old partition table. For example, this can be helpful if you have problems with unconventional disk labels. Using this method, all data on the hard disk is lost.

More Partitioning Tips

If the partitioning is performed by YaST and other partitions are detected in the system, these partitions are also entered in the file `/etc/fstab` to enable easy access to this data. This file contains all partitions in the system with their properties, such as the file system, mount point, and user permissions.

Example 3.1 */etc/fstab: Partition Data*

```
/dev/sda1    /data1    auto      noauto,user 0 0
/dev/sda5    /data2    auto      noauto,user 0 0
/dev/sda6    /data3    auto      noauto,user 0 0
```

The partitions, regardless of whether they are Linux or FAT partitions, are specified with the options `noauto` and `user`. This allows any user to mount or unmount these partitions as needed. For security reasons, YaST does not automatically enter the `exec` option here, which is needed for executing programs from the location. However, to run programs from there, you can enter this option manually. This measure is necessary if you encounter system messages such as bad interpreter or Permission denied.

Partitioning and LVM

From the expert partitioner, access the LVM configuration with *LVM* (see Section "LVM Configuration" (Chapter 2, *Advanced Disk Setup*, ↑Reference)). However, if a working LVM configuration already exists on your system, it is automatically activated as soon as you enter the LVM configuration for the first time in a session. In this case, any disks containing a partition belonging to an activated volume group cannot be repartitioned because the Linux kernel cannot reread the modified partition table of a hard disk when any partition on this disk is in use. However, if you already have a functioning LVM configuration on your system, physical repartitioning should not be necessary. Instead, change the configuration of the logical volumes.

At the beginning of the physical volumes (PVs), information about the volume is written to the partition. To reuse such a partition for other non-LVM purposes, it is advisable to delete the beginning of this volume. For example, in the VG `system` and PV `/dev/sda2`, do this with the command `dd if=/dev/zero of=/dev/sda2 bs=512 count=1`.

WARNING: File System for Booting

The file system used for booting (the root file system or `/boot`) must not be stored on an LVM logical volume. Instead, store it on a normal physical partition.

3.7.6 Powertweak Configuration

Powertweak is a SUSE Linux utility for tweaking your system to peak performance by tuning some kernel and hardware configurations. It should be used only by advanced users. After starting it with *Powertweak*, it detects your system settings and lists them in tree form in the left frame of the module. You can also use *Search* to find a configuration variable. Select the option to tweak to display it on the screen along with its directory and settings. To save the settings, click *Finish* then confirm it by clicking *OK*.

3.7.7 Profile Manager

Create, manage, and switch among system configurations with *Profile Management*, the YaST system configuration profile management (SCPM) module. This is especially useful for mobile computers that are used in different locations (in different networks)

and by different users. Nevertheless, this feature is useful even for stationary machines, because it enables the use of various hardware components or test configurations. For more information about SCPM basics and handling, refer to Chapter *System Configuration Profile Management* (↑Reference).

3.7.8 System Services (Runlevel)

SUSE Linux can be operated in several runlevels. By default, the system boots to runlevel 5, which offers multiuser mode, network access, and the graphical user interface (X Window System). The other runlevels offer multiuser mode with network but without X (runlevel 3), multiuser mode without network (runlevel 2), single-user mode (runlevel 1 and S), system halt (runlevel 0), and system reboot (runlevel 6).

The various runlevels are useful if problems are encountered in connection with a particular service (X or network) in a higher runlevel. In this case, the system can be booted to a lower runlevel to repair the service. Many servers operate without a graphical user interface and must be booted in a runlevel without X, such as runlevel 3.

Usually you only need the standard runlevel (5). However, if the graphical user interface freezes at any time, you can restart the X Window system by switching to a text console with Ctrl + Alt + F1, logging in as root, and switching to runlevel 3 with the command `init 3`. This shuts down your X Window System, leaving you with a text console. To restart the graphical system, enter `init 5`.

Configure runlevels and the services that start in them with *System Services*. For more information about the runlevels in SUSE Linux and a description of the YaST runlevel editor, refer to Section "Configuring System Services (Runlevel) with YaST" (Chapter 28, *Booting and Configuring a Linux System*, ↑Reference).

3.7.9 /etc/sysconfig Editor

The directory `/etc/sysconfig` contains the files with the most important settings for SUSE Linux. Use */etc/sysconfig Editor* to modify the values and save them to the individual configuration files. Generally, manual editing is not necessary, because the files are automatically adapted when a package is installed or a service is configured. More information about `/etc/sysconfig` and the YaST sysconfig editor is available in Section "Changing the System Configuration Using the YaST sysconfig Editor" (Chapter 28, *Booting and Configuring a Linux System*, ↑Reference).

3.7.10 Time Zone Selection

The time zone is initially set during installation, but you can change it with *Date and Time*. Also use this to change the current system date and time.

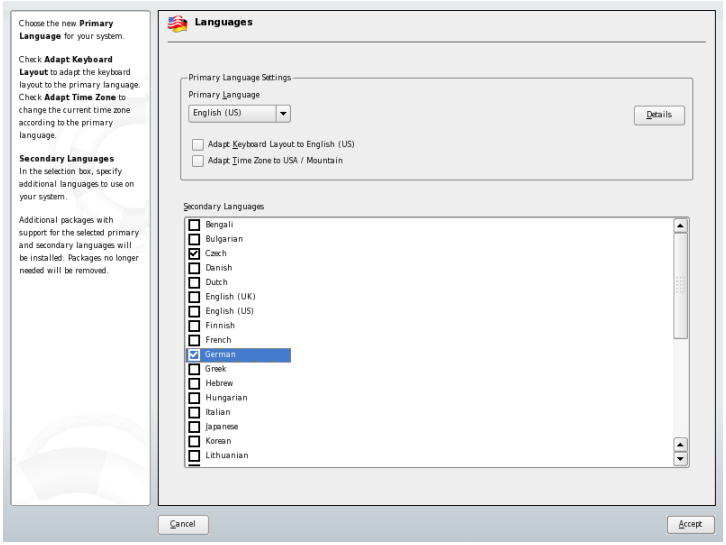
To change the time zone, select the region in the left column and the location or time zone in the right column. With *Hardware Clock Set To*, set whether the system clock should use *Local Time* or *UTC* (Coordinated Universal Time). *UTC* is often used in Linux systems, whereas machines with additional operating systems, such as Microsoft Windows, mostly use local time.

Set the current system time and date with *Change*. In the dialog that opens, modify the time and date by entering new values or adjusting them with the arrow buttons. Press *Apply* to save the changes.

3.7.11 Language

The primary and secondary languages for your Linux system are set during installation. However, they can be changed at any time using *Language*. The primary language set in YaST applies to the entire system, including YaST and the desktop environment. This is the language you expect to use most of the time. Secondary languages are languages that are sometimes needed by users for a variety of purposes, such as desktop language or word processing.

Figure 3.9 *Setting the Language*



Select the main language to use for your system in *Primary Language*. To adjust keyboard or time zone to this setting, enable *Adapt Keyboard Layout* or *Adapt Time Zone*.

Set how locale variables are set for the root user with *Details*. Also use *Details* to set the primary language to a dialect not available in the main list. These settings are written into the file `/etc/sysconfig/language`.

3.8 Miscellaneous

The YaST Control Center has several modules that cannot easily be classified into the first six module groups. They can be used for things like viewing log files and installing drivers from a vendor CD.

3.8.1 Start-Up Log and System Log

View information concerning the start-up of the computer in *Start-Up Log*. See messages for the entire system in *System Log*. This is one of the first places you might want to look when encountering problems with the system or when troubleshooting.

Boot Log

View the boot log `/var/log/boot.msg` that contains the screen messages displayed when the computer starts with *Start-Up Log*. It can help determine if the computer started properly, and if all services and functions were started correctly.

System Log

Use *System Log* to view the system log that keeps track of the operations of your computer in `var/log/messages`. Kernel messages, sorted according to date and time, are also recorded here. View the status of certain system components using the box at the top. The following options are possible from the system log and boot log modules:

/var/log/messages
This is the general system log file. Here, view kernel messages, users logging in as `root`, and other useful information.

/proc/cpuinfo
This displays processor information, including its type, make, model, and performance.

/proc/dma
This shows which DMA channels are currently being used.

/proc/interrupts
This shows which interrupts are in use and how many of each have been in use.

/proc/iomem
This displays the status of input/output memory.

/proc/ioports
This shows which I/O ports are in use at the moment.

/proc/meminfo
This displays memory status.

/proc/modules
This displays the individual modules.

/proc/mounts
This displays devices currently mounted.

/proc/partitions
This shows the partitioning of all hard disks.

/proc/version
This displays the current version of Linux.

/var/log/YaST2/y2log
This displays all YaST log messages.

/var/log/boot.msg
This displays information concerning the start-up of the system.

/var/log/faillog
This displays login failures.

/var/log/warn
This displays all system warnings.

3.8.2 Vendor Driver CD

Install device drivers from a Linux driver CD that contains drivers for SUSE Linux with *Vendor Driver CD*. When installing SUSE Linux from scratch, use this YaST module to load the required drivers from the vendor CD after the installation.

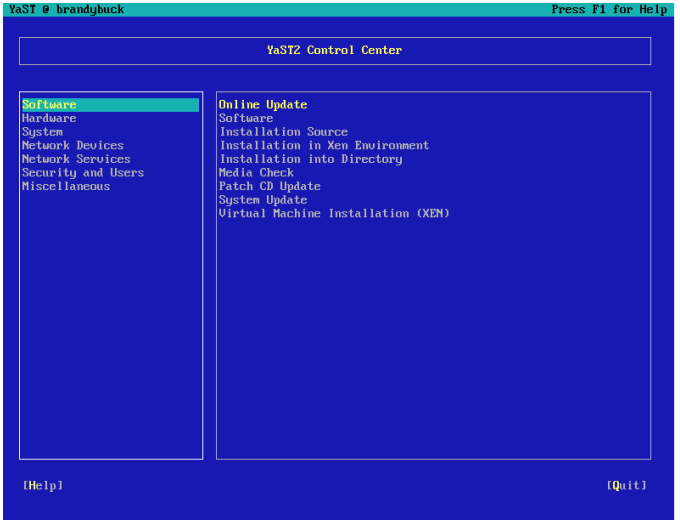
3.9 YaST in Text Mode

This section is mainly intended for system administrators and experts who do not run an X server on their systems and depend on the text-based installation tool. It provides basic information about starting and operating YaST in text mode.

When YaST is started in text mode, the YaST Control Center appears first. See Figure 3.10, "Main Window of YaST in Text Mode" (page 96). The main window consists of three areas. The left frame, which is surrounded by a thick white border, features the categories to which the various modules belong. The active category is indicated by a colored background. The right frame, which is surrounded by a thin white border, pro-

vides an overview of the modules available in the active category. The bottom frame contains the buttons for *Help* and *Exit*.

Figure 3.10 *Main Window of YaST in Text Mode*



When the YaST Control Center is started, the category *Software* is selected automatically. Use ↓ and ↑ to change the category. To start a module from the selected category, press →. The module selection now appears with a thick border. Use ↓ and ↑ to select the desired module. Keep the arrow keys pressed to scroll through the list of available modules. When a module is selected, the module title appears with a colored background and a brief description is displayed in the bottom frame.

Press Enter to start the desired module. Various buttons or selection fields in the module contain a letter with a different color (yellow by default). Use Alt + yellow_letter to select a button directly instead of navigating there with Tab. Exit the YaST Control Center by pressing the *Exit* button or by selecting *Exit* in the category overview and pressing Enter.

3.9.1 Navigation in Modules

The following description of the control elements in the YaST modules assumes that all function keys and Alt key combinations work and are not assigned different global

functions. Read Section 3.9.2, “Restriction of Key Combinations” (page 98) for information about possible exceptions.

Navigation among Buttons and Selection Lists

Use Tab and Alt + Tab or Shift + Tab to navigate among the buttons and the frames containing selection lists.

Navigation in Selection Lists

Use the arrow keys (↑ and ↓) to navigate among the individual elements in an active frame containing a selection list. If individual entries within a frame exceed its width, use Shift + → or Shift + ← to scroll horizontally to the right and left. Alternatively, use Ctrl + E or Ctrl + A. This combination can also be used if using → or ← would result in changing the active frame or the current selection list, as in the Control Center.

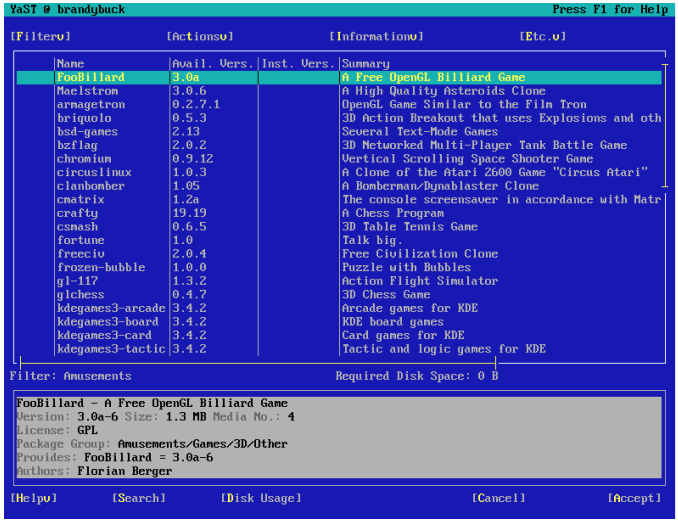
Buttons, Radio Buttons, and Check Boxes

To select buttons with empty square brackets (check boxes) or empty parentheses (radio buttons), press Space or Enter. Alternatively, radio buttons and check boxes can be selected directly with Alt + yellow_letter. In this case, you do not need to confirm with Enter. If you navigate to an item with Tab, press Enter to execute the selected action or activate the respective menu item.

Function Keys

The F keys (F1 to F12) enable quick access to the various buttons. Which function keys are actually mapped to which buttons depends on the active YaST module, because the different modules offer different buttons (Details, Info, Add, Delete, etc.). Use F10 for *OK*, *Next*, and *Finish*. Press F1 to access the YaST help, which shows the functions mapped to the individual F keys.

Figure 3.11 *The Software Installation Module*



3.9.2 Restriction of Key Combinations

If your window manager uses global Alt combinations, the Alt combinations in YaST might not work. Keys like Alt or Shift can also be occupied by the settings of the terminal.

Replacing Alt with Esc

Alt shortcuts can be executed with Esc instead of Alt. For example, Esc + H replaces Alt + H.

Backward and Forward Navigation with Ctrl + F and Ctrl + B

If the Alt and Shift combinations are occupied by the window manager or the terminal, use the combinations Ctrl + F (forward) and Ctrl + B (backward) instead.

Restriction of Function Keys

The F keys are also used for functions. Certain function keys might be occupied by the terminal and may not be available for YaST. However, the Alt key combinations and function keys should always be fully available on a pure text console.

3.9.3 Starting the Individual Modules

To save time, the individual YaST modules can be started directly. To start a module, enter:

```
yast <module_name>
```

View a list of all module names available on your system with `yast -l` or `yast --list`. Start the network module, for example, with `yast lan`.

3.10 Online Update from the Command Line

The behavior of the YaST Online Update can be controlled with command-line parameters. The syntax is `online_update [command-line parameter]`. The possible parameters and their functions are as follows:

`-u URL`
Base URL of the directory tree from which the patches should be downloaded.

`-g`
Only download patches. Do not install.

`-i`
Install downloaded patches. Do not download.

`-k`
Check if new patches are available.

`-c`
Show the current configuration. Do not perform any action.

`-p product`
Product for which patches should be downloaded.

`-v version`
Product version for which patches should be downloaded.

-a architecture
Base architecture of the product for which patches should be downloaded.

-d
Dry run. Download patches and simulate installation (system remains unchanged; for test purposes only).

-n
No signature check of the downloaded files.

-s
Display a list of available patches.

-V
Verbose mode.

-D
Debug mode for experts and for troubleshooting.

-h
Displays the help file.

Using the command-line tool `online_update`, the system can be updated automatically, for example, with scripts. For instance, you may want your system to search a specific server for updates and download the patches and patch information at a specified time in regular intervals. However, you may not want the patches to be installed automatically. Instead, you may want to review the patches and select the patches for installation at a later time.

To use the tool, first configure a cron job that executes the following command:

```
online_update -u <URL> -g <type_specification>
```

`-u` introduces the base URL of the directory tree from which the patches should be downloaded. The supported protocols are `http`, `ftp`, `smb`, `nfs`, `cd`, `dvd`, and `dir`. `-g` downloads the patches to a local directory without installing them. Optionally, filter the patches by specifying the type: `security`, `recommended`, or `optional`. If no filter is specified, online_update downloads all new `security` and `recommended` patches.

The downloaded packages can be installed immediately without reviewing the individual patches. online_update saves the patches in the directory `/var/lib/YaST2/you/mnt`. To install the patches, execute the following command:

```
online_update -u /var/lib/YaST2/you/mnt/ -i
```

The parameter `-u` specifies the local URL of the patches to install. `-i` starts the installation procedure.

To review the downloaded patches prior to the installation, start the YOU dialog:

```
yast online_update .url /var/lib/YaST2/you/mnt/
```

YOU starts and uses the local directory containing the downloaded patches instead of a remote directory on the Internet. Select the patches to install in the same way as packages for installation in the package manager.

For more information about online_update, enter `online_update -h`.

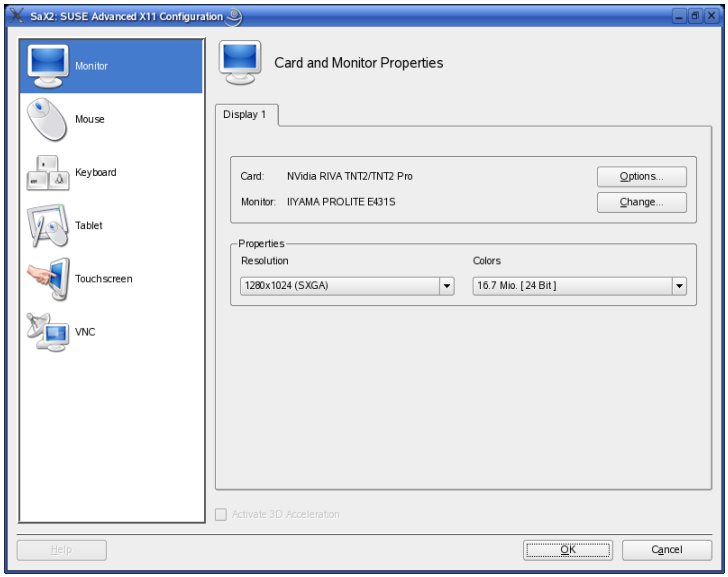
3.11 SaX2

Configure the graphical environment of your system with *Hardware → Graphics Card and Monitor*. This opens the SUSE Advanced X11 Configuration interface (SaX2), where you can configure devices such as your mouse, keyboard, or display devices. This interface can also accessed from the main menu by clicking *System → Configuration → SaX2*.

3.11.1 Card and Monitor Properties

Adjust the settings for your graphics card and display device in *Card and Monitor Properties*. If you have more than one graphics card installed, each device is shown in a separate dialog reachable by a tab. At the top of the dialog, see the current settings for the selected graphics card and the monitor that is attached to it. If more than one screen can be connected to the card (dual head), the monitor on the primary output is shown. Normally, the card and display device are detected automatically by the system. However, you can tune many parameters manually or even change the display device completely.

Figure 3.12 *Card and Monitor Properties*



Graphics Card

It is not possible to change the graphics card because only known models are supported and these are detected automatically. However, you can change many options that affect the behavior of the card. Normally, this should not be necessary because the system already has set them up appropriately during installation. If you are an expert and want to tweak some of the options, click *Options* next to the graphics card and select the option you want to change. To assign a value needed to a certain option, enter this value in the dialog that appears after selecting that option. Click *OK* to close the options dialog.

Monitor

To change the current settings for the monitor, click *Change* next to the monitor. A new dialog opens in which to adjust various monitor-specific settings. This dialog has several tabs for various aspects of monitor operation. Select the first tab to manually select the vendor and model of the display device in two lists. If your monitor is not listed, you can choose one of the VESA or LCD modes that suit your needs or, if you have a vendor driver disk or CD, click *Utility Disk* and follow the instructions on the

screen to use it. Check *Activate DPMS* to use display power management signaling. *Display Size*, with the geometrical properties of the monitor, and *Sync Frequencies*, with the ranges for the horizontal and vertical sync frequencies of your monitor, are normally set up correctly by the system, but you can modify these values manually. After making all adjustments, click *OK* to close this dialog.

WARNING: Changing Monitor Frequencies

Although there are safety mechanisms, you should still be very careful when changing the allowed monitor frequencies manually. Incorrect values might destroy your monitor. You should always refer to the monitor's manual before changing frequencies.

Resolution and Color Depth

The resolution and color depth can be chosen directly from two lists in the middle of the dialog. The resolution you select here marks the highest resolution to use. All common resolutions down to 640x480 are also added to the configuration automatically. Depending on the graphical desktop used, you can switch to any of these later without the need for reconfiguration.

Dual Head

If you have a graphics card with two outputs installed in your computer, you can connect two screens to your system. Two screens that are attached to the same graphics card are referred to as *dual head*. SaX2 automatically detects multiple display devices in the system and prepares the configuration accordingly. To use the dual head mode of a graphics card, check *Activate Dual Head Mode* at the bottom of the dialog and click *Configure* to set the dual head options and the arrangement of the screens in the dual head dialog.

The tabs in the row at the top of the dialog each correspond to a graphics card in your system. Select the card to configure and set its multihead options in the dialog below. In the upper part of the multihead dialog, click *Change* to configure the additional screen. The possible options are the same as for the first screen. Choose the resolution to use for this screen from the list. Select one of three possible multihead modes.

Traditional Multihead
Each monitor represents an individual unit. The mouse pointer can switch between the screens.

Cloned Multihead
In this mode, all monitors display the same contents. The mouse is only visible on the main screen.

Xinerama Multihead
All screens combine to form a single large screen. Program windows can be positioned freely on all screens or scaled to a size that fills more than one monitor.

NOTE

Linux currently does not offer 3D support for Xinerama multihead environments. In this case, SaX2 deactivates the 3D support.

The arrangement of the dual head environment describes the sequence of the individual screens. By default, SaX2 configures a standard layout that follows the sequence of the detected screens, arranging all screens in a row from left to right. In the *Arrangement* part of the dialog, determine the way the monitors are arranged by selecting one of the sequence buttons. Click *OK* to close the dialog.

Multihead

If you have more than one graphics card installed in your computer, you can connect more than one screen to your system. Two or more screens that are attached to different graphics cards are referred to as *multihead*. SaX2 automatically detects multiple graphics cards in the system and prepares the configuration accordingly. By default, SaX2 configures a standard layout that follows the sequence of the detected graphics cards, arranging all screens in a row from left to right. The additional *Arrangement* tab allows for changing this layout manually. Drag the icons representing the individual screens in the grid and click *OK* to close the dialog.

3D Acceleration

If your graphics card supports 3D acceleration, you can switch it on and off with *Activate 3D Acceleration*.

Testing the Configuration

Click *OK* in the main window after completing the configuration of your monitor and your graphics card, then test your settings. This ensures that your configuration is suitable for your devices. If the image is not steady, terminate the test immediately by pressing Ctrl+Alt+Backspace and reduce the refresh rate or the resolution and color depth.

NOTE

Regardless of whether you run a test, all modifications are only activated when you restart the X server.

3.11.2 Mouse Properties

Adjust the settings for your mouse in *Mouse Properties*. If you have more than one mouse with different drivers installed, each driver is shown in a separate tab. Multiple devices operated by the same driver are shown as one mouse. Activate or deactivate the currently selected mouse with the check box at the top of the dialog. Below the check box, see the current settings for that mouse. Normally, the mouse is detected automatically, but you can change it manually if the automatic detection fails. Refer to the documentation for your mouse for a description of the model. Click *Change* to select the vendor and model from two lists then click *OK* to confirm your selection. In the options part of the dialog, set various options for operating your mouse.

Activate 3-Button Emulation
: If your mouse has only two buttons, a third button is emulated when you click both buttons simultaneously.

Activate Mouse Wheel
: Check this box to use a scroll wheel.

Emulate Wheel with Mouse Button
: If your mouse does not have a scroll wheel but you want to use similar functionality, you can assign an additional button for this. Select the button to use. While pressing this button, any movement of the mouse is translated into scroll wheel commands. This feature is especially useful with trackballs.

When you are satisfied with your settings, click *OK* to confirm your changes.

NOTE

Any changes you make here take effect only after you restart the X server.

3.11.3 Keyboard Properties

Use this dialog to adjust the settings for operating your keyboard in the graphical environment. In the upper part of the dialog, select the type, language layout, and variant. Use the test field at the bottom of the dialog to check if special characters are displayed correctly. Select additional layouts and variants to use from the list in the middle. Depending on the type of your desktop, these may be switched in the running system without the need for reconfiguration. After you click *OK*, the changes are applied immediately.

3.11.4 Tablet Properties

Use this dialog to configure a graphics tablet attached to your system. Click the *Graphics Tablet* tab to select vendor and model from the lists. Currently, SUSE Linux supports only a limited number of graphics tablets. To activate the tablet, check *Activate This Tablet* at the top of the dialog.

In the *Port and Mode* dialog, configure the connection to the tablet. SaX2 enables the configuration of graphics tablets connected to the USB port or the serial port. If your tablet is connected to the serial port, verify the port. `/dev/ttyS0` refers to the first serial port. `/dev/ttyS1` refers to the second. Additional ports use similar notation. Choose appropriate *Options* from the list and select the *Primary Tablet Mode* suitable for your needs.

If your graphics tablet supports electronic pens, configure them in *Electronic Pens*. Add eraser and pen and set their properties after clicking *Properties*.

When you are satisfied with the settings, click *OK* to confirm your changes.

3.11.5 Touchscreen Properties

Use this dialog to configure touchscreens attached to your system. If you have more than one touchscreen installed, each device is shown in a separate dialog reachable by

a tab. To activate the currently selected touchscreen, check *Assign a Touchscreen to Display* at the top of the dialog. Select vendor and model from the lists below and set an appropriate *Connection Port* at the bottom. You can configure touchscreens connected to the USB port or the serial port. If your touchscreen is connected to the serial port, verify the port. `/dev/ttyS0` refers to the first serial port. `/dev/ttyS1` refers to the second. Additional ports use similar notation. When you are satisfied with your settings, click *OK* to confirm your changes.

3.11.6 Remote Access Properties

VNC (*Virtual Network Computing*) is a client-server solution that gives access a remote X server with a slim and easy-to-use client. This client is available for a variety of operating systems, including Microsoft Windows, Apple's MacOS, and Linux. Find additional information about VNC at `http://www.realvnc.com/`.

Use this dialog to configure your X server as a host for VNC sessions. If you want VNC clients to connect to your X server, check *Allow Access to Display Using VNC Protocol*. Set a password to restrict access to your VNC-enabled X server. Check *Allow Multiple VNC Connections* if more than one VNC client should connect to the X server at the same time. Allow HTTP access by checking *Activate HTTP Access* and setting the port to be use in *HTTP Port*.

When you are satisfied with your settings, click *OK* to save your changes.

Part II Basics

4 First Contact

This chapter guides you through the first encounter with your freshly installed Linux system. Learn all about the different components of your system environment. After this crash course, you will be able to use and enjoy your SUSE Linux system.

This chapter focuses on the installed system. It does not cover questions regarding the installation or hardware configuration procedures under SUSE Linux. These procedures are covered in-depth in the *Reference* manual and some of the most frequently encountered problems are dealt with in Chapter 9, *Common Problems and Their Solutions* (page 223).

4.1 Logging In and Out

If your computer is not run in a networking environment and you are the only person using it, your system automatically boots into the desktop environment. Once you have started your computer, there is no need for you to authenticate. This feature, called *auto login*, is only provided by the KDM display manager, however. It can be disabled at any time using the YaST user management module described in the *Reference* manual.

If more than one user account is configured on your computer, all users must authenticate. After your SUSE Linux system has started, you are prompted for your username and password.

Depending on the desktop environment installed, the program managing the login process and sessions is either GDM for GNOME desktops or KDM for KDE. GDM and KDM differ slightly in functionality, which is why they are treated separately. See

Section 4.3, “Desktop” (page 114) for details on the desktop environments or refer to the separate GNOME or KDE chapters, Chapter 8, *The GNOME Desktop* (page 201) or Chapter 7, *The KDE Desktop* (page 173), respectively.

4.1.1 Introducing GDM

A GDM login screen consists of two main components, the input fields for username and password and a menu.

The menu contains three items:

Language
Select the language to use in the following GNOME session. You may change the language temporarily for just the next session or set the choice permanently as your default.

Session

Determine the session type (GNOME, KDE, etc.). Change this setting only if you want to use something other than the system default. Future sessions will always be of the same type as the initial one, unless you change the session type manually.

Shutdown
Shut down the system entirely.

Reboot
Shut down the system and reboot.

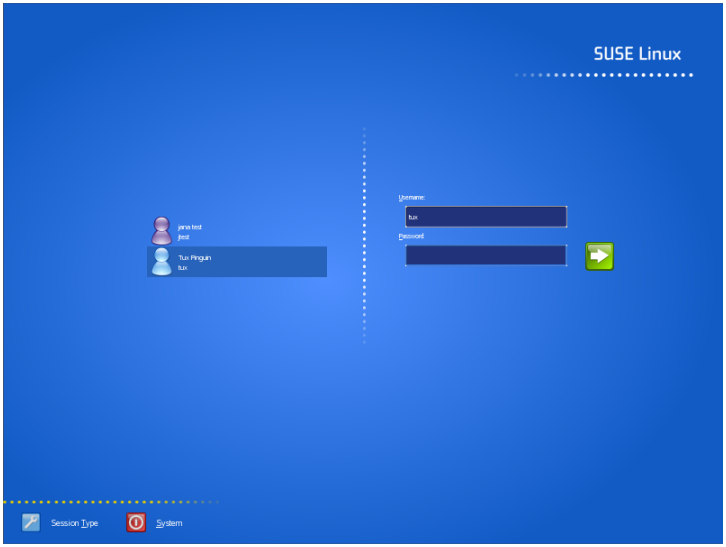
To terminate the session, choose *Log Out* from the *System* menu. Then determine whether to save the current state of your session, end your session and leave the system running, or restart or shut down on logout. Choose to save your session if you want to start your next one with exactly the same setup as when you leave.

4.1.2 Introducing KDM

A KDM login screen consists of two main elements. As shown in Figure 4.1, “A KDM Login Screen” (page 113), it has input fields for username and password and a menu.

The menu provides the following options:

Figure 4.1 *A KDM Login Screen*



Session Type

Determine the session type. Make changes only if you want to use a session type other than the default (KDE). Future sessions are automatically of the same type unless you change the session type manually.

Menu

Remote Login enables you to log in on a remote machine. *Shutdown* either turns the computer off completely or reboots the system.

To terminate the session, choose *Logout* from the main menu. Then determine whether to end your session and leave the system running or restart or shut down on logout. If your system provides power management, you are offered to suspend the computer, making the next system start much faster than a complete boot.

4.2 The User Concept of Linux

Linux distinguishes between “ordinary” users and a superuser. The superuser, called `root`, takes care of all kinds of administrative tasks and has access to all parts of the system. Normal users lack these privileges.

All users including the superuser have their own home directories where all private data, like documents, bookmarks, or e-mail, are stored. Write access to these home directories is strictly limited to the owner. Folders in a home directory holding sensitive data can also be protected against read access by other users. System directories holding central configuration files or executable files can only be modified by the superuser. For more information about the Linux permission and user concept, refer to Section “Users and Access Permissions” (Chapter 27, *Working with the Shell*, ↑Reference).

While this concept may not look very appealing at first, it adds to security. A user without `root` privileges cannot damage the entire system. Any damage caused is strictly limited to the user's own account and data. Any operation executed with `root` privileges may potentially harm the entire system. Anyone intending to harm a running Linux system must gain `root` privileges first. This is why it is much harder to create viruses for Linux systems. They must overcome the root barrier first.

As well as offering different user identities for administrators and normal users, Linux supports multiple users working on one machine simultaneously. These users can connect to the system via different terminals or network connections.

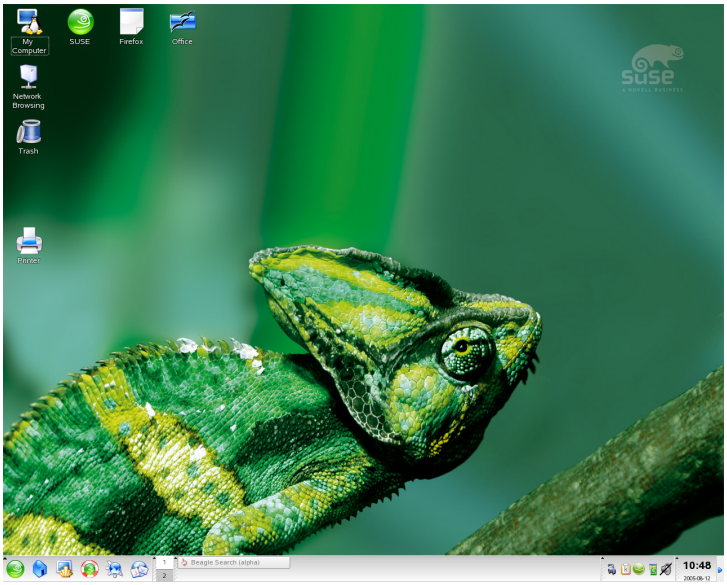
4.3 Desktop

SUSE Linux offers several choices for your desktop. GNOME and KDE, the most common desktops, provide features and functions similar to those of the desktop used in Microsoft Windows or Mac OS. This section introduces their most important features and helps you to get accustomed to your new desktop environment.

4.3.1 Desktop Terminology

The following list introduces some terms often used in a desktop context, regardless of the base system. However, some of them have different meanings in different desktop environments or are even limited to one environment.

Figure 4.2 *An Example Desktop*



desktop

The desktop is your primary work environment. It fills the screen, but is more than just a background. Put icons of your most frequently used applications or objects on the desktop for easy access.

panel

The panel is a bar, typically located at the top or the bottom of the screen, that holds the menus, the quick launch area, a notification area or system tray, some little helper applications, and, in most cases, also the taskbar (called window list in GNOME). It is designed to provide all vital information needed about running applications or the system and to provide easy access to some important functions or applications. Both GNOME and KDE allow you to adjust the panel orientation (horizontal versus vertical) to your needs. In a KDE environment, you might also see “Kicker” as another word for the panel.

menu button

Similar to the “start button” on the MS Windows desktop, Linux desktops normally contain a menu button at the left end of the panel that opens the main menu. This menu has a well-ordered structure for accessing the main applications or functions, such as *Search*, *Logout*, and *Lock Session*.

taskbar or window list

The taskbar (window list in GNOME) is used to switch between different open windows. In Linux, it also provides an overview of all virtual desktops available and provides a means to switch between them. The taskbar is part of the panel.

quick launcher

The quick launcher is part of the panel. It holds the icons for the most important functions or applications to enable you to start them without going through the application menu.

notification area or system tray

The rightmost part of the panel holds the system clock, the volume control, and several other helper applications.

applet

An applet is a small application that is integrated into the panel. An application is a fully fledged computer program using its own window on screen.

desktop icons

Desktop icons reside on the desktop. They represent files, directories, applications or functions, and removable media, like CDs or DVDs. The best known desktop icon is probably the trash bin, where you can drop files to delete.

virtual desktops or workspaces

The concept of virtual desktops (workspaces in GNOME) is like having several desks at your office. You store things on all of them, but you only work at one of them at a time. You can devote each to different tasks or just use them as extra space. Virtual desktops enable you to have multiple windows open at the same time, but only look at one or some of them. Easily shift windows between virtual desktops, like shifting papers from one physical desk to another. All desktop environments offer a means to control the number and use of virtual desktops. A workspace switcher is provided in both the GNOME and the KDE panel.

terminal

A terminal enables you to send commands to the operating system. There are “real” (physical) terminals basically consisting of a display screen and a keyboard connected to the computer. Then there are terminal emulations, which run in a window on your desktop and offer a prompt where you can pass commands to the operating system.

session

Once you log in to your desktop, it starts a session for you. This session is valid until you log out again. A session includes the start-up and shutdown of certain programs on login and logout. These settings can be configured individually for each user account.

4.3.2 Configuring Desktop Components

Almost all desktop components can be configured individually. Right-clicking an element opens its context menu. To illustrate the procedure, we provide some examples.

TIP: Controlling the Desktop Configuration

Both GNOME and KDE feature a Control Center providing central access to all key configuration options of the desktop environment. Refer to Chapter 8, *The GNOME Desktop* (page 201) or Chapter 7, *The KDE Desktop* (page 173) for details.

Configuring GNOME Desktop Components

Procedure 4.1 *Adding a New Application to the Quick Launch Area*

1. Right-click an empty patch of the panel where you want to add the new application.
2. Choose *Add to Panel* from the menu that appears.
3. Select *Application Launcher* from the *Add to Panel* menu.
4. Select the application from the *Applications* menu and quit the configuration.

Procedure 4.2 *Changing the Desktop Background*

1. Right-click the desktop.
2. Choose *Change Desktop Background* from the menu that appears.
3. A dialog box appears, offering several options concerning the desktop. Either use the mouse cursor to select one of the existing wallpapers or click *Add Wall-*

paper to open a file dialog where you can add your own image. Use *Style* to determine how the image should be rendered to fit into the dimensions of your display. Use *Remove* to remove a selected background from the menu. If you prefer no background image at all, set a desktop color.

4 Your changes are applied automatically. Leave the dialog with *Close*.

Procedure 4.3 *Creating a New Desktop Icon*

1 Add a new application or service icon (called "Launcher" in GNOME):

   a Right-click the desktop to open the context menu.

   b Select *Create Launcher* to open the appropriate dialog.

   c Enter *Name*, *Generic Name*, an optional *Comment*, and the *Command* to execute. Determine whether the application should be run in a terminal and verify that *Type* is set to the appropriate value, which is *Application* for commands.

   d Apply your settings and leave the dialog with *OK*.

2 Add a new folder or document:

   a Right-click the desktop to open the context menu.

   b Select *Create Folder* or *Create Document* to add the new item to the desktop.

   c Right-click the new desktop icon and select *Properties*.

   d Enter the name of the new object in the *Basic* tab. Select an appropriate icon via the *Emblems* tab. Determine the file system permissions assigned to this object using the *Permissions* tab. Finally, select the preferred application for opening this document via the *Open With* tab. Read more about file system permissions in Section "Users and Access Permissions" (Chapter 27, *Working with the Shell*, ↑Reference).

   e Close the *Properties* dialog to apply your changes.

Configuring KDE Desktop Components

Procedure 4.4 *Adding a New Application to the Quick Launch Area*

1. Right-click an empty patch of the panel where you want to add the new application.
2. Choose *Add to Panel* → *Application* from the menu that appears.
3. Select the application from one of the categories of the submenu.

Procedure 4.5 *Changing the Desktop Background*

1. Right-click the desktop.
2. Choose *Configure Desktop*. A dialog opens that allows the modification of the desktop settings *Background*, *Behavior*, *Multiple Desktops*, *Screen Saver*, and *Display*.
3. Choose *Background* and determine whether your settings should be applied to one specific desktop or to all. Select a background image, disable background images, or start a slide show. *Options* offers several settings for the positioning of the background image, the background color, and the blending of colored backgrounds.
4. Apply your changes and leave the dialog with *OK*.

Procedure 4.6 *Creating a New Desktop Icon*

1. Add a new folder icon:
   - **a** Right-click the desktop to open the context menu.
   - **b** Select *Create New* → *Folder*.
   - **c** Enter the name of the new folder when prompted to do so.
   - **d** Right-click the new icon and select *Properties* in the context menu that appears.

e The *Properties* dialog consists of four tabs: *General*, *Permissions*, *Meta Info*, and *Share*. The name and icon of the folder are set in the *General* tab. Permissions are modified in *Permissions*. *Meta Info* lists the size and number of items of the new folder. *Share* can be used to configure file sharing using NFS or Samba. For more information about these two protocols, refer to *Reference*.

f Apply your changes and leave the dialog with *OK*.

2 Add a new file icon:

a Right-click the desktop for the context menu to appear.

b Select *Create New*.

c Choose the appropriate file type from *HTML File*, *Link to Application*, *Link to Location*, or *Text File*.

d Enter the name of the new file when prompted to do so.

e Right-click the new icon and select *Properties* in the context menu that appears.

f The *Properties* dialog consists of three tabs: *General*, *Permissions*, and *Meta Info*. Set the name and icon of the file in the *General* tab. Change permissions in *Permissions*. *Meta Info* lists line, word, and character count and the format of the new file.

g Apply your changes and leave the dialog with *OK*.

3 Add a new device icon:

a Right-click the desktop to open the context menu.

b Select *Create New* → *Link to Device*.

c Choose the appropriate device type to open the *Properties* dialog.

d The *Properties* dialog consists of four tabs: *General*, *Permissions*, *Device*, and *Meta Info*. Set the name and icon of the device in the *General* tab. Modify permissions in *Permissions*. *Device* is used to set the device path, such as `/media/dvd` for your DVD drive, and several other options.

e Apply your changes and leave the dialog with *OK*.

4.3.3 Little Helpers

Both GNOME and KDE come with numerous little helper applications that can be included in your panel. To add new ones or remove existing ones, proceed as described in Section 4.3.2, "Configuring Desktop Components" (page 117). Some of the most useful and prominent ones are:

SuSEWatcher

SUSEWatcher is a program that is integrated into the system tray of the panel. It checks for new software updates. To be able to find any new updates, it requires an appropriate network connection. The status of SUSEWatcher is displayed in the panel by icons in different colors.

When you click the icon in the panel, a window opens, informing you about the status of your online updates and the availability of any new updates. You can also launch the check manually by clicking *Check for Updates*. Start the online update by selecting *Start Online Update* and entering the root password. The YaST Online Update window is displayed.

SUSE Hardware Tool

The SUSE Hardware Tool keeps a list of all hardware components of your system. Left-click the panel icon to open a dialog window with a tree view featuring the major hardware categories. Configure a new hardware item by selecting it and clicking *Configure*, which starts the appropriate YaST module after you provide the `root` password. Clicking *Details* reveals all information present for the specific hardware item. As soon as new hardware is connected and recognized, a pop-up announces this new hardware.

Beagle

Beagle is a little search tool tailored for the GNOME desktop that indexes and searches your personal information space, including e-mail messages, chat logs,

and many other items. Find out more on Beagle in Chapter *Using Beagle* (↑Reference).

KRandRTray

KRandRTray allows you to adjust the screen resolution and refresh rate on the KDE desktop. All options displayed are supported by your current hardware configuration. To change to another resolution, click the tray icon, select the new resolution, and confirm the new setting when prompted to do so. With *Configure Display*, change *Size & Orientation*, *Monitor Gamma*, and *Power Control* of your display, if your current hardware configuration provides the option to change these settings.

Resolution Switcher

Resolution Switcher adjusts screen resolution and refresh rate of your display on the GNOME desktop. Click the panel icon and select an appropriate resolution and refresh rate for your purposes. The options displayed by Resolution Switcher are all supported by your current display configuration. To change your display configuration, click the panel icon to open the menu and select *Configure Display Settings*. Provide the root password and change the hardware configuration if needed.

4.3.4 Switching Users

Both GDM and KDM allow you to switch between different user accounts on the same system. You can stay logged in while other users work on your system. Your session is locked while you switch to another account, but your applications continue to run and your whole session remains unchanged.

Switching Users in GNOME

To open an additional session for another user, select *New Login* from the GNOME *Applications* menu. The other user enters username and password in GDM then another GNOME session starts. Your original session is locked automatically on the user switch. To change back into your original session, use Ctrl + Alt + F7.

IMPORTANT: Switching Displays

Your original session is started on the graphical console that can be reached with Ctrl + Alt + F7. Additional sessions are started on the higher consoles, reachable with F8 and higher.

Switching Users in KDE

Open an additional session in KDE from the main menu. Select *Switch User* and determine whether your original session should be locked while you switch to another user account. KDM appears, requesting username and password for the new account. Enter the requested data and a new KDE session starts. To switch back to your original session, click *Switch User* again. Select the session to which to switch.

Another way to start a new session is to lock your current session via *Lock Session* then click *Switch User* in the unlock dialog. This goes to the KDM login screen, where username and password for the new session can be entered.

4.4 File Management

A central part of your desktop environment is a file manager application, enabling you easily to create, access, and manage all files on your system. Traditional file management in Linux would have been done via the command line, requiring some deeper knowledge of several commands to list, create, delete, or edit files and their properties. A file manager provides a graphical and more intuitive way to handle these tasks. Learn more about the file managers of GNOME and KDE in Section 8.2, "File Management with Nautilus" (page 205) and Section 7.2, "Konqueror as a File Manager" (page 176).

4.4.1 The Concept behind a Linux File System

Unlike a Windows operating system, Linux does not use drive letters. In Windows, you would address the floppy drive as `A:\`, Windows system data is under `C:\`, and so on. In Linux, all files and directories are located in a tree-like structure. The topmost directory is referred to as the file system root or just `/`. All other directories can be accessed from here.

The following is a short guide through the Linux file system tree, introducing the most important directories:

/home/*username*

`/home` holds the private data of every user who has an account on your system. The files located here can only be modified by their owner or the system administrator. Your e-mail directory is located here, for example.

/media

`/media` generally holds any type of drive except the hard drive of your system. Your USB flash drive appears under `/media` once you have connected it, as do your digital camera (if it uses USB) and DVD or CD drive.

/usr/share/doc

Under `/usr/share/doc`, find any kind of documentation on your Linux system and the installed packages. The `manual` subdirectory holds a digital copy of this manual as well as the *Reference* manual and the release notes of the installed version of SUSE Linux. The `packages` directory holds the documentation included in the software packages.

/windows

If you have both MS Windows and Linux installed on your system, this is where you find the MS Windows data.

Learn more about the Linux file system concept and find a more comprehensive list of directories in Section "Files and Directories" (Chapter 27, *Working with the Shell*, ↑Reference).

4.4.2 Different Flavors of Your File Manager

Apart from organizing all your data and previewing almost any type of file, your file manager can act as a "quick finder" for personal data, system information, and network services. These modules are part of your standard desktop.

Home Directory

Use the *Home* desktop icon in GNOME or the icon depicting a small house in the KDE panel to launch your file manager (Nautilus in GNOME, Konqueror in KDE) showing all the contents of your home directory. This option allows you to quickly retrieve any personal data located in your home directory.

Your System

If you need to know which hard drives or removable media are connected to your system, click the desktop icons *Computer* (GNOME) or *My Computer* (KDE). The file managers provide an overview of all drives attached to your system, including the hard drives. As you click one of the drives listed there, the file manager opens the files and directories located on this drive. This option allows you to locate data on any kind of removable device attached to your system. A digital camera appears in this list as does a USB flash or hard drive.

Your Network

Use the *Places* menu in the top GNOME panel to access network folders. In KDE, click the *Network Browsing* desktop icon to gather all services provided in your network. Use this functionality to access available network shares and Windows networks, FTP servers, or any other service type that has been registered for your network.

4.4.3 Searching Files

If you need to search for a certain file across the whole system, use the graphical search applications provided by your desktop environment. In GNOME, select *Places* → *Search for Files* to launch the search tool. The first dialog prompts you for the name or at least a part of the name of the file. Specify the directory to search for the file. If you know the file should be located in your home directory, accept the `/home/username` path that has automatically been selected. To launch a search on the entire file system, select the file system root by entering `/`. Refine your search by adding more search criteria. Click *Show more options* and select any of the criteria offered there. It is even possible to use regular expressions or wild cards. After you enter all data, hit *Find* to launch the search and see the result in the bottom part of the window. Depending on the scope of your search, the whole process may take a considerable amount of time.

KDE contains the application KFind, which is launched from the main menu with *Find Files*. The search window is divided into the tabs *Name/Location*, *Contents*, and *Properties*. In the *Name/Location* tab, enter the name of the file using wild cards, like asterisks or question marks, if needed. Enter the path to search and determine whether the search should include subfolders or be case sensitive. The *Contents* tab is used to search the contents of files for certain expressions. This type of search is only supported for a limited number of file types, such as text files and OpenOffice.org or KWord formats. You can even use regular expressions if KRegExpEditor is installed (package

`kdeutils3-extra`). To limit the scope of the search by providing attributes like file owner, file size, or modification date, use the *Properties* tab.

TIP: More Information about Search Patterns

For more information about search patterns and the use of wild cards or regular expressions, refer to Section "Using of Bash on the Command Line" (Chapter 27, *Working with the Shell*, ↑Reference).

4.5 Applications

SUSE Linux comes with a wealth of applications. There is a Linux option for almost any purpose. Quite often, you even find more than one suitable application for your purpose. Chapter 5, *Getting to Know Linux Software* (page 137) provides a comprehensive list of applications you might look for when converting from MS Windows. There, easily find the Linux analog of your MS Windows application.

There are three different ways to launch an application in Linux. The easiest and most prominent one is the main menu of your desktop environment. Click at the leftmost edge of the panel to fold out the menu. Select the appropriate category to fold out a submenu holding the actual application names and icons.

Some applications do not appear in the main menu even though they are installed. To launch one of them, open the main menu then select *Run Application* (GNOME) or *Run Command* (KDE) and enter the name of the application in lowercase letters. Alternatively, start this dialog using Alt + F2. The third way to launch an application is to open a shell and enter the command at the shell prompt, also known as command line.

TIP: Missing Applications

If an application could not be started from the menu or the command line, you need to install it from your SUSE Linux CD or DVD.

4.6 Printing

Printers can either be connected to your system locally or via a network. Either kind of configuration is made initially using YaST. For an in-depth coverage of printer configuration, refer to the printer chapter in the *Reference* manual. As soon as a connection has been established, start using the printer. Both desktops provide applications enabling you to monitor and edit the print jobs queued at the selected printer.

4.6.1 Managing Print Jobs in GNOME

When you send a print job to the printer, such as printing a document from OpenOffice.org or printing an image from The GIMP, the print job is added to the print spool queue. The print spool queue is a list of print jobs that have been sent to the printer along with information about each print job, such as the status of the job, the username of the person who sent the job, the name of the print job, and the job number.

To manage print jobs in GNOME, start the Cups Manager from the command line with `gnome-cups-manager` or by clicking *Applications* → *Utilities* → *Printing* → *Printers*. A window opens showing any printers attached to your system. Double-click the icon representing the printer you want to monitor. This opens a window holding the list of print jobs. See Figure 4.3, "Managing Print Jobs with GNOME Cups Manager" (page 127).

Figure 4.3 *Managing Print Jobs with GNOME Cups Manager*

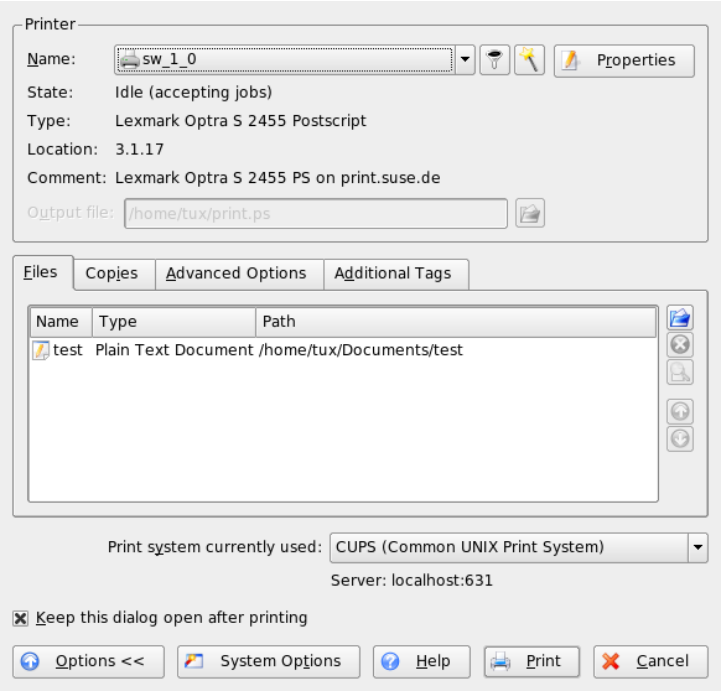
The menu bar of the jobs window contains two menus, *Printer* and *Edit*. Use the *Printer* menu to pause the current print job, print a test page, or modify the print properties (such as paper size and orientation, printout mode, and resolution). The *Edit* menu allows you to pause, resume, or remove any selected job that is not yet printing.

4.6.2 Managing Print Jobs in KDE

To control print jobs in KDE, use two different applications. Start and configure the print job with KPrinter then control the processing of the print job with KJobViewer.

Start KPrinter with the command `kprinter` from the command line. A small window opens in which to choose a printer and edit the *Properties* of your print job, such as page orientation, pages per sheet, and duplex printing. To specify the file to print, the number of copies, and various other options, click *Expand* at the bottom left. The window then expands and shows four tabs: *Files*, *Copies*, *Advanced Options*, and *Additional Tags*. See Figure 4.4, "Starting a Print Job with KPrinter" (page 128).

Figure 4.4 *Starting a Print Job with KPrinter*



The first tab, *Files*, determines the file or files to print. Either drag them from the desktop and drop them into the list window or use the file dialog to locate them. *Copies* determines the page selection (all pages of the selected document, the currently selected one, or a range) and the number of copies. You may also choose to print only the even

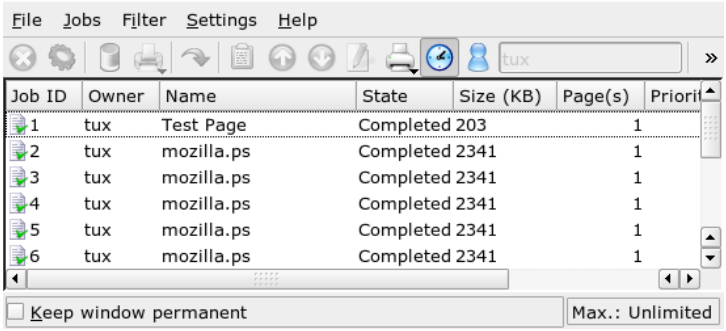
or only the odd numbered pages of the selected document. Use *Advanced Options* to specify any additional information for the print job. Enter any *Billing information* if needed or set a custom page label at the top and bottom of the page. The *Job Priority* can also be set here. The fourth tab, *Additional Tags* is hardly ever needed. Once your print job has been filed, you can watch its progress using KJobViewer.

TIP: Printing from KDE Applications

The KPrinter dialog opens any time you print from a KDE application. The dialog is basically the same except for the lack of the *Files* tab, which is not needed because the file to print was determined when you selected *Print*.

Start KJobViewer from the main menu or with the command `kjobviewer` from the command line. A window like that in Figure 4.5, "Managing Print Jobs with KJobViewer" (page 129) opens, listing all the print jobs queued on your printer. As long as your print job is not active, you can edit it. Do this using the entries of the *Jobs* menu.

Figure 4.5 *Managing Print Jobs with KJobViewer*



If, for example, you want to check if you sent the correct document to the printer, you can stop the job and resume it if you decide to print it. Remove your own print jobs from the queue with *Remove*. To change the printer, select a different printer with *Move to Printer*.

With *Restart*, reprint a document. To do this, select *Filter* → *Toggle Completed Jobs*, select the desired document, and click *Jobs* → *Restart*. Clicking *Jobs* → *Job IPP Report* reveals the technical details of a job. Use *Jobs* → *Increase Priority* and *Jobs* → *Decrease Priority* to set the priority, depending on how quickly you need the document.

Filter enables you to switch between various printers, toggle completed jobs, and limit the view to your own print jobs by selecting *Show Only User Jobs*. The current user is then displayed in the top right field.

Settings → *Configure KJobViewer* opens a configuration dialog. Here, determine the maximum number of print jobs to display. Enter a number in the field or use the slider to the right to determine a value. Press *OK* to save the setting or *Cancel* to exit the dialog without saving.

The icons in the toolbar correspond to the functions you can access by way of the menu. A help text explaining the function is displayed when you move the mouse pointer over one of the icons.

The job list consists of eight columns. The job ID is automatically assigned by the print system to identify the various jobs. The next column contains the login of the user who sent the job followed by the filename of the document. The status column indicates whether a job is still in the queue, currently being printed, or already completed. Next, the size of the document is displayed in kilobytes and number of pages. The default priority of 50 can be increased or reduced if necessary. Billing information can be cost centers or other company-specific information. If you right-click a job in the list, the *Jobs* menu opens under the mouse pointer, allowing you to select an action. Only a few functions are available for completed jobs. If you activate *Keep window permanent*, KJobViewer opens automatically when you log in the next time.

4.7 Security

If converting to a Linux system from a Microsoft Windows system, you probably experienced a fair share of trouble caused by multiple kinds of viruses and worms spreading over the Internet via e-mail. Now that you have made the switch to Linux, you can at least put that fear aside, because these cannot harm a Linux system as easily as a Windows system.

As mentioned in Section 4.2, “The User Concept of Linux” (page 113), Linux knows two different kinds of users, a superuser (`root`) and normal users. `root` has access to all system resources and is allowed to change all aspects of the system's configuration. Switching from your normal user account to `root` for administrative tasks and switching back for your normal work sounds tedious and perhaps unnecessary because `root` has ultimate power over the system. Still, switching back to the normal user account after accomplishing the administrative jobs adds to security, because any mistake

made as `root` can have severe consequences. The whole system might be affected, not just the normal user account. Thus, preserve your system's integrity by clearly distinguishing between the different roles (“normal user” and “superuser”).

Keeping your system up to date by always applying the software updates provided by SUSE adds to the security of your system. These updates fix possible exploits contained in the application code.

Protect your system or your network against external “visitors” by running a firewall. A preconfigured firewall is started on installation, providing maximum security to your network. If you need to add support for certain services and do not maintain your system yourself, ask your system administrator to make the necessary adjustments in the firewall settings. Otherwise read the chapter about security in the *Reference* manual and learn how to secure your network using SuSEFirewall.

4.8 Networking and Mobility

GNOME and KDE offer several applications for working in a network environment or using a mobile computer. It is much more convenient and much easier to click a small icon to connect to or disconnect from a network than to run a script manually. Monitoring the power state of your mobile computer via a small icon is easier than watching obscure system messages. The following sections introduce some of these little helpers, but many more are offered by your desktop environment.

4.8.1 Networking

Network connections, even wireless ones, can be easily configured and monitored by small applications seamlessly integrating into your desktop panel. KInternet can be used to configure and monitor any kind of network connection on the KDE desktop. Netapplet serves the same purpose in a GNOME desktop environment.

IMPORTANT: Network Configuration

The initial configuration of any network connection is made with YaST, the SUSE Linux configuration management tool. Find information about this in the *Reference* manual.

KInternet—Connecting to the Internet

After your network device has been configured correctly, control the Internet dial-up with KInternet. On start-up, KDE loads KInternet. The program checks whether an Internet connection can be established. If this is possible, the application icon, a plug, automatically appears in the right part of the KDE panel. Depending on the state of the network connection, the panel icon changes appearance:

Currently there is no connection to the Internet.

The connection is just being established or terminated.

The connection has been established.

Data is transmitted to or from the Internet.

An error has occurred. If a connection has already been configured with YaST, use *View Log* to identify the reason for the error. The menu can be accessed by right-clicking the KInternet icon.

The connection is not yet active, but will be established as soon as a request is made.

Right-click the KInternet panel icon to access its configuration menu. The YaST configuration dialog can be started via *Settings* → *Configure with YaST*. After entering the root password, YaST starts. Depending on the access type, start the modem, ISDN, network, or DSL configuration of YaST.

If you are using an ISDN connection and you have selected *Channel Bundling* in YaST, a second ISDN channel can be added to an existing connection with *Add link*. This doubles the transfer rate (although at a higher price). Activate channel bundling if you

need to download large files. The activated channel bundling is evident from the red plus symbol at the top left corner of the KInternet icon.

If your computer has more than one network device and you have configured all of them with YaST, you can use the KInternet option *Interface* to switch between these interfaces. You must have selected *User Controlled* device activation in the appropriate YaST network dialog to do this. If you have multiple providers as well, choose them using *Provider* in KInternet. Providers are also set in YaST.

Users who want to establish Internet connections automatically can use *dial on demand* (DoD). If this mode is selected, KInternet automatically connects to your Internet service provider (ISP) as soon as a request is submitted. After a certain time-out, the connection is terminated. A DoD connection is evident from the blue D at the bottom right corner of the KInternet icon.

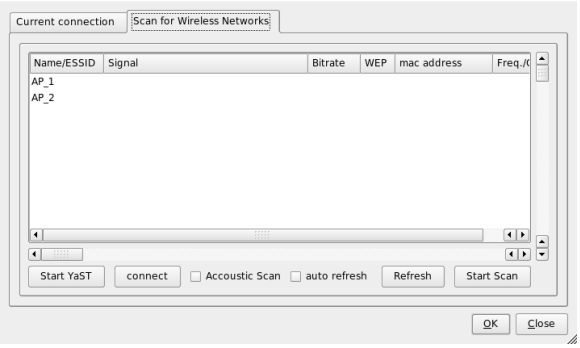
WARNING: Cost Control

Note that DoD only makes sense if you have a flat rate Internet account. If that is not the case, connecting and disconnecting all the time can become very costly.

If you intend to use a wireless network card as your connection to the Internet, configure it using YaST as described in the *Reference* manual and make sure that the device activation in YaST is set to *User Controlled*. As soon as the interface is configured, you can use KInternet to control your wireless network connection, just as you would for normal network interfaces.

To access the WLAN functionality of KInternet, right-click the icon to open the menu. Select *Wireless Connection* and a window showing two tabs opens. First, scan for suitable wireless networks you could connect to. Select the tab *Scan for Wireless Networks*, shown in Figure 4.6, “KInternet: Scanning for Wireless Networks” (page 134).

Figure 4.6 *KInternet: Scanning for Wireless Networks*



Start the scan with *Start Scan*. For KInternet to continuously scan the network environment, also select *Auto Refresh*. Acoustic feedback for each connection found can be activated via *Acoustic Scan*. Any connection found is displayed in the list window. Select one and click *Connect* to connect to the selected network. If additional configuration efforts are needed to connect to the selected network, click *Start YaST* to launch the YaST network module for wireless network devices.

The *Current Connection* tab allows you to monitor the state of your current wireless connection. The left-hand view of this tab offers a summary of all connection parameters regarding network address and ESSID, signal quality, signal and noise level, channel frequency and speed, and encryption parameters, such as type of encryption and key length. Select any of these parameters in the tree structure and check the details displayed in the right part of the window.

Netapplet—Managing Your Internet Connections

Netapplet allows you to easily monitor and switch network connections available on your computer including wireless connections. Once the initial configuration of the network interfaces is done with YaST, Netapplet controls your Internet connectivity.

A typical Netapplet menu contains the following items that are displayed when you click the panel icon:

Network Connections

Depending on the hardware configuration of your machine, all sorts of possible network interfaces can appear in this area: dial-up, wireless, and ethernet.

Wireless Connections

If your machine is currently configured to use wireless networking, this area displays the currently configured ESSID in YaST. Clicking *Other* allows you to configure another ESSID temporarily, which comes in handy if you use your laptop in several different environments. These temporary settings are overwritten with the default configured in YaST when the computer is restarted.

Connection Information

This option shows the connection parameters of your currently selected connection (IP address, routing information, etc.).

Configure Network Settings

Use this option to configure additional network hardware using the YaST network modules.

Remove From Panel

If Netapplet is not needed any more or you prefer not to use it for controlling your network connectivity, remove the applet from your panel.

4.8.2 Mobile Computing

Working on a mobile computer requires a great deal of flexibility in adjusting to changing network and system environments. SUSE Linux offers small helpers, like GNOME Battery Charge Monitor, KPowersave, and Profile Chooser, which assist you in adjusting the power management scheme and the system configuration of your computer.

TIP: More Information about Mobile Computing

Refer to the *Reference* manual to learn more about mobile computing under SUSE Linux. Get an introduction to the software components involved and learn how to configure your mobile devices for maximum flexibility.

Power Management

Successfully working on battery power requires a very sophisticated handling of the system resources by the operating system. Mobile hardware is optimized to allow a very flexible management of power usage by the CPU and other components. Depending

on the environment in which the system is run, the power management can easily be adjusted in SUSE Linux using GNOME Battery Charge Monitor or KDE KPowersave.

Battery Charge Monitor allows you to send your machine into a hibernation state (*Suspend Computer*) in which the entire system state is written to disk prior to shutdown. Once reactivated, this state is recovered. Configure the power management settings with *Power Management Settings*. The YaST Power Management module is launched enabling you to configure all power management settings centrally.

Using KPowersave, you can start the YaST Power Management module and issue both a suspend to disk or a suspend to RAM (if configured accordingly with YaST). You can change the CPU frequency policy, meaning your system either lets the CPU frequency drop when the system is idle and adjusts it dynamically if more CPU power is needed (set the CPU frequency policy to *Dynamic*), permanently keeps a low CPU frequency to save power (select *Powersave*), or permanently keeps a high CPU frequency for maximum CPU performance (select *Performance*). If you change the active power management scheme (*Set Active Scheme*), all components of your system are part of the powersaving effort. A power management scheme includes settings for CPU frequency scaling, throttling, hard disk control, and system cooling. To start this program in a GNOME environment, enter `kpowersave` at the *Run Application* prompt.

Profile Management

Your system needs to adapt to changing operating environments when used for mobile computing. A lot of services depend on the environment and the underlying clients must be reconfigured. Use the system configuration profile management (SCPM) framework to create different configuration profiles for all environments your machine is used in. Change the active profile using Profile Chooser. To modify your SCPM settings, select *Select YaST Profile Manager Module* and enter the `root` password when prompted to do so. Start Profile Chooser in KDE using the main menu. In GNOME, enter `profile_chooser` at the *Run Application* prompt.

5 Getting to Know Linux Software

Linux comes with a wealth of applications, often offering more than one solution to specific problems. The difficulty is finding the one application that suits your needs and offers a similar ease of use compared to the Windows or Mac applications you have been using so far. This chapter points out the most important and powerful Linux applications, enabling you to change into your new working environment smoothly.

The next few sections introduce some of the most powerful Linux counterparts of common Windows software. Each section is dedicated to one particular field of application and lists the tasks, Windows applications, and Linux equivalents. These applications are then discussed in further detail and links to more information are provided. This list is by no means complete, because software development is an evolutionary process and new applications are being created every minute.

TIP: Missing Applications

In case one of the listed applications is not installed by default on your SUSE Linux system, use YaST to install the missing packages. Use the search function of the YaST package management tool to find the package names.

5.1 Office

This section features the most popular and powerful Linux office and business software solutions. These include office suites, databases, accounting software, and project management software.

Table 5.1 *Office Software for Windows and Linux*

Task	Windows Application	Linux Application
Office Suite	MS Office, StarOffice, OpenOffice.org	OpenOffice.org, StarOffice, KOffice
Word Processor	MS Word, StarOffice/OpenOffice.org Writer, WordPerfect	OpenOffice.org/StarOffice Writer
Spreadsheet	MS Excel, StarOffice/OpenOffice.org Calc	OpenOffice.org/StarOffice Calc, Gnumeric, KSpread
Presentation	MS PowerPoint, StarOffice Presentation, OpenOffice.org Impress	OpenOffice.org Impress, StarOffice Presentation
Data Plotting	MS Excel, MicroCall Origin	OpenOffice.org Calc, Gnuplot, Grace (Xmgr), LabPlot
Local Database	MS Access, OpenOffice.org + MySQL	OpenOffice.org + MySQL, Rekall, kexi, Mergeant, PostgreSQL
Financial Accounting	MS Money, Quicken, moneyplex	GnuCash, moneyplex
Project Management	MS Project	Planner, Taskjuggler
Mind Mapping	MindManager, Free Mind	VYM (View Your Mind)

OpenOffice.org

OpenOffice.org is the open source equivalent of MS Office. It is a very powerful office suite including a word processor (Write), a spreadsheet and database manager (Calc), a presentation manager (Impress), and a drawing program (Draw). Users familiar with the MS Office family of applications find a very similar application interface and all the functionality to which they are accustomed. Because OpenOffice.org is capable of importing data from MS Office applications, the transition

from one office suite to the other is very smooth. A Windows version of OpenOffice.org even exists, enabling Windows users to switch to an open source alternative while still using Windows. Find more information about OpenOffice.org at http://www.openoffice.org/ and read Chapter *The OpenOffice.org Office Suite* (↑Reference) for an introduction to OpenOffice.org and a short guide to migrating your data from one office suite to the other.

StarOffice

StarOffice is a proprietary version of OpenOffice.org and is distributed by Sun Microsystems. It is available on multiple platforms including Windows and Solaris. It includes certain advanced features not available with the free version (OpenOffice.org). Find more information about StarOffice at http://www.sun.com/software/star/staroffice/.

KOffice

KOffice is an integrated office suite for the KDE desktop. It comes with various modules like word processing (KWord), spreadsheets (KSpread), presentation (KPresenter), several image processing applications (Kivio, Karbon14, Krita), a database front-end (Kexi), and many more. Find more information about KOffice at http://www.koffice.org/.

Gnumeric

Gnumeric is a spreadsheet solution for the GNOME desktop environment. Find more information about Gnumeric at http://www.gnumeric.org.

Gnuplot

Gnuplot is a very powerful and portable command line controlled data plotting software. It is also available for MacOS and Windows platforms. Plots created by Gnuplot can be exported to various formats, such as PostScript, PDF, SVG, and others, allowing you to process these plots easily. Find more information about Gnuplot at http://www.gnuplot.info/index.html.

Grace

Grace is a very mature 2D plotting tool for almost all flavors of Unix including Linux. Plot creation and editing can be done via a graphical user interface. Grace supports an unlimited number of graphs per plot. Its export formats include JPEG, PNG, SVG, PDF and (E)PS. More information can be found at http://plasma-gate.weizmann.ac.il/Grace/.

LabPlot

LabPlot is a program for creating and managing two or three-dimensional data plots. Graphs can be produced both from data and functions and one plot might include multiple graphs. It also offers various data analysis methods. More information about LabPlot can be found at http://labplot.sourceforge.net/.

Rekall

Rekall is a tool for manipulating databases. Supported databases include MySQL, PostgreSQL, XBase with XBSQL, IBM DB2, and ODBC. Use Rekall to generate different sorts of reports and forms, design database queries, or import and export data to various formats. Find more information about Rekall at http://www.thekompany.com/products/rekall/.

Kexi

Kexi is a database front-end to various different types of databases. It supports connections to MySQL, PostgreSQL, and SQLite database servers. Kexi can be used for manipulating data in tables and creating and storing queries. Find more information about kexi at http://www.koffice.org/kexi/.

Mergeant

Mergeant is a database front-end for the GNOME desktop. Find more information at http://www.gnome-db.org.

PostgreSQL

PostgreSQL is an object-relational database management system that supports an extended subset of the SQL standard, including transactions, foreign keys, subqueries, triggers, and user-defined types and functions. Find more information about PostgreSQL at http://www.postgresql.org/.

GnuCash

GnuCash is a software tool to control both your personal and business finances. Keep track of income and expenses and manage your bank accounts and stock portfolios all using one piece of software. Learn more about GnuCash at http://www.gnucash.org.

moneyplex

moneyplex is a tool to control your finances. All tasks from managing incoming resources and expenses and monitoring your stock portfolio to online transactions via the HBCI standard are handled by moneyplex. Keep track of your financial transactions over time using various analysis options. Because this tool is also

available for Windows, users can migrate very easily without having to learn a whole new application interface. More information about moneyplex can be found at http://www.matrica.de.

Planner

Planner is a project management tool aiming to provide functionality similar to the project management tools used under Windows. Among its various features are Gantt charting abilities, different kinds of views on tasks and resources, and much more. Find more information about Planner at http://www.imendio.com/projects/planner/.

Taskjuggler

Taskjuggler is a lean, but very powerful project management software. Take control of your projects using the Gantt charting features or by generating all kinds of reports (in XML, HTML, or CSV format). Those users who are not comfortable with controlling applications via the command line can use a graphical front-end to Taskjuggler. Find more information about Taskjuggler at http://www.taskjuggler.org.

VYM (View Your Mind)

VYM is a software for visualizing your thoughts by creating and manipulating mind maps. Most manipulations do not require more than one mouse click. Branches can be inserted, deleted, and reordered very easily. VYM also offers a set of flags allowing you to mark certain parts of the map (important, time critical, etc.). Links, notes, and images can be added to a mind map as well. VYM mind maps use an XML format, allowing you to export your mind maps to HTML easily. Find more information about VYM at http://www.insilmaril.de/vym.

5.2 Network

The following section features various Linux applications for networking purposes. Get to know the most popular Linux browsers and e-mail and chat clients.

Table 5.2 *Network Software for Windows and Linux*

Task	Windows Application	Linux Application
Web Browser	Internet Explorer, Firefox, Opera	Konqueror, Firefox, Opera, Epiphany
E-Mail Client/Personal Information Management	MS Outlook, Lotus Notes, Mozilla Thunderbird	Evolution, Kontact, Mozilla Thunderbird
Instant Messaging/IRC Clients	MSN, AIM, Yahoo Messenger, XChat, Gaim	Gaim, Kopete, Konversation, XChat
Conferencing (Video and Audio)	NetMeeting	GnomeMeeting
Voice over IP	X-Lite	Linphone, kphone, Skype
FTP Clients	leechftp, wsftp	gftp, kbear

Konqueror

Konqueror is a multitalented application created by the KDE developers. It acts as file manager and document viewer, but is also a very powerful and highly customizable Web browser. It supports the current Web standards, such as CSS(2), Java applets, JavaScript and Netscape plug-ins (Flash and RealVideo), DOM, and SSL. It offers neat helpers like an integrated search bar and supports tabbed browsing. Bookmarks can be imported from various other Web browsers, like Internet Explorer, Mozilla, and Opera. Find more information about Konqueror at `http://www.konqueror.org/` and read our introduction to using Konqueror in Chapter *The Web Browser Konqueror* (↑Reference).

Firefox

Firefox is the youngest member of the Mozilla browser family. It runs on various platforms, including Linux, MacOS, and Windows. Its main features include built-in customizable searches, pop-up blocking, RSS news feeds, password management, tabbed browsing, and some advanced security and privacy options. Firefox is very flexible, allowing you to customize almost anything you want (searches, toolbars, skins, buttons, etc.). Neat add-ons and extensions can be downloaded from the Firefox Web site (`https://addons.update.mozilla.org/`

?application=firefox). Find more information about Firefox at http://www.mozilla.org/products/firefox/ and read our introduction to using Firefox in Chapter *Firefox* (↑Reference).

Opera

Opera is a powerful Web browser with neat add-ons like an optional e-mail client and a chat module. Opera offers pop-up blocking, RSS feeds, built-in and customizable searches, a password manager, and tabbed browsing. The main functionalities are easily reached via their respective panels. Because this tool is also available for Windows, it allows a much easier transition to Linux for those who have been using it under Windows. Find more information about Opera at http://www.opera.com/.

Epiphany

Epiphany is a lean, but powerful Web browser for the GNOME desktop. Many of its features and extensions will remind you of Firefox. Find more information about Epiphany at http://www.gnome.org/projects/epiphany/.

Evolution

Evolution is personal information management software for the GNOME desktop combining mail, calendar, and address book functionality. It offers advanced e-mail filter and search options, provides sync functionality for Palm devices, and allows you to run Evolution as an Exchange or GroupWise client to integrate better into heterogeneous environments. Find more information about Evolution at http://www.gnome.org/projects/evolution/ and read our introduction to using Evolution in Chapter *Evolution: An E-Mail and Calendar Program* (↑Reference).

Kontact

Kontact is the KDE personal information management suite. It includes e-mail, calendar, address book, and Palm sync functionalities. Like Evolution, it can act as an Exchange or GroupWise client. Kontact combines several stand-alone KDE applications (KMail, KAddressbook, KOrganizer, and KPilot) to form an entity providing all the PIM functionality you need. Find more information about Kontact at http://www.kontact.org/ and read our introduction to using Kontact in Chapter *Kontact: An E-Mail and Calendar Program* (↑Reference).

Mozilla Thunderbird

Thunderbird is an e-mail client application that comes as part of the Mozilla suite. It is also available for Microsoft Windows and MacOS which facilitates the transition

from one of these operating systems to Linux. Find more information about Mozilla Thunderbird at http://www.mozilla.org/products/thunderbird/.

Gaim

Gaim is a smart instant messenger program supporting multiple protocols, such as AIM and ICQ (Oscar protocol), MSN Messenger, Yahoo!, IRC, Jabber, SILC, and GroupWise Messenger. It is possible to log in to different accounts on different IM networks and chat on different channels simultaneously. Gaim also exists in a Windows version. Find more information about Gaim at http://gaim.sourceforge.net/about.php.

Kopete

Kopete is a very intuitive and easy-to-use instant messenger tool supporting protocols including IRC, ICQ, AIM, GroupWise Messenger, Yahoo, MSN, Gadu-Gadu, Lotus Sametime, SMS messages, and Jabber. Find more information about Kopete at http://kopete.kde.org/ and read an introduction to using Kopete in Section 7.3.9, "Chatting with Friends: Kopete" (page 192).

Konversation

Konversation is an easy-to-use IRC client for KDE. Its features include support for SSL connections, strikeout, multichannel joins, away and unaway messages, ignore list functionality, Unicode, autoconnect to a server, optional time stamps in chat windows, and configurable background colors. Find more information about Konversation at http://konversation.kde.org.

XChat

XChat is an IRC client that runs on most Linux and UNIX platforms as well as under Windows and MacOS X. Find more information about XChat at http://www.xchat.org/.

GnomeMeeting

GnomeMeeting is the open source equivalent of Microsoft's NetMeeting. It features LDAP and ILS support for address lookup and integrates with Evolution to share the address data stored there. GnomeMeeting supports PC-to-phone calls, allowing you to call another party with just your computer, sound card, and microphone without any additional hardware. Find more information about GnomeMeeting at http://www.gnomemeeting.org/.

Linphone

Linphone is a smart and lean Voice over IP client using the SIP protocol to establish calls. Find more information at http://www.linphone.org and in Chapter *Linphone—VoIP for the Linux Desktop* (↑Reference).

KPhone

KPhone is a program to initiate Voice over IP connections across the Internet. Find more information at http://www.wirlab.net/kphone.

gftp

gftp is an FTP client using the GTK toolkit. Its features include simultaneous downloads, resume of interrupted file transfers, file transfer queues, download of entire directories, FTP proxy support, remote directory caching, passive and nonpassive file transfers, and drag and drop support. Find more information at http://gftp.seul.org.

kbear

KBear is a KDE FTP client with the ability to have concurrent connections to multiple hosts, three separate view modes, support for multiple protocols (like ftp, sftp, etc.), a site manager plug-in, firewall support, logging capabilities, and much more. Find more information at http://kbear.sourceforge.net.

5.3 Multimedia

The following section introduces the most popular multimedia applications for Linux. Get to know media players, sound editing solutions, and video editing tools.

Table 5.3 *Multimedia Software for Windows and Linux*

Task	Windows Application	Linux Application
Audio CD Player	CD Player, Winamp, Windows Media Player	KsCD, Grip, Banshee
CD Burner	Nero, Roxio Easy CD Creator	K3b
CD Ripper	WMPlayer	Grip, kaudiocreator, Sound Juicer, Banshee

Task	Windows Application	Linux Application
Audio Player	Winamp, Windows Media Player, iTunes	amaroK, XMMS, Rhythmbox, Banshee
Video Player	Winamp, Windows Media Player	Kaffeine, MPlayer, Xine, XMMS, Totem
Audio Editor	SoundForge, Cooledit, Audacity	Audacity
Sound Mixer	sndvol32	alsamixer, Kmix
Music Notation	Finale, SmartScore, Sibelius	LilyPond, MusE, Noteedit, Rosegarden
Video Creator and Editor	Windows Movie Maker, Adobe Premiere, Media Studio Pro, MainActor	MainActor, Kino
TV Viewer	AVerTV, PowerVCR 3.0, CinePlayer DVR	xawtv (analog), motv (analog), xawtv4, tvtime, kdetv, zapping, Kaffeine

KsCD

KsCD is a neat little CD player application for the KDE desktop. Its user interface very much resembles that of a normal hardware CD player, guaranteeing ease of use. KsCD supports CDDB, enabling you to get any track and album information either from the Internet or your local file system. Find more information at http://docs.kde.org/en/3.3/kdemultimedia/kscd/.

Grip

Grip provides CD player and ripper functionalities for the GNOME desktop. It supports CDDB lookups for track and album data. Ripping can be done using the built-in cdparanoia capabilities or via external rippers. Find more information at http://www.nostatic.org/grip/.

Sound Juicer

Sound Juicer is a lean CD ripper application for the GNOME desktop. Find more information about Sound Juicer at http://www.burtonini.com/blog/computers/sound-juicer.

Banshee

Banshee is a digital jukebox very similar to iTunes.

K3b

K3b is a multitalented media creation tool. Create data, audio, or video CD and DVD projects by dragging and dropping. Find more information about K3b at http://www.k3b.org/ or refer to Chapter *K3b—Burning CDs or DVDs* (↑Reference).

Kaffeine

Kaffeine is a versatile multimedia application supporting a wide range of audio and video formats including Ogg Vorbis, WMV, MOV, and AVI. Import and edit play lists of various types, create screenshots, and save media streams to your local hard disk. Find more information about Kaffeine at http://kaffeine.sourceforge.net/.

Totem

Totem is a movie player application for the GNOME desktop. It supports Shoutcast, m3u, asx, SMIL, and ra play lists, lets you use keyboard controls, and plays a wide range of audio and video formats. Find more information about Totem at http://www.gnome.org/projects/totem/.

amaroK

The amaroK media player handles various audio formats and plays the streaming audio broadcasts of radio stations on the Internet. The program handles all file types supported by the sound server acting as a back-end—currently aRts or GStreamer. Find more information about amaroK at http://amarok.kde.org/ or refer to Section “amaroK” (Chapter 7, *Sound in Linux*, ↑Reference).

XMMS

XMMS is the traditional choice for multimedia playback. It is focused on music playback, offering support for CD playback and Ogg Vorbis files. Users of Winamp should find XMMS comfortable because of its similarity. Find more information about XMMS at http://www.xmms.org/ or refer to Section “XMMS” (Chapter 7, *Sound in Linux*, ↑Reference).

Rhythmbox

Rhythmbox is a powerful, multitalented media player for the GNOME desktop. It allows you to organize and browse your music collection using playlists and even supports Internet radio. Find more information about Rhythmbox at http://www.gnome.org/projects/rhythmbox/.

Audacity

Audacity is a powerful, free sound editing tool. Record, edit, and play any Ogg Vorbis or WAV file. Mix tracks at your whim, apply effects to them, and export the results to WAV or Ogg Vorbis. Find more information about Audacity at http://audacity.sourceforge.net/ or refer to Section "Hard Disk Recording with Audacity" (Chapter 7, *Sound in Linux*, ↑Reference).

LilyPond

LilyPond is a free music sheet editor. Because the input format is text-based, you can use any text editor to create note sheets. Users do not need to tackle any formatting or notation issues, like spacing, line-breaking, or polyphonic collisions. All these issues are automatically resolved by LilyPond. It supports many special notations like chord names and tablatures. The output can be exported to PNG, TeX, PDF, PostScript, and MIDI. Find more information about LilyPond at http://lilypond.org/web/.

MusE

MusE's goal is to be a complete multitrack virtual studio for Linux. Find more information about MusE at http://www.muse-sequencer.org/index.php.

Noteedit

Noteedit is a powerful score editor for Linux. Use it to create sheets of notes and to export and import scores to and from many formats, such as MIDI, MusicXML and LilyPond. Find more information about Noteedit at http://developer.berlios.de/projects/noteedit/.

Rosegarden

Rosegarden is a free music composition and editing environment. It features an audio and MIDI sequencer and a score editor. Find more information about Rosegarden at http://rosegardenmusic.com/.

MainActor

MainActor is a fully fledged video authoring software. Because there is a Windows version of MainActor, transition from Windows is easy. Find more information about MainActor at http://www.mainactor.com/.

xawtv and motv

xawtv is a TV viewer and recorder application supporting analog TV. motv is basically the same as xawtv, but with a slightly different user interface. Find more information about the xawtv project at http://linux.bytesex.org/xawtv/.

xawtv4

xawtv4 is a successor of the xawtv application. It supports both analog and digital audio and video broadcasts. The xawtv4 package contains several useful applications apart from the TV viewer: pia4 (a command line controlled movie player for streams recorded by xawtv4), mtt4 (a video text browser), alexplore (a DVB channel scanner; built-in), dvbradio (a DVB radio player; needs an initial channel scan), and dvbrowse (an EPG browser). For more information, refer to http://linux.bytesex.org/xawtv/.

tvtime

tvtime is a lean TV viewer application supporting analog TV. Find more information about tvtime, including a comprehensive usage guide, at http://tvtime.sourceforge.net/.

kdetv

A TV viewer and recorder application for the KDE desktop supporting analog TV. Find more information about kdetv at http://www.kdetv.org/.

zapping

A TV viewer and recorder application for the GNOME desktop supporting analog TV. Find more information about Zapping at http://zapping.sourceforge.net/cgi-bin/view/Main/WebHome.

5.4 Graphics

The following section presents some of the Linux software solutions for graphics work. These include simple drawing applications as well as fully-fledged image editing tools and powerful rendering and animation programs.

Table 5.4 *Graphics Software for Windows and Linux*

Task	Windows Application	Linux Application
Simple Graphic Editing	MS Paint	The GIMP, Krita
Professional Graphic Editing	Adobe Photoshop, Paint Shop Pro, Corel PhotoPaint, The GIMP	The GIMP, Krita
Creating Vector Graphics	Adobe Illustrator, CorelDraw, OpenOffice.org Draw, Freehand	OpenOffice.org Draw, Inkscape, Dia
SVG Editing	WebDraw, Freehand, Adobe Illustrator	Inkscape, Dia, Karbon14, Kivio
Creating 3D Graphics	3D Studio MAX, Maya, POV-Ray, Blender	POV-Ray, Blender, KPovmodeler
Managing Digital Photographs	Software provided by the camera manufacturer	Digikam, F-Spot
Scanning	Vuescan	Vuescan, Kooka, The GIMP
Image Viewing	ACDSee	gwenview, gThumb, Eye of Gnome

The GIMP

The GIMP is the open source alternative to Adobe Photoshop. Its feature list rivals that of Photoshop, so it is well suited for professional image manipulation. There is even a Windows version of GIMP available. Find more information at `http://www.gimp.org/` or refer to Chapter *Manipulating Graphics with The GIMP* (↑Reference).

Krita

Krita is KOffice's answer to Adobe Photoshop and The GIMP. It can be used for pixel-based image creation and editing. Its features include many of the advanced

image editing capabilities you would normally expect with either Adobe Photoshop or The GIMP. Find more information at http://www.koffice.org/krita.

Dia

Dia is a Linux application aiming to be the Linux equivalent of Visio. It supports many types of special diagrams, such as network or UML charts. Export formats include SVG, PNG, and EPS. To support your own custom-made diagram types, provide the new shapes in a special XML format. Find more information about Dia at http://www.gnome.org/projects/dia/.

Inkscape

Inkscape is a free SVG editor. Users of Adobe Illustrator, Corel Draw, and Visio can find a similar range of features and a familiar user interface in Inkscape. Among its features, find SVG-to-PNG export, layering, transforms, gradients, grouping of objects, and more. Find more information about Inkscape at http://www.inkscape.org/.

Karbon14

Karbon14 is a vector graphics application that integrates into KOffice. Find more information at http://www.koffice.org/karbon/.

Kivio

Kivio is a flow-charting application that integrates into the KOffice suite. Former users of Visio will find a familiar look and feel in Kivio. Find more information about Kivio at http://www.koffice.org/kivio/.

POV-Ray

The Persistence of Vision Raytracer creates three-dimensional, photo-realistic images using a rendering technique called ray tracing. Because there is a Windows version of POV-Ray, it does not take much for Windows users to switch to the Linux version of this application. Find more information about POV-Ray at http://www.povray.org/.

Blender

Blender is a powerful rendering and animation tool available on many platforms, including Windows, MacOS, and Linux. Find more information about Blender at http://www.blender3d.com/.

KPovmodeler

KPovmodeler is a POV-Ray front-end that integrates with the KDE desktop. KPovmodeler saves users from needing a detailed knowledge of POV-Ray scripting by translating the POV-Ray language in an easy to understand tree view. Native POV-Ray scripts can be imported to KPovmodeler as well. Find more information at http://www.kpovmodeler.org.

Digikam

Digikam is a smart digital photo management tool for the KDE desktop. Importing and organizing your digital images is a matter of a few clicks. Create albums, add tags to spare you from copying images around different subdirectories, and eventually export your images to your own Web site. Find more information about Digikam at http://digikam.sourceforge.net/Digikam-SPIP/ and in Section "Using Digikam" (Chapter 15, *Digital Cameras and Linux*, ↑Reference).

f-spot

f-spot is a flexible digital photographs management tool for the GNOME desktop. It lets you create and manage albums, supports various export options like HTML pages or burning of image archives to CD. Find more information about f-spot at http://www.gnome.org/projects/f-spot/ and in Section "Using f-spot" (Chapter 15, *Digital Cameras and Linux*, ↑Reference).

Kooka

Kooka is a scan and OCR (text recognition) suite for the KDE desktop. It allows you to configure the main scan parameters, choose from various export formats, and organize the scanned data. The OCR module provided by the Kooka package adds some basic text recognition features. Find more information about Kooka at http://www.kde.org/apps/kooka/ or refer to Chapter *Kooka—A Scanning Application* (↑Reference).

Gwenview

Gwenview is a simple image viewer for KDE. It features a folder tree window and a file list window that provides easy navigation of your file hierarchy. Find more information at http://gwenview.sourceforge.net/home/.

gThumb

gThumb is an image viewer, browser, and organizer for the GNOME desktop. It supports the import of your digital images via gphoto2, allows you to carry out basic transformation and modifications, and lets you tag your images to create albums

matching certain categories. Find more information about gThumb at http://gthumb.sourceforge.net/.

Eye of Gnome (eog)

Eye of Gnome is an image viewer application that is part of the GNOME Office suite. Find more information at http://www.gnome.org/gnome-office/eog.shtml.

5.5 System and File Management

The following section provides an overview of Linux tools for system and file management. Get to know text and source code editors, backup solutions, and archiving tools.

Table 5.5 *System and File Management Software for Windows and Linux*

Task	Windows Application	Linux Application
Text Editor	NotePad, WordPad, (X)Emacs	kate, gedit, (X)Emacs, vim
PDF Creator	Adobe Distiller	Scribus
PDF Viewer	Adobe Reader	Adobe Reader, Evince, KPDF, Xpdf
Text Recognition	Recognita, FineReader	GOCR
Command Line Pack Programs	zip, rar, arj, lha, etc.	zip, tar, gzip, bzip2, etc.
GUI Based Pack Programs	WinZip	Ark, File Roller
Hard Disk Partitioner	PowerQuest, Acronis, Partition Commander	YaST, GNU Parted
Backup Software	ntbackup, Veritas	dar, taper, dump

kate

Kate is part of the KDE suite. It has the ability to open several files at once either locally or remotely. With syntax highlighting, project file creation, and external scripts execution, it is a perfect tool for a programmer. Find more information at http://kate.kde.org/.

gedit

GEdit is the official text editor of the GNOME desktop. It provides similar features to Kate. Find more information at http://www.gnome.org/projects/gedit/.

(X)Emacs

GNU Emacs and XEmacs are very professional editors. XEmacs is based on GNU Emacs. To quote the GNU Emacs Manual, "Emacs is the extensible, customizable, self-documenting real-time display editor." Both offer nearly the same functionality with minor differences. Used by experienced developers, they are highly extensible through the Emacs Lisp language. They support many languages, like Russian, Greek, Japanese, Chinese, and Korean. Find more information at http://www.xemacs.org/ and http://www.gnu.org/software/emacs/emacs.html.

vim

vim (vi improved) is a program similar to the text editor vi. Users may need time to adjust to vim, because it distinguishes between command mode and insert mode. The basic features are the same as in all text editors. vim offers some unique options, like macro recording, file format detection and conversion, and multiple buffers in a screen. Find more information at http://www.vim.org/ or in *Reference*.

GOCR

GOCR is an OCR (optical character recognition) tool. It converts scanned images of text into text files. It is also part of Kooka, a KDE scanning tool. Find more information at http://jocr.sourceforge.net/ and in Chapter *Kooka—A Scanning Application* (↑Reference).

Adobe Reader

Adobe Reader for Linux is the exact counterpart of the Windows and Mac versions of this application. The look and feel on Linux are the same as on other platforms. The other parts of the Adobe Acrobat suite have not been ported to Linux. Find more information at http://www.adobe.com/products/acrobat/readermain.html.

Evince

Evince is a document viewer for PDF and PostScript formats for the GNOME desktop. Find more information at http://www.gnome.org/projects/evince/.

KPDF

KPDF is a PDF viewing application for the KDE desktop. Its features include searching the PDF and full screen reading mode like in Adobe Reader. Find more information at http://kpdf.kde.org/.

Xpdf

Xpdf is lean PDF viewing suite for Linux and Unix platforms. It includes a viewer application and some export plug-ins for PostScript or text formats. Find more information at http://www.foolabs.com/xpdf/.

gzip, tar, bzip2

There are plenty of packaging programs for reducing disk usage. In general, they differ only in their pack algorithm. Linux can also handle the packaging formats used on Windows. Find more information about `gzip` and `tar` in Section "File Administration" (Chapter 27, *Working with the Shell*, ↑Reference). `bzip2` is a bit more efficient than `gzip`, but needs more time, depending on the pack algorithm.

GNU Parted

GNU Parted is a command-line tool for creating, destroying, resizing, checking, and copying partitions and the file systems on them. If you need to create space for new operating systems, use this tool to reorganize disk usage and copy data between different hard disks. Find more information at http://www.gnu.org/software/parted/.

KDar

KDar stands for KDE disk archiver and is a hardware-independent backup solution. KDar uses catalogs (unlike tar), so it is possible to extract a single file without having to read the whole archive and it is also possible to create incremental backups. KDar can split an archive into multiple slices and trigger the burning of a data CD or DVD for each slice. Find more information about KDar at http://kdar.sourceforge.net/.

taper

Taper is a backup and restore program that provides a friendly user interface to allow backup and restoration of files to and from a tape drive. Alternatively, files can be

backed up to archive files. Recursively selected directories are supported. Find more information at http://taper.sourceforge.net/.

dump

The dump package contains both dump and restore. dump examines files in a file system, determines which ones need to be backed up, and copies those files to a specified disk, tape, or other storage medium. The restore command performs the inverse function of dump—it can restore a full backup of a file system. Find more information at http://dump.sourceforge.net/.

5.6 Software Development

This section introduces Linux IDEs, toolkits, development tools, and versioning systems for professional software development.

Table 5.6 *Development Software for Windows and Linux*

Task	Windows Application	Linux Application
Integrated Development Environments	Borland C++, Delphi, Visual Studio, .NET	KDevelop, Eric, Eclipse, MonoDevelop, Anjuta
Toolkits	MFC, Qt, GTK	Qt, GTK
Compilers	VisualStudio	GCC
Debugging Tools	Visual Studio	GDB, valgrind
GUI Design	Visual Basic, Visual C++	Glade, Qt Designer
Versioning Systems	Clearcase, Perforce, Source-Safe	CVS, Subversion

KDevelop

KDevelop allows you to write programs for different languages (C/C++, Python, Perl, etc.). It includes a documentation browser, a source code editor with syntax highlighting, a GUI for the compiler, and much more. Find more information at http://www.kdevelop.org.

Eclipse

The Eclipse Platform is designed for building integrated development environments that can be extended with custom plug-ins. The base distribution also contains a full-featured Java development environment. Find more information at http://www.eclipse.org.

MonoDevelop

The Mono Project is an open development initiative that is working to develop an open source Unix version of the .NET development platform. Its objective is to enable Unix developers to build and deploy cross-platform .NET applications. MonoDevelop complements the Mono development with an IDE. Find more information about MonoDevelop at http://www.monodevelop.com/.

Anjuta

Anjuta is an IDE for GNOME/GTK application development. It includes an editor with automated formatting, code completion and highlighting. Apart from GTK it supports Perl, Pascal, and Java development. A GDB based debugger is also included. Find more information about Anjuta at http://anjuta.sourceforge.net.

Eric

Eric is an IDE optimized for Python and Python-Qt development. Find more information about Eric at http://www.die-offenbachs.de/detlev/eric3.html.

Qt

Qt is a program library for developing applications with graphical user interfaces. It allows you to develop professional programs rapidly. The Qt library is available not only for Linux, but for a number of Unixes and even for Windows and Macintosh. Thus it is possible to write programs that can be easily ported to those platforms. Find more information at http://www.trolltech.com. Language bindings for Qt development are summarized under http://developer.kde.org/language-bindings/.

GTK

GTK is a multiplatform toolkit for creating graphical user interfaces. It is used for all GNOME applications, The GIMP, and several others. GTK has been designed to support a range of languages, not only C/C++. Originally it was written for GIMP, hence the name "GIMP Toolkit." Find more information at http://www.gtk.org. Language bindings for GTK are summarized under http://www.gtk.org/bindings.html.

GCC

GCC is a compiler collection with front-ends for various programming languages. Check out a complete list of features and find extensive documentation at http://gcc.gnu.org.

GDB

GDB is a debugging tool for programs written in various programming languages. Find more information about GDB at http://www.gnu.org/software/gdb/gdb.html.

Valgrind

Valgrind is a suite of programs for debugging and profiling x86 applications. Find more information about Valgrind at http://valgrind.org/info/.

Glade

Glade is a user interface builder for GTK and GNOME development. As well as GTK support, it offers support for C, C++, C#, Perl, Python, Java, and others. Find more information about Glade at http://glade.gnome.org/.

Qt Designer

Qt Designer is a user interface and form builder for Qt and KDE development. It can be run as part of the KDevelop IDE or in stand-alone mode. QtDesigner can be run under Windows and even integrates into the Visual Studio development suite. Find more information about Qt Designer at http://www.trolltech.com/products/qt/designer.html.

CVS

CVS, the Concurrent Versions System, is one of the most important version control systems for open source. It is a front-end to the Revision Control System (RCS) included in the standard Linux distributions. Read more about CVS in *Reference*. Find more information at the home page http://www.cvshome.org/.

Subversion

Subversion does the same thing CVS does but has major enhancements, like moving, renaming, and attaching meta information to files and directories. Read more about Subversion in *Reference* or go to the home page http://subversion.tigris.org/.

6 Help and Documentation

SUSE Linux comes with various sources of information and documentation. The SUSE Help Center provides central access to the most important documentation resources on your system in searchable form. These resources include online help for installed applications, manual pages, info pages, databases on hardware and software topics, and all manuals delivered with your product.

6.1 Using the SUSE Help Center

When you start the SUSE Help Center for the first time from the main menu (*SuSE Help Center*) or with the command `susehelp` in the shell, a window as shown in Figure 6.1, "The Main Window of the SUSE Help Center" (page 160) is displayed. The dialog window consists of three main areas:

Menu Bar and Toolbar

The menu bar provides the main editing, navigation, and configuration options. *File* contains the option for printing the currently displayed content. Under *Edit*, access the search function. *Go* contains all navigation possibilities: *Table of Contents* (home page of the Help Center), *Back*, *Forward*, and *Last Search Result*. With *Settings* → *Build Search Index*, generate a search index for all selected information sources. The toolbar contains three navigation icons (forward, back, home) and a printer icon for printing the current contents.

Navigation Area with Tabs

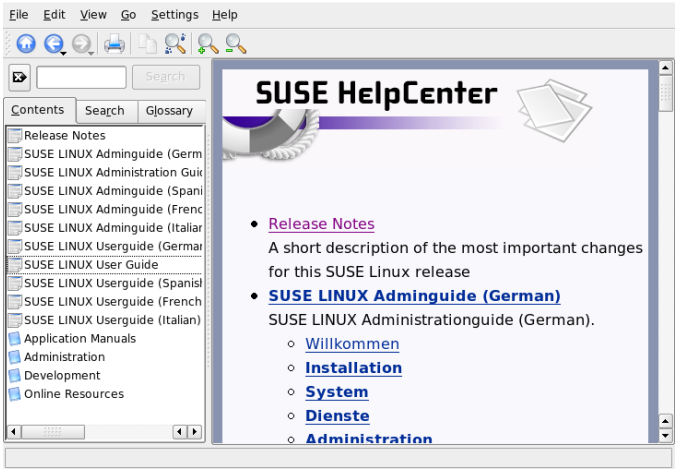
The navigation area in the left part of the window provides an input field for a quick search in selected information sources. Details regarding the search and the confi-

guration of the search function in the *Search* tab are presented in Section 6.1.2, "The Search Function" (page 161). The *Contents* tab presents a tree view of all available and currently installed information sources. Click the book icons to open and browse the individual categories.

View Window

The view window always displays the currently selected contents, such as online manuals, search results, or Web pages.

Figure 6.1 *The Main Window of the SUSE Help Center*



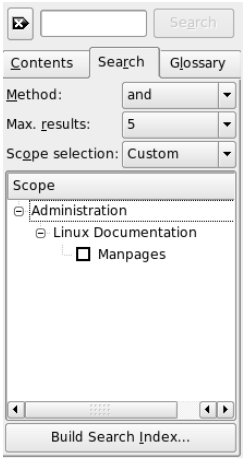
6.1.1 Contents

The SUSE Help Center provides access to useful information from various sources. It contains special documentation for SUSE Linux (*Start-Up* and *Reference*), all available information sources for your workstation environment, online help for the installed programs, and help texts for other applications. Furthermore, the SUSE Help Center provides access to SUSE's online databases that cover special hardware and software issues for SUSE Linux. All these sources can be searched comfortably once a search index has been generated.

6.1.2 The Search Function

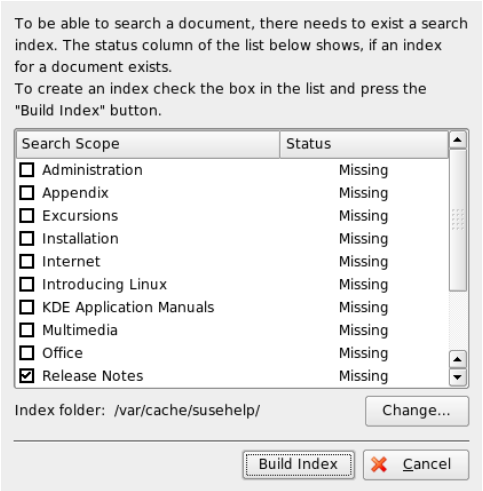
To search all installed information sources of SUSE Linux, generate a search index and set a number of search parameters. To do this, open the *Search* tab. See Figure 6.2, “Configuring the Search Function” (page 161).

Figure 6.2 *Configuring the Search Function*



If no search index has been generated, the system automatically prompts you to do so when you click the *Search* tab or enter a search string then click *Search*. In the window for generating the search index, shown in Figure 6.3, “Generating a Search Index” (page 162), use the check boxes to determine the information sources to index. The index is generated when you exit the dialog with *Build Index*.

Figure 6.3 *Generating a Search Index*



To limit the search base and the hit list as precisely as possible, use the three drop-down menus to determine the number of displayed hits and the selection area of sources to search. The following options are available for determining the selection area:

Default
A predefined selection of sources is searched.

All
All sources are searched.

None
No sources selected for the search.

Custom
Determine the sources to search by activating the respective check boxes in the overview.

When you have completed the search configuration, click *Search*. The relevant items are then displayed in the view window and can easily be navigated with mouse clicks.

6.2 Man Pages

Man pages are an essential part of any Linux system. They explain the usage of a command and all available options and parameters. Man pages are sorted in categories as shown in Table 6.1, "Man Pages—Categories and Descriptions" (page 163) (taken from the man page for man itself).

Table 6.1 *Man Pages—Categories and Descriptions*

Number	Description
1	Executable programs or shell commands
2	System calls (functions provided by the kernel)
3	Library calls (functions within program libraries)
4	Special files (usually found in /dev)
5	File formats and conventions (`/etc/fstab`)
6	Games
7	Miscellaneous (including macro packages and conventions), e.g., man(7), groff(7)
8	System administration commands (usually only for root)
9	Kernel routines (nonstandard)

Generally, man pages are delivered with the associated command. They can be browsed in the help center or directly in a shell. To display a man page in a shell, use the `man` command. For example, to display the man page for `ls` enter `man ls`. Each man page consists of several parts labeled *NAME*, *SYNOPSIS*, *DESCRIPTION*, *SEE ALSO*, *LICENSING*, and *AUTHOR*. There may be additional sections available depending on the type of command. With Q, exit the man page viewer.

Another possibility to display a man page is to use Konqueror. Start Konqueror and type, for example, `man:/ls`. If there are different categories for a command, Konqueror displays them as links.

6.3 Info Pages

Info pages are another important source of information on your system. Usually they are more verbose than man pages. You can browse an info page with an info viewer and display the different sections, called "nodes." Use the command `info` for this task. For example, to view the info page of `info` itself, type `info info` in the shell.

For more convenience, use the Help Center or Konqueror. Start Konqueror and type `info:/` to view the top level. To display the info page for `grep`, type `info:/grep`.

6.4 The Linux Documentation Project

The Linux Documentation Project (TLDP) is run by a team of volunteers who write Linux and Linux-related documentation (see `http://www.tldp.org`). The set of documents contains tutorials for beginners, but is mainly focused on experienced users and professional system administrators. TLDP publishes HOWTOs, FAQs, and guides (handbooks) under a free license.

6.4.1 HOWTOs

HOWTOs are usually a short, informal, step-by-step guide to accomplishing a specific task. It is written by experts for nonexperts in a procedural manner. For example, how to configure a DHCP server. HOWTOs can be found in the package `howto` and are installed under `/usr/share/doc/howto`

6.4.2 Frequently Asked Questions

FAQs (frequently asked questions) are a series of questions and answers. They originate from Usenet newsgroups where the purpose was to reduce continuous reposting of the same basic questions.

6.5 Wikipedia: the Free Online Encyclopedia

Wikipedia is “a multilingual encyclopedia designed to be read and edited by anyone” (see http://en.wikipedia.org). The content of Wikipedia is created by its users and is published under a free license (GFDL). Any visitors can edit articles, which gives the danger of vandalism, but this does not repel visitors. With over four hundred thousand articles, find an answer for nearly every topic.

6.6 Guides and Books

A broad range of guides and books are available for Linux topics.

6.6.1 SUSE Books

SUSE provides detailed and informative books. We provide HTML and PDF versions of our books in different languages. The PDF file is available on DVD in the directory `docu`. For HTML, install the package `suselinux-manual_LANG` (replace *LANG* with your preferred language.) After the installation you find them in the SUSE Help Center.

6.6.2 Other Manuals

The SUSE help center offers additional manuals and guides for various topics or programs. More can be found at http://www.tldp.org/guides.html. They range from *Bash Guide for Beginners* to *Linux Filesystem Hierarchy* to *Linux Administrator's Security Guide*. Generally, guides are more detailed and exhaustive than a HOWTO or FAQ. They are usually written by experts for experts. Some of these books are old but still valid. Install books and guides with YaST.

6.7 Package Documentation

If you install a package in your system, a directory `/usr/share/doc/packages/`*`packagename`* is created. You can find files from the package maintainer as well as additional information from SUSE. Sometimes there are also examples, configuration files, additional scripts, etc., available. Usually you can find the following files, but they are not standard and sometimes not all files are available.

AUTHORS
: This file contains the list of the main developers of this package and usually their tasks.

BUGS
: Lists known bugs or malfunctions of this package. Usually it also contains a link to a Bugzilla Web page where you can search all bugs.

CHANGES, ChangeLog
: Summary of changes from version to version. Usually interesting for developers, because it is very detailed.

COPYING, LICENSE
: Contains licensing information

FAQ
: This file contains question and answers collected from mailing lists or newsgroups.

INSTALL
: This file contains procedures for installing this package in your system. Normally you do not need it, because you have the package installed already.

README, README.*
: General information about how to use it, what you can do with this package, etc.

TODO
: Things that are not implemented yet, but probably will be in the future.

MANIFEST
: List of files with a brief summary.

NEWS
Describes what is new in this version

6.8 Usenet

Created in 1979 before the rise of the Internet, Usenet is one of the oldest computer networks and still in active use. The format and transmission of Usenet articles is very similar to e-mail, but is developed for a many-to-many communication.

Usenet is organized into seven topical categories: `comp.*` for computer-related discussions, `misc.*` for miscellaneous topics, `news.*` for newsgroup-related matters, `rec.*` for recreation and entertainment, `sci.*` for science-related discussions, `soc.*` for social discussions, and `talk.*` for various controversial topics. The top levels are split in subgroups. For instance, `comp.os.linux.hardware` is a newsgroup for Linux-specific hardware issues.

Before you can post an article, have your client connect to a news server and subscribe to a specific newsgroup. News clients include Knode or Evolution. Each news server communicates to other news servers and exchanges articles with them. Not all newsgroups may be available on your news server.

Interesting newsgroups for Linux users are `comp.os.linux.apps`, `comp.os.linux.questions`, and `comp.os.linux.hardware`. If you cannot find a specific newsgroup, go to http://www.linux.org/docs/usenetlinux.html. Follow the general Usenet rules available online at http://www.faqs.org/faqs/usenet/posting-rules/part1/.

6.9 Standards and Specifications

There are various sources that provide information about standards or specifications.

www.linuxbase.org
The Free Standards Group is an independent nonprofit organization that promotes the distribution of free software and open source software. The organization endeavors to achieve this by defining distribution-independent standards. The maintenance of several standards, such as the important LSB (Linux Standard Base), is supervised by this organization.

http://www.w3.org

The World Wide Web Consortium (W3C) is certainly one of the best-known standards organizations. It was founded in October 1994 by Tim Berners-Lee and concentrates on standardizing Web technologies. W3C promotes the dissemination of open, license-free, and manufacturer-independent specifications, such as HTML, XHTML, and XML. These Web standards are developed in a four-stage process in *working groups* and are presented to the public as *W3C recommendations* (REC).

http://www.oasis-open.org

OASIS (Organization for the Advancement of Structured Information Standards) is an international consortium specializing in the development of standards for Web security, e-business, business transactions, logistics, and interoperability between various markets.

http://www.ietf.org

The Internet Engineering Task Force (IETF) is an internationally active cooperative of researchers, network designers, suppliers, and users. It concentrates on the development of Internet architecture and the smooth operation of the Internet by means of protocols.

Every IETF standard is published as an RFC (Request for Comments) and is available free-of-charge. There are six types of RFC: proposed standards, draft standards, Internet standards, experimental protocols, information documents, and historic standards. Only the first three (proposed, draft, and full) are IETF standards in the narrower sense (see http://www.ietf.org/rfc/rfc1796.txt).

http://www.ieee.org

The Institute of Electrical and Electronics Engineers (IEEE) is an organization that draws up standards in the areas of information technology, telecommunication, medicine and health care, transport, and others. IEEE standards are subject to a fee.

http://www.iso.org

The ISO Committee (International Organization for Standards) is the world's largest developer of standards and maintains a network of national standardization institutes in over 140 countries. ISO standards are subject to a fee.

http://www.din.de, http://www.din.com

The Deutsches Institut für Normung (DIN) is a registered technical and scientific association. It was founded in 1917. According to DIN, the organization is “the in-

stitution responsible for standards in Germany and represents German interests in worldwide and European standards organizations."

The association brings together manufacturers, consumers, trade professionals, service companies, scientists and others who have an interest in the establishment of standards. The standards are subject to a fee and can be ordered using the DIN home page.

Part III Desktop

7 The KDE Desktop

The KDE desktop offers an intuitive graphical interface. The following sections show you how to make efficient use of KDE's features and how to customize the desktop to meet your personal needs. This is followed by an introduction to the file manager Konqueror and a brief description of some small but useful utilities.

7.1 Desktop Components

The main components are the icons on the desktop and the panel at the bottom of the screen. The mouse is your most important tool. Click a symbol or an icon once to start the associated program or the file manager Konqueror. When you right-click icons, different menus appear, depending on the program. As well as the icons, there are two desktop menus.

7.1.1 The Desktop Menus

If you middle-click the desktop (if your mouse only has two buttons, press both buttons at the same time), a window and desktop management menu is displayed. The menu lists the various desktops and the windows opened in them. It also offers the following items:

Unclutter Windows
: If you have several windows on your desktop, they are placed next to each other and aligned with the top left corner.

Cascade Windows

Starting from the top left corner, the windows on the desktop are placed on top of each other in such a way that only the top and left borders of the lower windows are visible.

Desktop x

Desktop 1 is your default desktop. This part of the menu lists all the windows currently opened. You can bring them to the foreground by clicking one of the respective items.

Additional Desktops

You can use the additional (virtual) desktops provided and switch to them with the menu or the panel. All functions are available on all desktops. This limits the number of programs and associated windows that need to be arranged on one desktop. These virtual desktops resemble additional desks in your office.

If you right-click the desktop, a more complex menu is displayed, allowing you to customize your desktop.

Create New

Use this menu item to create new directories, files, or devices on the desktop. A list of possible elements is provided for selection in a submenu.

Bookmarks

The bookmark editor allows you to create, group, change, or delete bookmarks. The bookmarks are used by the browser and file manager Konqueror. The bookmark editor can also import bookmarks from other browsers, such as Mozilla, Netscape, Opera, and Internet Explorer.

Run Command

This menu item opens a window in which to enter a command manually. Execute the command by pressing Enter.

Undo

Use this item to undo the last action. For example, if you have just created a new directory on the desktop, clicking this item reverts the creation so the directory disappears.

Paste

To keep a folder or document handy on the desktop, you can copy an icon from the file manager by right-clicking and selecting *Copy* then moving the mouse to the

desired location on the desktop. Right-click again and select *Paste*. The icon is now available on your desktop and can be moved around by dragging it with the left mouse button pressed.

Icons

This allows you to rearrange the icons on the desktop. You can also change the order of the icons.

Windows

This arranges the windows on the desktop, either on top of each other beginning from the top left corner or next to each other.

Refresh Desktop

If the desktop appears garbled in some way, use this menu item to redraw it.

Configure Desktop

This menu item starts a configuration dialog with which to configure the appearance and behavior of the desktop.

Start New Session

This menu opens a dialog box asking if you want to start a new user environment. After clicking *Start New Session*, the current session disappears into the background and the system switches to a new login screen. Each session has a function key assigned to it: F7 represents the first session, F8 the second one, and so on. To switch between different sessions, press Ctrl + Alt + Fx, where Fx is the function key corresponding to the desired session.

Lock Screen

If you leave your workstation and do not log out, you should use this function to prevent others from gaining access to your files. Depending on the setting, the screen turns blank or starts displaying a screensaver. To continue using the computer, enter your password.

Logout

Log out of your system if you are not going to use the system for some time.

7.1.2 The Main Menu

Open the main menu by clicking the icon to the far left of the panel. Alternatively, press Alt + F1. The main menu is subdivided into these sections: *Most Used Applications*,

All Applications (a menu with all applications sorted according to categories), and *Actions*. The following section provides information about a number of actions that can be triggered from the main menu.

Bookmarks

By selecting *Edit Bookmarks* from this menu, start an editor in which to organize your bookmarks. If you select one of the bookmarks present in the menu, the Konqueror browser starts and loads the corresponding URL.

Run Command

This item opens a dialog in which to enter a command. You can use it to start an application whose command you know without navigating through the program submenus.

Switch User

To start a second session with a graphical user interface on your machine, select *Start New Session* from the main menu. Your current session remains active while you are taken to the login screen. Log in. You can also start another window manager. Access the first session by pressing Ctrl + Alt + F7. Press F8 instead of F7 to access the new session. Additional sessions can be accessed by pressing Ctrl + Alt + F9 to F12.

Lock Session

If you leave your workstation, you can blank your screen or start a screensaver. Access to the session can only be regained with a password. To unlock, enter your normal login password. Locking the screen ensures that others cannot read or manipulate your documents or e-mail messages.

Log Out

You can log out from the system by means of this menu item. However, first you are asked what should happen after the logout. If you select *Login as different user*, the login screen is displayed, allowing you or another user to log in to the system. You can also shut down and turn off the computer or shut it down and reboot immediately. Confirm your selection with *OK* or remain logged in by clicking *Cancel*.

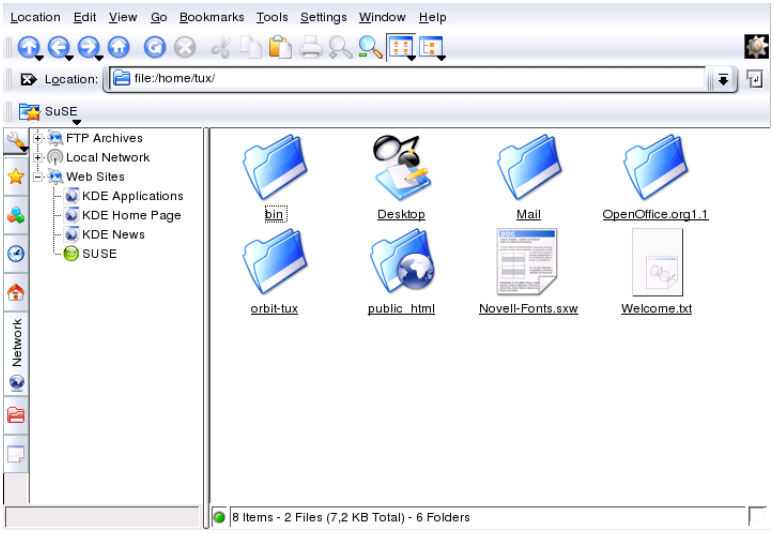
7.2 Konqueror as a File Manager

Konqueror is a unified Web browser, file manager, document viewer, and image viewer. This section covers the use of Konqueror for file management. If you are inter-

ested in Konqueror as a Web browser, see Chapter *The Web Browser Konqueror* (↑Reference).

Start Konqueror by clicking the house icon in the panel or by pressing Alt + F2 and entering `konqueror $HOME`. The contents of your home directory are then displayed. The file manager window consists of the menu bar at the top, the toolbar, and the location bar. The lower part of the window is split vertically into the navigation panel and the main window, which displays the contents.

Figure 7.1 *The File Manager Konqueror*



7.2.1 File Preview

Konqueror can show you a preview of certain files. Normally this is switched on if you browse in a directory. It only works if your icon view is activated (look into *View* → *View Mode*). The preview function can simplify your daily work. In big directories, it gives a rough overview of what is inside the files. Sometimes this is not useful, for example, for packed files. But if you point to the respective file, Konqueror opens a tool tip with additional information, like name, owner, and size.

You can change which files have a preview. Go to *Settings → Configure Konqueror* and open the section *Previews & Meta-Data*. Konqueror differentiates between Internet and local protocols. Each protocol can be activated. Approve with *Ok*.

7.2.2 File Associations

A modern desktop system should know how to handle its file types. With Konqueror, decide which application can be used to process a file. Go to *Settings → Configure Konqueror* and open the section *File Associations*. If you are searching for an extension, use *Find filename pattern*. Only file types with a matching file pattern appear in the list.

For example, to modify the application for MP3 files, enter `mp3` and see an entry `x-mp3`. After a click, the setting dialog opens on the right side for this file type. You can change the icon, the filename patterns, a description, and the order of the applications. If your tool is not listed, press *Add* and enter its command. Sometimes the order of the list entries is inappropriate. To change it, click the program to move then give it a higher or lower priority with *Move Up* or *Move Down*. The application listed at the top is used by default if you click a file of this type.

Sometimes you need a file type that is not in the list. With *Add*, open a dialog box in which to select a group and enter a type name. The group determines the main type, for example, audio, image, text, or video. Usually your file type can be assigned to one of those. In *Type name*, name your file type. After clicking *Ok*, determine the extensions of the filename. Put a description in the text field and decide which application to use. Approve with *Ok*.

7.2.3 The Konqueror Menu

Location

Using *Location*, open additional Konqueror windows. If you click *New Window*, your home directory is displayed in a new window. *Duplicate Window* produces a second window with the same content. You can also send a file or a link (using the browser function) by e-mail. If you click one of these menu items, the KMail composer opens. Specify the recipient and compose a text. Depending on the selected item, the file is already attached or the link is displayed in the e-mail body. You can also print directly from this menu.

Edit

Most items under *Edit* only become active if you select an object in the main window. Apart from the standard editing functions, like cutting, copying, pasting, renaming, moving to the trash, and deleting, there is also the *Create New* item, which can be used to create directories, files, and devices. Another item in the *Edit* menu lets you view and change the properties of files and directories and their permissions. With it, grant or deny the owner, a group, or all users read, write, and execute permissions. In the main window, select one or several files by moving the mouse pointer over them while keeping the left mouse button pressed or using *Selection* → *Select*.

View

Use the *View* menu to change views. If a directory has many objects in it, the text view or the tree view may be more efficient. To view HTML pages, activate *Use index.html*. If a directory contains a file with this name, Konqueror loads and displays it.

To influence the way in which the main window displays directory contents, use the items *Icon Size*, *Show Hidden Files*, *Sort*, and *Preview*. In addition, use *Configure Background* to set the main window's background to a certain color or use an image for it.

Go

The *Go* menu contains the navigation functions *Up*, *Back*, *Forward*, and *Home Page*. However, the same functions can be accessed more quickly and conveniently through the toolbar. You can also call applications from this menu and open all folders that have an icon on the desktop. In the lower part of the menu, find a list of the recently-viewed directories or links.

Bookmarks

Bookmarks can be made for Internet addresses (URLs) and paths to specific files or directories on your host. If you select *Add Bookmark*, the current content of the location bar is saved as a bookmark. To access this location, simply click this bookmark. For practical reasons, arrange bookmarks in folders. The `SUSE` folder already exists. This folder contains bookmarks of important SUSE Web pages. *Edit Bookmarks* opens the bookmark editor in which to perform tasks like deleting obsolete bookmarks, renaming bookmarks, and moving bookmarks from one folder to another.

Tools

This menu includes entries for a variety of items, such as *Run Command*, *Open Terminal Window*, and *Find Files*. You can use *View Filter* to limit the view to certain types of files. For example, one of your directories may hold graphics files of different formats, but you only want to see those in PNG format. You could then use this submenu item to hide all files that are not in PNG format.

Selecting *Create Image Gallery* causes Konqueror to search the directory for any image files. The program then creates thumbnail pictures of them and combines these into an HTML page. A dialog box prompts you to set the options for the HTML page, such as the font and the number of thumbnails per line.

Settings

Use the *Settings* menu to configure the look and feel of Konqueror. If you do not want a menu, select *Hide Menubar*. Press Ctrl + M to display it again. The *Toolbars* submenu allows you to hide or display other elements of the file manager.

View profiles can be used to change the view according to predefined usage patterns. To switch between the available profiles, select *Load View Profile*. One of the profiles is the Web browser profile, which is used automatically when you click the Konqueror icon in the panel. Add your own profiles by selecting *Configure View Profiles*. In addition, you can specify individual keyboard shortcuts with *Configure Shortcuts*, customize the toolbar with *Configure Toolbars*, and configure global settings for the file manager with *Configure Konqueror*.

Window

The *Window* menu allows you to split the main window horizontally and vertically. It also allows you to manage the tabbed subwindows within the main window by opening or closing a tab, duplicating an existing tab, or detaching a tab into a separate window.

Help

Under the *Help* menu, access the Konqueror handbook or the *What's This* function. Normally this function can also be accessed with the question mark symbol at the top right in the title bar. The mouse pointer is then displayed with a question mark. If you click an icon, a brief help text is displayed, if available. The *Help* menu also provides a short introduction to Konqueror and the possibility to report bugs and other concerns to the developers. *About Konqueror* and *About KDE* provide information about the version, license, authors, and translators of the project.

7.2.4 The Toolbar

The toolbar provides quick access to frequently-used functions that can also be accessed via the menu. If you let the mouse pointer rest above an icon, a short description is displayed. Right-click a free space in the toolbar to open a menu with which to change the position of the toolbar, switch from icons to text, change the icon size, and display or hide the individual bars. Start the configuration dialog with *Configure Toolbars*. To the right, the toolbar features the Konqueror icon, which is animated while a directory or Web page is loaded.

7.2.5 The Location Bar

The location bar is preceded by a black symbol with a white X. If you click this icon, the contents of the line are deleted, allowing entry of a new location. Valid locations can be path specifications, like the one that appears when the home directory is displayed, or Web page URLs. After entering an address, press Enter or click *Go* to the right of the input line. Access directories or Web pages visited recently via the black arrow to the right of the location bar. This function saves some typing if you need to access certain contents repeatedly. If there are locations that you need to view again and again, it is more convenient to create bookmarks for them.

7.2.6 The Main Window

The main window displays the content of the selected directory. If you click an icon, the respective file is displayed in Konqueror or loaded into the appropriate application for further processing. Clicking an RPM package lists the contents of the file. Selecting *Install package with YaST* prompts for the `root` password entry, after which the package is installed.

If you right-click an icon, a menu opens. The kind of menu displayed depends on the file type and offers common actions, such as *Cut*, *Copy*, *Paste*, and *Delete*. Use *Open with* to select the application with which to open the file from a list of suitable programs.

The quickest way to perform many actions is the drag and drop method. For example, easily move files from one Konqueror window to another by simply dragging them there while pressing the left mouse button. Subsequently, you are asked whether the objects should be moved or copied.

7.3 Important Utilities

The following pages introduce a number of small KDE utilities intended to assist in daily work. These applications perform various tasks, such as managing your keys for encrypting and signing files and e-mail messages, managing your clipboard, formatting floppy disks, compressing and decompressing diverse file archive types, and sharing your desktop with other users.

7.3.1 Creating an Image Gallery

If you have a large collection of images in a directory, you may find it difficult to manage them. Konqueror can help you by creating an HTML file with thumbnails. Open the respective directory in Konqueror and select *Tools → Create Image Gallery*. A dialog opens in which to specify the page title, the number of thumbnails per line, the background and foreground colors, and some other details. When you are finished, select *Create* to start the action. By default, Konqueror creates a file named `images.html`. It can be opened with Konqueror and presents a well-arranged thumbnail index of your image collection. To view an image in full size, simply click the corresponding thumbnail.

7.3.2 Managing Passwords with KWallet Manager

Remembering all the passwords for protected resources to which you need to log in can be problematic. KWallet remembers them for you. It collects all passwords and stores them in an encrypted file. With a single password, open your wallet to view, search, delete, or create new entries. Normally you do not need to insert an entry manually. KDE recognizes if a resource requires authentication and KWallet starts automatically.

IMPORTANT: Protect Your KWallet Password

If you forget your KWallet password, it cannot be recovered. Furthermore, anyone who knows your password can obtain all information contained in the wallet.

Configuring KWallet

When start KWallet for the first time, a window appears with the welcome screen. Choose between *Basic setup* and *Advanced setup*. *Basic setup* is recommended. If you choose it, select in the next screen whether you want to store personal information. Some KDE applications, like Konqueror or KMail, can use the wallet system to store Web form data and cookies. Select *Yes, I wish to use the KDE wallet to store my personal information* for this purpose and leave with *Finish*.

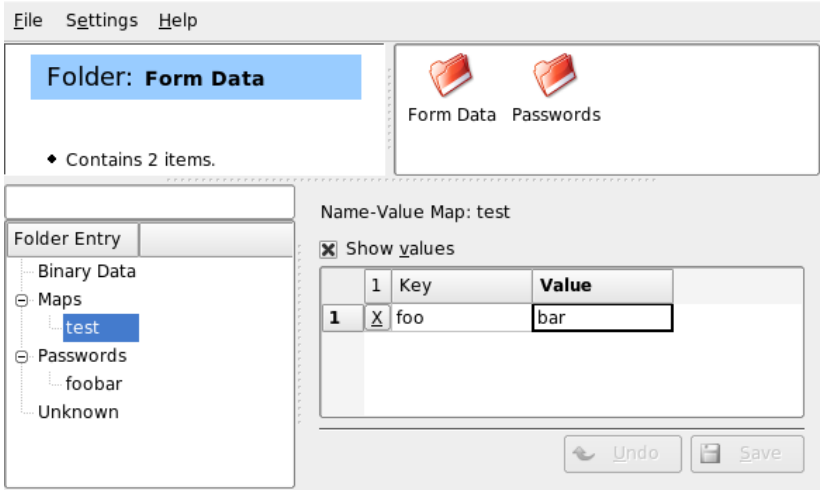
If you choose *Advanced setup*, you have an additional security level screen. The default settings are generally acceptable for most users, but others may wish to change them. *Automatically close idle wallets* closes wallets after a period of inactivity. To separate network passwords and local passwords, activate *Store network passwords and local passwords in separate wallet files*. Close with *Finish*.

Once configured, KWallet appears in the panel. Right-click the KWallet icon and select *Configure Wallet* if you want to modify the configured. A dialog box opens. Configure different settings, like how KWallet closes a wallet, which wallet is automatically selected, and two options about the wallet manager itself.

The KWallet Manager Window

To store data in your wallet or view its contents, open the manager window by right-clicking the KWallet icon in the panel and selecting *Configure Wallet*. The `kdewallet` folder is the default folder for your passwords. Click `kdewallet` and a window prompts for your password. After a successful login, you can see the main window. It is divided into four different parts: the top left part displays a summary, the top right part displays subfolders, the lower left part shows a list with folder entries, and the lower right part shows the contents of a selected entry. The window is shown in Figure 7.2, “The KWallet Manager Window” (page 184).

Figure 7.2 *The KWallet Manager Window*



To insert a new item, proceed as follows:

Procedure 7.1 *Inserting New Entries in Your Wallet*

1. You can add a new entry to *Maps* or *Passwords* only. Use *Maps* if you have key and value pairs. *Passwords* can contain multiline entries.

2. Right-click the respective folder entry.

3. A dialog box appears and prompts for a name of the new entry. Name your entry and approve it with *Ok*.

4. Your new entry is sorted under your folder entry. Click the new entry to display it on the right side. Initially it is empty.

5. Insert a new key and value pair with a right-click and choose *New Entry*. All entries are shown in a table view.

6. Name your key. Activate *Show values* to view the value row. Click to write into the cell.

7. Store your modifications with *Save*.

You can always change your password with *File → Change Password*.

Advanced Features

You probably do not need to pay very much attention to KWallet. It resides silently in the panel and is automatically activated if needed. One nice feature of KWallet is that you can move your wallet files to another computer, for example, to your laptop. To simplify this task, wallets can be dragged from the manager window to a file browser window. For example, save it on a USB stick and carry your passwords with you.

7.3.3 The Download Manager KGet

KGet is the download manager for KDE. It manages your transfers in a window. Stop, resume, delete, queue, and add transfers.

Adding Transfers

Start KGet by pressing Alt + F2 and entering the command `kget`. When the program starts for the first time, a dialog is displayed. Confirm this dialog to integrate KGet in Konqueror. When you close the dialog, KGet is integrated in the system tray of the panel as an icon with a down arrow.

Click this arrow to open the dialog displaying your transfers. To add a transfer to the list, select *File → Paste*. A dialog opens. Enter a URL in the input field and confirm with *OK*. Then specify the location for saving the downloaded file. After all information has been entered, the entry for the transfer is added to the main window of KGet and started.

Another way to add a transfer is by means of drag and drop. Simply drag a file, for example, from an FTP server, from Konqueror and drop it in the main window.

Timer-Controlled Transfers

You can also instruct KGet to perform your transfers at a specific time. Activate *Options → Offline Mode*. All transfers inserted from this point are not started immediately but queued. To start the clock, double-click the respective entry. A dialog opens. Select *Advanced*. The dialog is expanded by the settings needed for starting the transfer at a

certain time. Enter the day, month, year, and time and activate the *Timer* icon. Then close the window.

After making the desired settings for all your transfers, set KGet back to the online mode by deactivating *Options* → *Offline Mode*. The transfers should start at the specified times.

Settings

In *Settings* → *Configure KGet*, set preferences for the connection, determine directories for specific file extensions, and specify other settings.

7.3.4 The Clipboard Klipper

The KDE program Klipper serves as a clipboard for selected text, normally marked by keeping the left mouse button pressed. This text can be transferred to another application by moving the mouse pointer to the target location then pressing the middle mouse button (on a two-button mouse, press both buttons simultaneously). The text is copied to the selected location from the clipboard.

By default, Klipper is started when KDE is loaded and appears as a clipboard icon in the panel. View the contents of the clipboard by clicking this icon. The Klipper context menu and the last seven entries, also referred to as the history, are displayed. If an extensive text was copied to Klipper, only the first line of the text is displayed. The most recent entry is listed on top and is marked as active with a black check mark. To copy an older text fragment from Klipper to an application, select it by clicking it, move the mouse pointer to the target application, then middle-click.

As well as the contents of the clipboard, the context menu features the following menu items:

Enable Actions
: If you click this, a black check mark is displayed in front of it. For example, if you mark a URL with the mouse when actions are enabled, a window opens, enabling you to select a browser for displaying this URL. Click *Enable Actions* to disable this function.

Clear Clipboard History
: Deletes all entries from the clipboard.

Configure Klipper

This opens the Klipper configuration dialog. Control the program with keyboard shortcuts or use regular expressions. Check the Klipper handbook for details. Former Windows users may appreciate the option for activating the keyboard shortcuts Ctrl + C and Ctrl + X for cutting and Ctrl + V for pasting under the *General* tab. To use this feature, activate the entry *Synchronize contents of the clipboard and the selection* in *Clipboard/Selection Behavior*. Subsequently, use the mouse or the keyboard shortcuts to which you are accustomed.

Help

This item opens a submenu from which to open the Klipper handbook, send a bug report to the developers, and view information about Klipper and KDE.

Quit

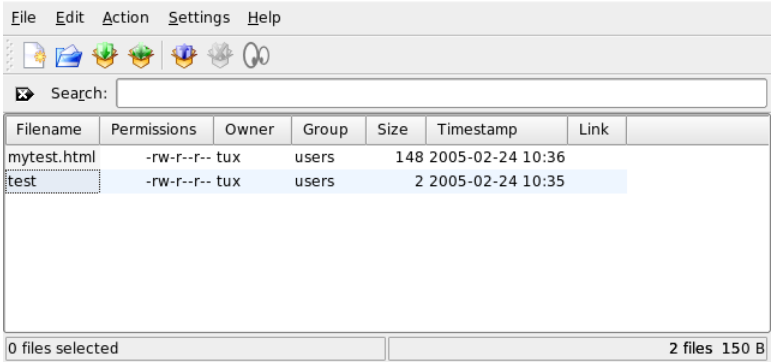
If you click *Quit*, a dialog is displayed asking whether Klipper should be started automatically the next time you log in. If you click *No*, start the program from the main menu the next time you want to use it. If you click *Cancel*, the program is not terminated.

7.3.5 Ark: Displaying, Decompressing, and Creating Archives

To save space on the hard disk, use a packer that compresses files and directories to a fraction of their original size. The application Ark can be used to manage such archives. It supports common formats, such as `zip`, `tar.gz`, `tar.bz2`, `lha`, and `rar`.

Start Ark from the main menu or from the command line with `ark`. If you already have some compressed files, move these from an open Konqueror window to the Ark window to view the contents of the archive. To view an integrated preview of the archive in Konqueror, right-click the archive in Konqueror and select *Preview in Archiver*. Alternatively, select *File* → *Open* in Ark to open the file directly. See Figure 7.3, “Ark: File Archive Preview” (page 188).

Figure 7.3 *Ark: File Archive Preview*



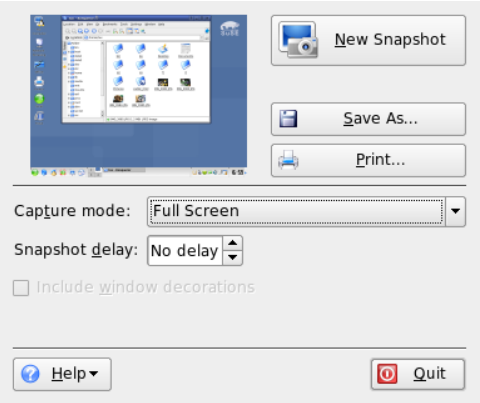
Once you have opened an archive, perform various actions. *Action* offers options such as *Add File*, *Add Folder*, *Delete*, *Extract*, *View*, *Edit With*, and *Open With*.

To create a new archive, select *File* → *New*. Enter the name of the new archive in the dialog that opens and specify the format using *Filter*. After confirming with *Save* or by pressing Enter, Ark opens an empty window. You can drag and drop files and directories from the file manager into this window. As the final step, Ark compresses everything into the previously selected archive format. For more information about Ark, select *Help* → *Ark Handbook*.

7.3.6 Screenshots with KSnapshot

With KSnapshot, create snapshots of your screen or individual application windows. Start the program from the main menu or from the command line with the command `ksnapshot`. The dialog of KSnapshot, shown in Figure 7.4, "KSnapshot" (page 189), consists of two parts. The upper area contains a preview of the current screen and three buttons for creating and saving the screenshots. In the lower part of the window, set some options to decide how the screenshot should be created.

Figure 7.4 *KSnapshot*



To take a screenshot, use *Snapshot delay* to determine the period in seconds to wait between when *New Snapshot* is clicked and the actual creation of the screenshot. If *Only grab the window containing the pointer* is active, only the window currently under the pointer is "photographed." By default, the program creates a shot of the entire screen. To change this, select an item from *Capture Mode*. To save the screenshot to a file, select *Save as* and set the directory and filename in the dialog that opens. To print the screenshot right away, select *Print*.

7.3.7 Viewing PDF Files with KPDF

PDF is probably one of more important formats. KPDF is a KDE program that can view and print them.

Start KPDF by pressing Alt + F2 and entering the command `kpdf`. Load a PDF file with *File* → *Open*. KPDF displays it in its main window. On the left side, there is a sidebar with thumbnails and a contents view. Thumbnails give an overview of the page. The contents view contains bookmarks to navigate in your document. Sometimes it is empty, meaning bookmarks are not supported by this PDF.

To view two pages in the main window, select *View* → *Two Pages*. The view depends on what last two options you activate in the *View* menu.

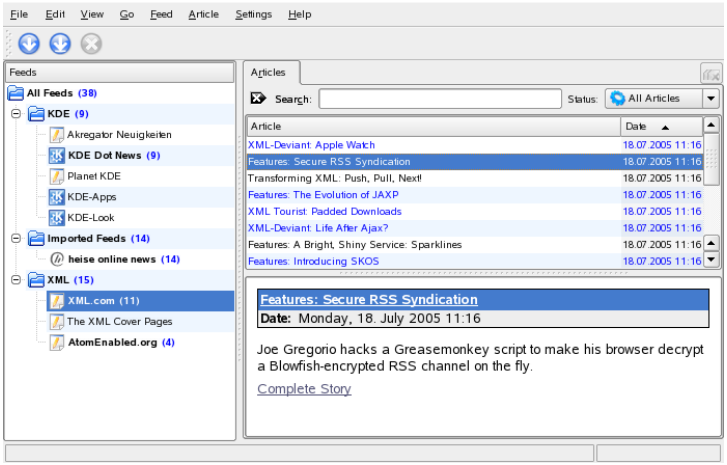
Another nice option is to select the area in which you are interested with the select tool from the toolbar. Draw a rectangle and choose from the pop-up menu whether you need

the selected area as text or as a graphic. It is copied to the clipboard. You can even save the area to a file.

7.3.8 Getting News with Akregator

Users who want to get the latest news can get their information with a newsfeed reader. One reader is Akregator. It connects to a server that contains a newsticker file and downloads it then shows the headlines and sometimes a small text to get an overview. See Figure 7.5, "Akregator Showing Some News" (page 190). If interested in this news, click it and view it in a separate tab.

Figure 7.5 *Akregator Showing Some News*



Akregator contains some predefined news feeds for KDE to get in touch with this tool. You can add news feeds manually or some Web sites announce it. For example, a Web site with feed support contains an orange rectangle in the bottom right corner. Click it to open a pop-up menu where you can select *Add Feed to Akregator*. Sometimes a Web site does not announce that it supports a news feed. Then you can search this site with some keywords like `feed` or `rss`. Sometimes you are successful and can obtain a link.

If you want to add a news feed, do the following:

Procedure 7.2 *Adding a News Feed to Akregator*

1. Determine the URL of your news feed. Normally this can be found on your preferred Web site. More links can be found in the KNewsticker tool, an applet for the KDE panel.

2. Open Akregator by pressing Alt + F2 and entering `akregator`. It opens a new window with the list of all feeds in your configuration. If you close this window it docks in the system tray.

3. Create a new folder with *Feed* → *New Folder*. This gives you the opportunity to group your feeds in categories.

4. Name your new folder.

5. Click this folder and choose *Feed* → *Add Feed*.

6. Insert the feed URL, for example `http://www.novell.com/newsfeeds/rss/coolsolutions.xml`. A new window opens where you can change the feed name, URL, or the update interval. With the *Feed Archive* tab, change how long articles should be stored.

7. Proceed with *Ok*. Akregator downloads the latest articles.

After the download of the latest headers is finished, you can click an entry. Depending on the feed, this can list a small summary or just a link. With *Complete Story*, read the entire article.

You can check for new news manually with *Fetch Feed*. Another option is to specify an update interval. Configure this by clicking *Settings* → *Configure Akregator*. A window opens where you can select the interval in *General* → *Use interval fetching*. Confirm with *Ok*.

You can read the complete story either in Akregator or in an external browser. Clicking *Complete Story* lets you select which.

7.3.9 Chatting with Friends: Kopete

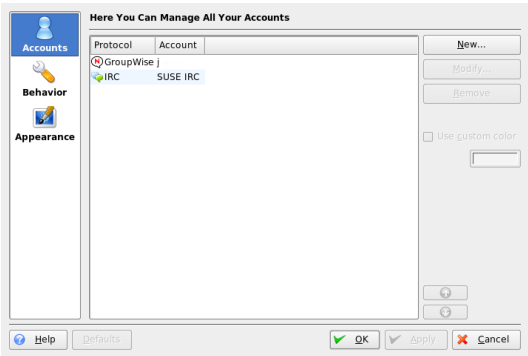
Kopete is an online messenger application allowing multiple partners connected to the Internet to chat with each other. Kopete currently supports all common messenger protocols, such as ICQ, MSN, Yahoo, SMS, Jabber, and IRC.

Configuring Kopete

Configure Kopete by entering your personal user data. Click *Settings* → *Configure Kopete*. With *Accounts*, enter your user data. You must register with a provider offering instant messaging services before using such service. Click *New* to open a configuration assistant that can assist you in completing your user profile.

The next step lists the available messaging services. Select the service with which you have registered and click *Continue*. Then enter the user data received on registration with the messaging service. This usually consists of the nickname or e-mail address and a password. Complete the configuration of the messenger account by clicking *Finish*.

Figure 7.6 *Kopete Configuration Panels*



The next item in the configuration dialog is *Appearance*. It influences how Kopete is displayed. *Emoticons* provides a selection of various types of smileys.

Use *Chat window* and *Colors & Fonts* to adjust the appearance of the chat windows for communication with other participants. Choose from the classic themes of the corresponding providers or create a custom theme by adjusting the font or color to your preferences.

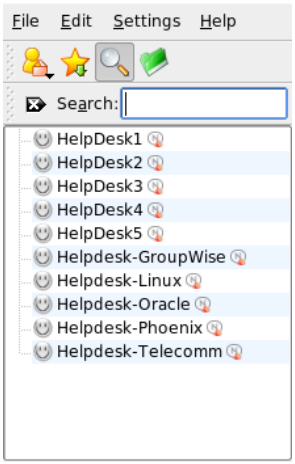
Adding Contacts

Add contacts to chat with them. If you have already created an account on another PC, this data is imported and automatically added to your contact list. To create a contact entry manually, click *File → Add Contact*. A new assistant appears to help with creation. However, you must be online and connect with Kopete to the selected messaging service to add a contact to your list.

Adding Groups

Access this with *File → Create New Group*. Name the group and confirm this with *OK*. A new folder appears in the contact list that can be used to store the desired contacts. Drag and drop contacts into the desired folder. Grouping contacts can give a better overview.

Figure 7.7 *The Main Kopete Window*



Empty groups can be disabled by activating *Settings → Hide Empty Groups*.

Using Kopete

It is necessary to establish a connection to the Internet to be able to chat with other participants. When this is done, you should set your status by clicking *File → Set Status*

→ *Online*. This establishes a connection between Kopete and the selected messaging service. After the successful login, you are visible to others.

The main application windows features a list of contacts. You must have contacts to chat with others (see Section "Adding Contacts" (page 193) for more information). When you right-click a contact marked as online, a menu opens with various options. Send that person a message or start a chatting session. A chat allows invitation of additional participants for real-time discussion. Connection to all participants is closed when the creator of the chat session closes it.

If you want to see your former chatting session, select a contact and go to *Edit* → *View History*. This menu item opens a dialog where you can search and view your chatting sessions with this person.

You can view other options by right-clicking a username. A pop-up menu opens. An important option is *Start Chat* to start a chatting session. With *Rename Contact* and *Remove Contact*, you can run the respective action. The pop-up menu also contains a submenu item with the username where you can block the user or get user information.

7.3.10 KDE Accessibility Tools

KDE offers handicap support for daily computer work. There are a number of options in KDE, especially *Regional & Accessibility* → *Accessibility* in the KDE Control Center. Some additional programs also help meet particular needs.

KMag—Magnify Your Desktop

People with low vision have limited possibilities for improving the visibility of their desktop. The font size can be increased, but that is not always a good solution. The tool KMag solves this problem. It magnifies your desktop. Start it with the command `kmag` then see a part of the screen in the KMag window.

With the toolbar, choose some important options, such as the zoom factor, the refresh rate, and how KMag should behave. You can magnify around the mouse cursor, show a window for selecting the magnified area, or magnify the entire screen. With F5, halt the process. Press it again to restart it.

KTTS—The KDE Text-to-Speech Manager

KTTS is an implementation of a system for producing speech from text. This enables other applications to use this subsystem in a consistent manner. The capabilities of KTTS include speaking the content of a text file, KDE notification events, and all or part of the text of a Web page in Konqueror. Before configuring KTTS, make sure that you have `festival` and the KDE accessibility package installed.

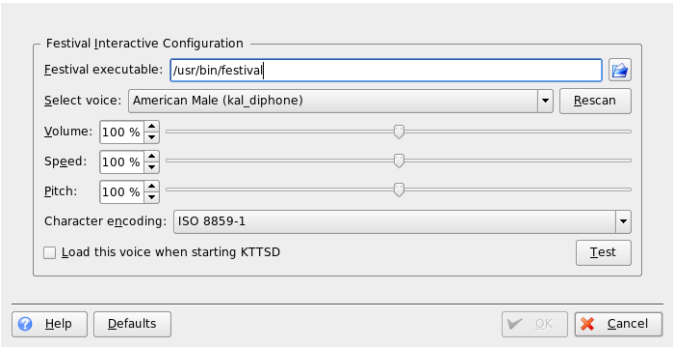
NOTE: Additional Languages

Due to incompatible licenses, only the English may be included in our distribution. For more information about festival, see `http://festvox.org/`.

To start KTTS, press Alt + F2 and type `kttsmgr`. If you have not configured KTTS yet, the talkers screen appears with an empty list. Click *Add* to add a talker to the list. This opens a new dialog box. Select a speech synthesis plug-in by name or by language. When the synthesizer method is chosen, the synthesizer box and the language box are updated. For example, check the synthesizer box and choose *Festival Interactive*. If you leave with *OK*, the synthesizer automatically configures itself.

In this example, the *Festival Interactive* talker is added to the list. To configure it, select it and go to *Edit*. A dialog box like that in Figure 7.8, "Configuring Talkers" (page 195) appears. In it, select the voice (if more than one is available), set the volume, speed, and pitch, and test it. Approve with *OK*.

Figure 7.8 *Configuring Talkers*



KTTS has some additional tabs. With *General*, enable or disable the text-to-speech service. Notifications are messages routed from an application to the KDE notification system. You can configure it with *Speak notifications (KNotify)*. To embed KTTS in the system tray, check the respective option.

The *Talker* tab was already explained above. In *Audio*, choose between aRts and GStreamer, two sound systems. *Jobs* gives an overview of your current speech jobs. You can pause, resume, restart, remove, or change the order of the jobs.

KMouth—Speak Text with KDE

KMouth is a program designed to speak for those who cannot. You must have installed and configured a speech synthesizer as described in Section "KTTS—The KDE Text-to-Speech Manager" (page 195).

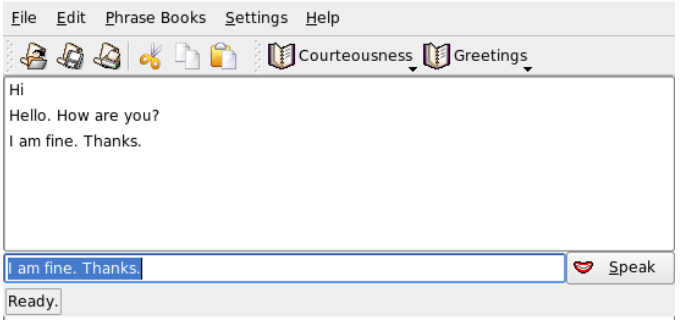
When you start KMouth for the first time, a wizard opens. This enables you to specify the command to use to speak the text. If you already configured your text to speech system with KTTS, this is not necessary.

The second page lets you select some phrase books. A phrase book is a collection of frequently-used phrases. This has the advantage that the user does not need to type them. KMouth supports different languages and different topics (courteousness, greetings, "How are you?," and personal). You can select all or only one of them.

With the third page, define a dictionary. It is used for word completion. You can define either the KDE documentation of the respective language or the OpenOffice.org dictionary as a text base. After leaving with *Finish*, KMouth generates the dictionary and opens the main dialog.

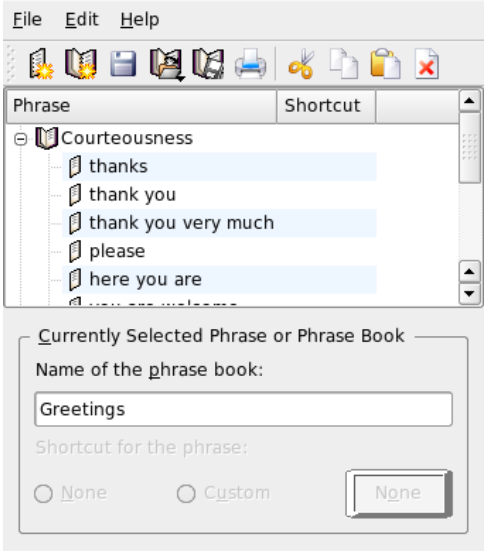
The main dialog, shown in Figure 7.9, "Using KMouth" (page 197), displays the topics of the phrase books, a history of spoken sentences, and an edit field. To speak, type the sentence in the text field or choose it from the list. Click *Speak*.

Figure 7.9 *Using KMouth*



Improve the application by entering your own sentences in your phrase book. Choose *Phrase Books* → *Edit* and a window appears like that in Figure 7.10, "Using Phrase Books in KMouth" (page 197). You can see the phrase and the assigned shortcut. By right-clicking the phrase book or a phrase itself, open pop-up menu in which to select *New Phrase*. Insert your phrase in the text field. You can assign a shortcut with the keycap button. When satisfied with your settings, choose *File* → *Save*. Your added phrase book is shown in your toolbar.

Figure 7.10 *Using Phrase Books in KMouth*

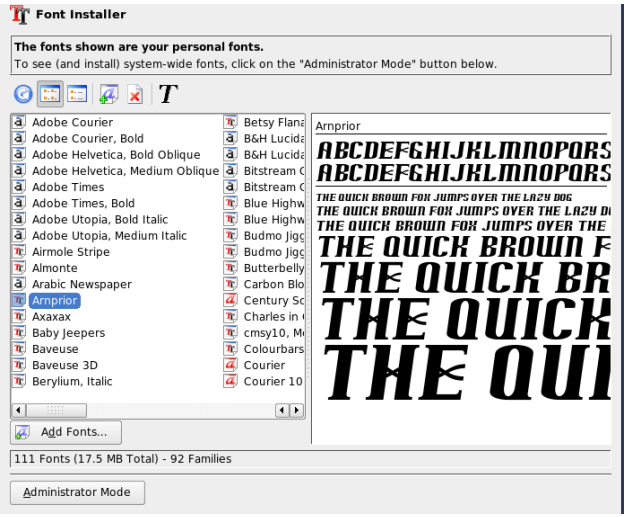


7.3.11 Font Administration with KFontinst

By default, SUSE Linux provides various fonts commonly available in different file formats (Bitmap, TrueType, etc.). These are known as *system fonts*. Users can additionally install their own fonts from various collections on CD-ROM. Such user-installed fonts are, however, only visible and available to the corresponding user.

The KDE control center provides a comfortable tool for administering system and user fonts. It is shown in Figure 7.11, "Font Administration from the Control Center" (page 198).

Figure 7.11 *Font Administration from the Control Center*



To check which fonts are currently available, type the URL `fonts:/` into the address field of a Konqueror session. This displays two windows: `Personal` and `System`. User-installed fonts are installed to the folder `Personal`. Only root can install to the `System` folder.

To install fonts as a user, follow these steps:

1. Start the Control Center and access the appropriate module with *System Administration* → *Font Installer*.

2. Choose *Add Fonts* from the toolbar or from the menu available when right-clicking the list.

3. In the dialog that opens, select one or more fonts for installation.

4. The marked fonts are then installed to your personal font folder. Selecting a font shows a preview.

To update system fonts, first select *Administrator mode* and enter your root password. Then proceed as described for user font installation.

8 The GNOME Desktop

This chapter introduces the GNOME (GNU Network Object Model Environment) desktop. It provides a brief overview of the most important elements and functionalities of your desktop, including an in-depth description of the Nautilus file manager. It also includes descriptions of several smart and useful applications that can help you feel at home in your new desktop environment.

GNOME has a very intuitive look and feel. However, users migrating to Linux from a Microsoft Windows desktop might need to get accustomed to a few things. Users migrating from a Macintosh might notice that GNOME feels very much like home, because it provides a Mac-like look-and-feel on the Linux desktop.

The following issues are very important in GNOME:

double-click
: Like a Mac desktop, the GNOME desktop is entirely ruled by the double-click. To trigger an event by clicking a desktop icon (for example, to open your home folder), double-click it. To open subdirectories in the file manager, double-click the parent folder.

instant apply
: Any configuration dialog opened from a GNOME application or as part of the GNOME desktop configuration follows the principle of *instant apply*. After you specify your preferences, click the *Close* button to save your changes and exit the dialog. You will not find *Apply*, *OK*, or *Cancel* buttons in this kind of dialog.

8.1 Desktop Components

The most important elements of the GNOME desktop are the icons on the desktop, the panels at the top and bottom border of the screen, and the panel menus. The mouse is your most important tool, although GNOME does have built-in support for assistive technologies, such as braille, speech synthesizers, and on-screen keyboards to support handicapped users. For information about these technologies, see Section 8.4, "Assistive Technology Support" (page 217).

8.1.1 The Icons

The default GNOME desktop features the following desktop icons providing basic navigation and functionalities for your system:

Computer
: The *Computer* desktop icon can be used to quickly access any device attached to your computer. This includes hard drives, partitions, digital cameras, and USB flash drives.

Home
: The *Home* desktop icon provides easy access to your private data.

Trash
: Anything you want to delete can be dropped onto the *Trash* desktop icon. As long as you do not empty the trash can, these items are not deleted permanently and can still be restored.

You can right-click an icon to display a menu offering file operations such as copying, cutting, or renaming. Selecting *Properties* from the menu displays a configuration dialog. The title of an icon and the icon itself can be changed with *Select Custom Icon*. Use the *Emblems* tab to add a small icon to an item (such as a file or a folder) to visually mark the item. For example, to mark a file as important, you can add an Important emblem to the file icon. Use *Permissions* to view and modify the access, read, and write permission settings for this file for the user, the group, or others. *Notes* manages comments. The menu for the trash can additionally features *Empty Trash*, which deletes the contents of the trash can.

To remove an icon from the desktop, simply drag it to the trash can. Be careful with this option—if you throw folder or file icons into the trash can, the actual data is

deleted. If the icons only represent links to a file or directory, only the links are deleted.

To create a link on the desktop to a folder or a file, access the object with Nautilus (see Section 8.2.1, "Navigating in Nautilus" (page 206)). Right-click the object then click *Make Link*. Drag the link from the Nautilus window and drop it onto the desktop.

8.1.2 The Desktop Context Menu

Right-clicking an empty spot on the desktop displays a menu with various options. Select *Create Folder* to create a new folder or *Create Document* to create a new document. You can create a launcher icon for an application with *Create Launcher*. Provide the name of the application and the command for starting it, then choose an icon to represent it. The order and alignment of desktop icons are controlled by the *Clean Up by Name* and *Keep Aligned* options. It is also possible to change the desktop background or paste an item on the desktop.

8.1.3 The Panels

On your first login, the GNOME desktop starts with two panels, one located at the top of the screen and the other located at the bottom of the screen. The upper panel holds the three panel menus (*Applications*, *Places*, and *Desktop)*, a quick launch area providing application buttons for the most important programs (Firefox Web browser and OpenOffice.org Writer), a system tray holding applet icons (SUSEWatcher, SUSEPlugger, Display Settings, and Network Settings), and a notification area with the system clock and the volume control.

The bottom panel contains the window icons of all started applications in the taskbar on the left. If you click the name of a window in the taskbar, the window is moved to the foreground. If the program is already in the foreground, a mouse click minimizes it. Clicking a minimized application reopens the window.

To the right of the taskbar, the *Workspace Switcher* provides access to additional work areas. These virtual desktops provide extra space in which to arrange open applications and windows. For example, you can open an editor in one workspace, some shells on another, and your e-mail application and Web browser on a third. Move a window to another workspace by dragging its icon in the Workspace Switcher from one workspace to another.

Right-click an empty spot in a panel to open a menu offering help, information, and commands for GNOME and the panels. Select *Properties* to open a configuration dialog where you can change the position and background of the panel. You can add launchers, tools, and various applets to the existing panels with *Add to Panel*. Remove panel elements by right-clicking their icons and selecting *Delete This Panel*. Add a new panel by clicking *New Panel*.

The Applications Menu

The *Applications* menu provides an easily accessible hierarchy of the applications installed on your system. Most of them are grouped into smaller submenus dedicated to a category, such as *System*, *Office*, and *Internet*. To start any application, click *Applications* to display the complete menu, select a suitable category, click the submenu, then click the application's name.

Applications not listed in the menu can be started via the *Run Application* prompt (Alt + F2) if you know the command. For example, if you want to browse your digital photographs and can not find gThumb in the menu, enter `gthumb` at the *Run Application* prompt.

The Places Menu

The *Places* menu provides easy access to common locations, such as your home directory, drives, the desktop, and network folders. A search function for recent documents and a file search can also be launched with this menu. For more information about file management of local and remote folders, see Section 8.2.2, "File Management" (page 207).

The Desktop Menu

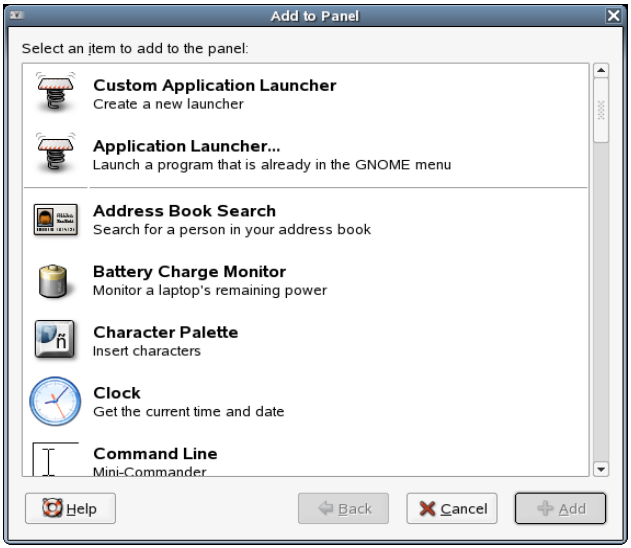
The *Desktop* menu contains controls for managing your desktop. Here, find the *GNOME Control Center* (customizes your desktop), *Lock Screen* (starts the screen saver and requires the password to stop it), and *Log Out* (ends your session), and an easy-to-use program for taking screen shots of your desktop. The screen shot function can also be accessed by pressing Print Screen (also known as PrtSc).

Applets

An applet is a small application that resides within a panel, indicated by a small icon that you click to interact with the applet. Unlike “real” applications, applets do not have their own windows on screen. Some applets are already preconfigured to be in your panel on first start, but there are many more applets you can add to your own panels.

Add an applet to a panel from the panel menu. Right-click any empty space on the panel then click *Add to Panel*. Select the applet to add then click *Add*. The new applet is then permanently added to the panel.

Figure 8.1 *Adding a New Icon to the Panel*



To modify the properties of an applet, right-click the applet to display the panel object pop-up menu then click *Preferences*. To move an applet, middle-click the applet.

8.2 File Management with Nautilus

Nautilus is GNOME's file manager and viewer. You can use Nautilus to create folders and documents, display and manage your files and folders, run scripts, write data to a CD, and open URI locations. The following sections provide an overview of the basic

functions of Nautilus and a few tips on its configuration. For more information, see the help pages for Nautilus.

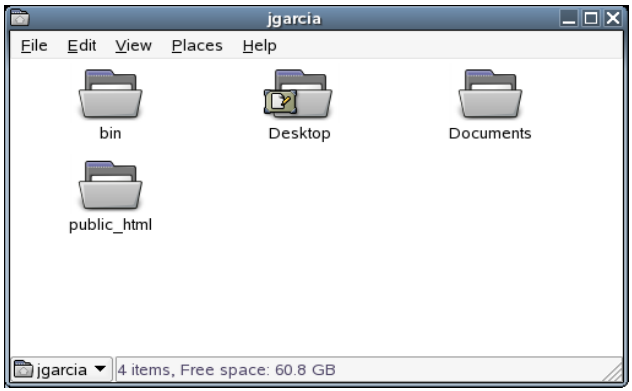
You can open Nautilus in any of the following ways:

- Click *Applications* → *System* → *File Manager*
- Click the *Computer* icon on the desktop
- Click the Home icon on the desktop

8.2.1 Navigating in Nautilus

The standard window of Nautilus is shown in Figure 8.2, "Nautilus Standard Window" (page 206). The default view of a folder's content is the icon view featuring just an icon and the filename for each file. If configured accordingly, a preview of the file's content can be provided, as described in Section 8.2.4, "Configuring Nautilus" (page 209). When you double-click a folder icon, a new Nautilus window opens, displaying the folder's content.

Figure 8.2 *Nautilus Standard Window*



To navigate between folders, use the drop-down menu in the bottom left corner of the Nautilus window. In it, find all parent folders to the current directory up to the root file system. You can select the folder you want and open it in a new Nautilus window on top of the old one or you can open just the immediate parent of the current folder by

clicking *File → Open Parent*. If you want to close these parent folders, click *File → Close Parent Folders*.

If you prefer a browser-like file navigation, switch to the Nautilus browser interface by right-clicking a folder then clicking *Browse Folder*. A new Nautilus window opens, providing the normal functionality but with a browser's look-and-feel.

To navigate folders and files, use the *Back*, *Forward*, and *Up* buttons as you would in a Web browser. The functionalities and configuration options described in Section 8.2.2, "File Management" (page 207) and Section 8.2.4, "Configuring Nautilus" (page 209) also apply to the file browser interface.

8.2.2 File Management

You can use drag-and-drop to perform several tasks in Nautilus. For example, you can drag any file from the desktop and drop it onto an open Nautilus window. If you have two Nautilus windows open, you can drag a file or folder from one window and drop it onto another. To copy an item, select the item, press and hold Ctrl, then drag the item to a new location.

To move files between directories, you can open the source directory containing the file you want to move, click *File → Open Location*, type the path to the target directory, click *Open*, then drag the files to the Nautilus window holding the target directory. Files and folders can be moved to and from an open Nautilus window and the desktop.

If you need to create multiple copies of a file, click *Edit → Duplicate*. For a simple cut, copy, and paste of files, use the *Edit* menu or right-click the file icon then select the appropriate item from the context menu that appears. To rename a file, right-click it then click *Rename*.

Nautilus also supports file browsing across a network. To connect to a remote server such as FTP, SSH, HTTP, or Samba, click *File → Connect to Server*. You are then prompted for the type of server you want to connect to as well as some additional information, such as the name of the folder you want to access, the port number, and a username. When you click *Connect*, the remote folder is displayed as part of the *Places* panel menu and appears as a desktop icon. For any future connections, select the appropriate item from the *Places* menu and provide the necessary authentication to log in to these network folders. To close these connections, right-click the desktop icon then click *Unmount Volume*.

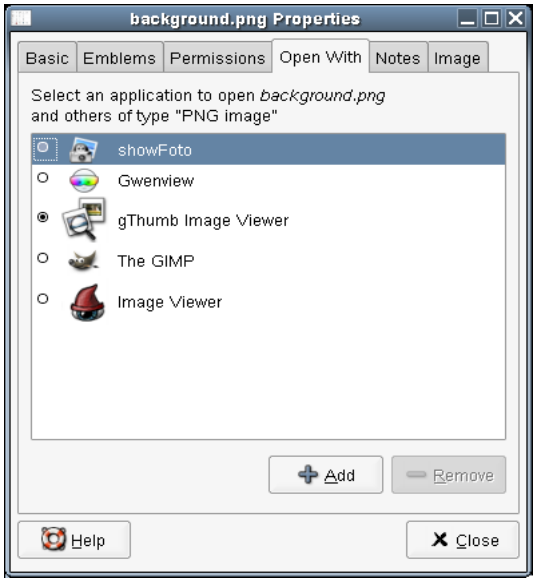
Nautilus provides basic CD and DVD burning functionality. To copy data to CD or DVD, create a directory containing the data you want to burn, click *Places → CD/DVD Creator,* drag the folder holding the data onto the *CD/DVD Creator* window, then click *File → Write to Disc*.

8.2.3 Editing MIME Types

MIME types determine which application should open a file when clicked in a Web or file browser. The actual file type and the MIME type of a file are closely associated with each other. An HTML file has the `html` file type and would be registered to have a `text/html` MIME type. Nautilus has built-in support for most of the common MIME types and proposes the appropriate application when you choose to open a file. In this case, it would propose a Web browser.

However, you might want to change the MIME type for certain files if you are not happy with the default applications suggested by Nautilus. Changing the default application assigned to a certain MIME type is very straightforward.

Figure 8.3 *Editing the MIME Type*



To edit a MIME type:

1. In a Nautilus window, right-click a file of the MIME type to change.
2. Click *Properties* → *Open With*.
3. Click *Add* to search for a suitable application.
4. Select the application to use then click *Add*.
5. Click *Close* to exit the dialog.

Even if a MIME type has not yet been properly registered, the procedure is the same as described above. These modifications are applied globally, which means that any file of this type is subsequently opened by the defined application.

8.2.4 Configuring Nautilus

Nautilus retrieves its default font and other preferences from the desktop configuration. To set Nautilus-specific preferences, click *Edit* → *Preferences* in any Nautilus window to open the *File Management Preferences* dialog. This dialog offers five tabs (*Views*, *Behavior*, *Display*, *List Columns*, and *Preview*) that you can use to set the following preferences:

- The default settings for views
- The behavior of files and folders, executable text files, and Trash
- The information that is displayed in icon captions
- Preview options to improve the performance of Nautilus

In *Views*, specify a default view and select sort options and display settings. You can choose to display hidden files and backup files in the view window, set a default zoom level for folders, and arrange items in icon view so that the items in the folder are closer to each other. You can also choose to place icon captions beside the icons instead of under them.

Behavior lets you choose to single-click or double-click an item to activate it and run executable files when you click them. Alternatively, choose to display the contents of

an executable file when it is clicked. The operating mode of the trash is also set here. You can activate a confirmation dialog before deletion or add a *Delete* item to the *Edit* menu and the pop-up menu that is displayed when you right-click a a file, folder, or desktop object. If you select an item then click *Delete*, the item is immediately deleted from your file system.

Use *Display* to set icon caption preferences. An icon caption displays the name of a file or folder in an icon view. The icon caption also includes three additional items of information on the file or folder that are displayed after the filename. Normally, only one item of information is visible, but when you zoom in on an icon, more of the information is displayed. You can modify what additional information is displayed in icon captions.

In *List Columns*, specify what information is displayed in list view in Nautilus windows. Set which columns are displayed in list view and the order in which the columns are displayed.

With *Preview*, select whether to activate preview thumbnails for certain file types. The preview features can affect the speed at which Nautilus responds to your requests. You can modify the behavior of some of these features to improve the speed of the file manager.

8.3 Important Utilities

GNOME has many applets and applications designed to interact with the desktop and each other. This section introduces some of them. Learn how to manage little notes on your desktop, use the GNOME dictionary, chat using Gaim, and enjoy various types of multimedia applications.

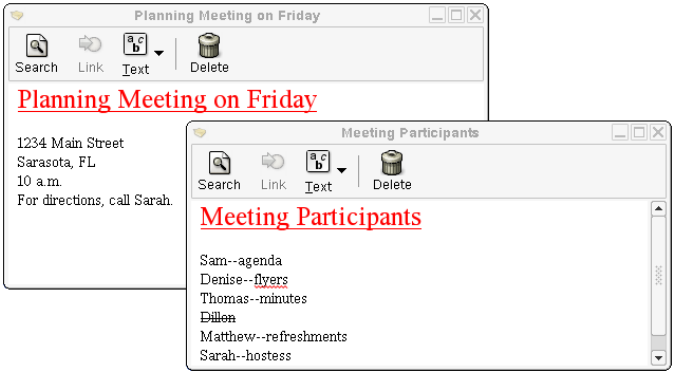
8.3.1 Taking Notes with Tomboy

Tomboy is a desktop note-taking application that helps you organize ideas and information. See an example in Figure 8.4, “Examples of Tomboy Notes” (page 211). Add Tomboy to a panel by right-clicking the panel then clicking *Add to Panel*. Scroll down the list of items, select *Tomboy Notes*, then click *Add*. The Tomboy icon appears in your panel.

To create a new note, left-click the Tomboy icon then select *Create New Note*. Type the text of your note. Link notes with each other by clicking *Link*. These links can even survive renaming and reorganizing. The *Search Notes* function located in the panel menu of Tomboy lets you search your notes. Web links and e-mail addresses can also be dropped onto Tomboy. Click *Recent Changes* to view a list of your notes in the order they were last modified.

Tomboy also supports advanced editing features, such as highlighted text, inline spell checking, autolinking Web and e-mail addresses, undo and redo, and font styling and sizing.

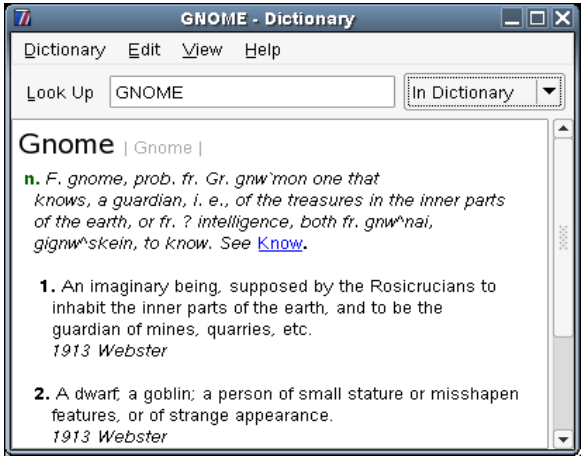
Figure 8.4 *Examples of Tomboy Notes*



8.3.2 Dictionary

GNOME Dictionary, shown in Figure 8.5, "GNOME Dictionary" (page 212), provides dictionary definitions of words using any server that supports the dict protocol (an Internet standard for client/server dictionary applications). An Internet connection is required because this applet accesses an online dictionary. To open Dictionary, click *Applications* → *Office* → *Dictionary* → *Dictionary* or enter `gnome-dictionary` in a terminal window.

Figure 8.5 *GNOME Dictionary*



Type a word in *Look Up* then press Enter. By default, the query is sent to the dict.org server. To use a different server, click *Edit* → *Preferences*. dict.org lets you choose between various databases for special vocabularies, such as jargon or computer terminology. Under *Strategy*, specify the search strategy to use, such as matching the exact word, parts of the word, or the prefix or suffix. Click *Help* to access the application's help.

8.3.3 The Gaim Messenger

Gaim is a powerful instant messenger client. It is shown in Figure 8.6, "Gaim" (page 213). The application supports various protocols, such as AIM, ICQ, GroupWise®, IRC, Jabber, and MSN. Its most popular features include the ability to log in to multiple accounts on multiple instant messaging networks at the same time, automatic text replacement, and spell checking. Gaim has buddy pounces (known as "buddy alerts" in AOL Messenger), meaning that you can configure Gaim to notify you whenever one of your buddies enters or leaves a channel you are currently connected to. Gaim can send you a message announcing this, play a sound, or execute a command.

To access Gaim, click *Applications* → *Internet* → *Chat* → *Gaim Internet Messenger* or enter `gaim` in a terminal window. On first start-up, create a list of your accounts on different instant messaging networks by clicking *Accounts* → *Add*. Select the protocol then specify your screen name, password, and alias. Select *Remember password* and

Auto-login if you want Gaim to log in automatically on start-up. To keep track of your e-mail while using Gaim, select *New mail notifications*. To use a buddy icon with your account, open a file dialog and select one. Additional options, such as proxy settings and server addresses, can be configured after clicking *Show more options*. When you have completed your account settings, click *Save* to exit this dialog.

Figure 8.6 *Gaim*

As soon as you are finished specifying the account data, it is shown in the login window. To sign on, select your account from the *Account* menu, type your password, click *Sign on*, and start chatting.

8.3.4 Playing Streaming Media with RealPlayer

RealPlayer* gives you access to multimedia files stored on the Internet or locally on your computer. See Figure 8.7, "RealPlayer" (page 214). It supports RealAudio*, RealVideo* 10, MP3, Ogg Vorbis, Theora, H263, AAC, and more. To launch RealPlayer, click *Applications* → *Multimedia* → *RealPlayer* 10.

The first time you open RealPlayer, see the RealPlayer Setup Assistant. Click *Forward* to start then follow the instructions in the assistant to set up RealPlayer on your computer.

Figure 8.7 *RealPlayer*

There are two ways to play media clips on your computer. The first is local playback, which is when you click *File → Open File* on the RealPlayer menu then select the media file to play. The other way clips are played is as streamed content. This is when any clip is played in real time over the Internet. You can connect to streamed content by clicking links on a Web page or selecting *File → Open Location*.

Use the options on the *Play* menu or the buttons in the lower-left of the program to navigate through a clip. You can play, pause, stop, fast forward, or rewind a clip; turn the volume up or down; or mute a clip. The *Position Slider* (located in the lower-right of the program window) indicates where you are in the clip. Drag the slider to jump to a different position in the clip.

8.3.5 Internet Telephony and Video Conferencing with GnomeMeeting

GnomeMeeting lets you see and speak to other people via Internet telephony (VoIP) and video conferencing. The GnomeMeeting address book is shared with the Evolution e-mail client, so you do not need to specify contact information in more than one place.

You can browse for other GnomeMeeting users on your local network without knowing their contact details first, and you can view your own video output side by side with the video from your conversation partners so you see what they see.

To open GnomeMeeting, click *Applications → Internet → Telephone → GnomeMeeting*. The first time you access GnomeMeeting, you need to complete the steps in the First Time Configuration Druid that automatically opens.

8.3.6 Managing Archives with File Roller

In GNOME, you can manage file archives with File Roller. As an archive manager, it can create and modify archives, view the content of an archive, view a file contained in the archive, and extract files from the archive. File Roller supports the following formats: tar archives uncompressed (`.tar`) or compressed with gzip (`.tar.gz`, `.tgz`), bzip (`.tar.bz`, `.tbz`), bzip2 (`.tar.bz2`, `.tbz2`), compress (`.tar.Z`, `.taz`), or lzop (`.tar.lzo`, `.tzo`); Zip archives (`.zip`); Jar archives (`.jar`, `.ear`, `.war`); Lha archives (`.lzh`); Rar archives (`.rar`); and single files compressed with gzip, bzip, bzip2, compress, and lzop.

You can easily view archive contents from File Roller with other applications without needing to decompress the archives. File Roller supports drag-and-drop, allowing you to drag file icons from the desktop or from the file manager (Nautilus) to the File Roller window and drop them there.

To open File Roller, click *Applications → Utilities → Archiving → Archive Manager*. To create a new archive, click *Archive → New*. Specify a name for the new archive (without a file extension) and the directory where you want to create the archive. Then select an archive type from the drop-down menu. Click *New* to exit the dialog. Add files to the archive by dragging-and-dropping files from the desktop or the file manager or by clicking *Edit → Add Files*.

After completing the selection and configuration, exit the dialog. The archive you created is available for further processing at the specified location. To decompress an archive, load it to File Roller, click *Edit → Extract*, then specify the target directory.

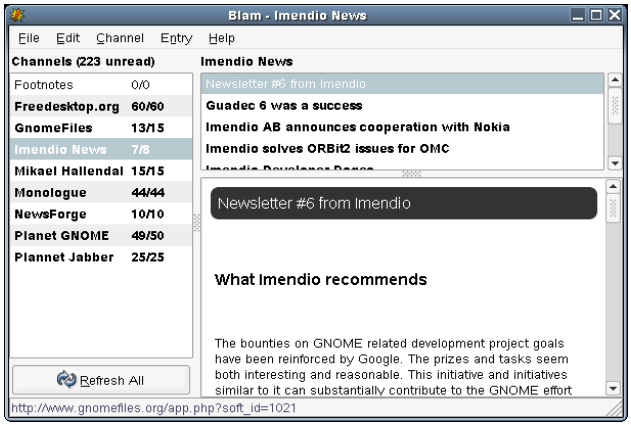
8.3.7 Reading News Feeds with Blam

Blam, shown in Figure 8.8, “Blam Feed Reader” (page 216), is a tool that helps you keep track of the growing number of news feeds distributed as RSS. RSS provides news updates from a Web site in a simple form for your computer. You can read these files in a program called an *aggregator*, which collects news from various Web sites and provides it to you in a simple form. Blam is a GNOME aggregator that lets you subscribe

to any number of feeds and provides an easy-to-use interface to stay up to date. Blam lets you print the news entries you like and automatically updates feeds at regular intervals.

To open Blam, click *Applications → Internet → RSS Reader → Blam Feed Reader*. Channels appear in a list on the left of the Blam window. Click any channel then view the headlines in the top-right panel. Clicking a headline displays the article in the lower-right panel. To see the full article, scroll to the bottom of the lower-right panel and click *Show in browser*.

Figure 8.8 *Blam Feed Reader*



To add a new channel, click *Channel → Add*, enter the URL, then click *OK*. For example, entering `http://www.novell.com/newsfeeds/rss/slp.xml` adds the SUSE Linux Professional Cool Solutions channel to your list and downloads the latest articles.

8.3.8 Exchanging News with Pan Newsreader

Usenet is a collection of computers that let users exchange public messages on various topics. These messages are similar to e-mail, but are transmitted by special software that is separate from your e-mail system. They are intended for public discussions rather than personal communication. A Usenet message is called an *article*. Articles are

grouped by topic into *newsgroups*. The entire collection of articles and newsgroups is called *news*.

Pan is an open source newsgroup client that supports basic newsreader features, such as reading and writing news, threading articles, and replying via e-mail. Articles can be sorted by author, date, subject, or the number of unread children in the thread. Pan also supports yEnc (see `http://www.yenc.org`), offline newsreading, article filtering, multiple connections, and more features for power users and `alt.binaries` fans.

To open Pan, click *Applications* → *Internet* → *Usenet News Reader* → *Pan Newsreader*. When you start Pan for the first time, it prompts you for configuration information. Click *Forward* then follow the online instructions to configure Pan.

To read the messages in a group, click the group in the left pane. You are then prompted for how many headers to download. If this is the first time you have viewed a group, select *Download All Headers*. Otherwise, select *Download New Headers*. Then click *Execute*.

To subscribe to a newsgroup, right-click the group in the left pane then click *Subscribe*.

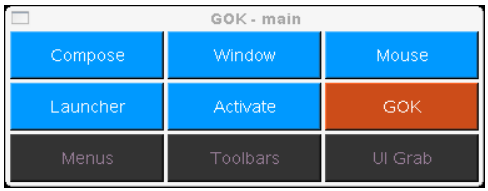
8.4 Assistive Technology Support

GNOME offers a number of applications to support users with disabilities. These applications include an on-screen keyboard (GOK), a powerful screen reader (Gnopernicus) with magnification, speech and braille support, and a text entry interface (Dasher). Activate the support for any assistive technology in the GNOME control center, which can be accessed by clicking *Desktop* → *GNOME Control Center*.

8.4.1 GNOME On-Screen Keyboard

GNOME On-Screen Keyboard (GOK) provides a virtual keyboard on screen if you cannot use standard mouse and keyboard devices to control you computer. With appropriate hardware support, you can use a joystick or any pointer device as the input device. To access GOK, click *Applications* → *Utilities* → *Desktop* → *On-Screen Keyboard*.

Figure 8.9 *GOK in Use*



To edit a text file using GOK:

1. Click *Launcher* in the main menu, which is shown in Figure 8.9, "GOK in Use" (page 218).

2. Click *Text Editor* to launch a GNOME text editor, then click *back* to return to the main menu.

3. Click *Compose* to launch the actual on-screen keyboard and start entering your text. If you need advanced editing functionality such as selecting, copying, pasting, or skipping characters, words, sentences, or lines, click *Edit*. To return to the keyboard window, click *back*.

4. To save the text you have written, click *back* to return to the main window then click *Menus* to launch a window containing buttons to open any menu from the text editor's menu bar.

5. Click *File* → *Save As* to open the file dialog of the text editor.

6. Click *Compose* to type the filename via the virtual keyboard then click *Return* on the virtual keyboard.

7. To terminate the text editor, return to the main menu then click *Menus* → *File* → *Quit*.

To configure the behavior of GOK, click *GOK* → *Preferences* in the main window and adjust the *Appearance*, *Keyboard*, *Actions*, *Feedback*, *Access Methods*, and *Prediction* settings.

For more information on GOK, see `http://www.gok.ca`, where you can also find comprehensive online help for this tool.

8.4.2 Gnopernicus

Gnopernicus is a powerful tool collection with various types of screen reading applications for blind and visually impaired users. It provides the following functionalities:

Speech
A speech synthesizer software is used to translate the actions on screen to spoken words. If your computer has a sound card, you can configure Gnopernicus to speak about anything that happens on screen.

Braille and Braille Monitor
If a braille device is connected to your computer, Gnopernicus can translate the screen directly to this device. If you also activated *Braille Monitor*, you get an on-screen display of the braille output. This option is useful for demonstration purposes.

Magnifier
This module assists visually impaired users by magnifying the screen using a customizable zoom factor.

To access Gnopernicus, click *Applications* → *Utilities* → *Desktop* → *Screen Reader and Magnifier*. After Gnopernicus is started, its main menu appears in the top-left corner of the screen, as shown in Figure 8.10, "Configuring Gnopernicus" (page 219). You can determine which functionalities should be provided when your desktop starts by clicking *Startup Mode*. Each active module can be configured using the *Preferences* dialog.

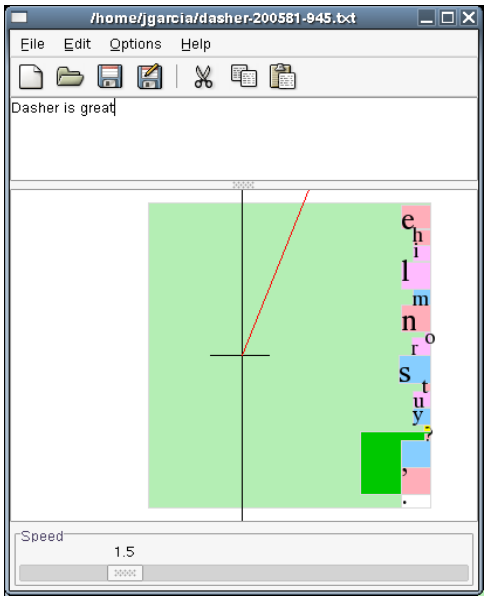
Figure 8.10 *Configuring Gnopernicus*

For more information on the Gnopernicus project, see http://www.baum.ro/gnopernicus.html.

8.4.3 Dasher

Dasher lets you create texts without using a keyboard. You can use it on any computer device that comes without a keyboard (handheld or wearable computers) or on a normal computer that is controlled with a joystick, touchpad, head mouse, or eyetracker instead of keyboard and mouse.

Figure 8.11 *Writing with Dasher*



Dasher is driven by continuous pointer gestures. Start with one character, then drag the pointer to the next one until your text input is finished. Dasher supports various languages (English and European languages, Japanese, and some African languages) and can easily be trained to support other languages. For more information on the Dasher project, see http://www.inference.phy.cam.ac.uk/dasher.

Part IV Troubleshooting

Common Problems and Their Solutions

9

This chapter offers a range of common problems that can arise with SUSE Linux, with an intention of covering as many of the various types of potential problems as possible. That way, even if your precise situation is not listed here, there might be one similar enough to offer hints as to the solution.

9.1 Finding Information

Linux logs things in a fair amount of detail. This means that when things do go wrong, there is usually some information about what happened. Even if the logs do not tell you why (although they do, sometimes), you can at least get a head start on figuring it out. There are several places to look when you have problems with a SUSE Linux system, most of which are standard to Linux systems in general and some of which are peculiar to SUSE Linux systems.

The following is a list of the most commonly checked log files and what they typically contain.

Log File	Description
`/var/log/boot.msg`	Messages from the kernel during the boot process.
`/var/log/mail.*`	Messages from the mail system.

Log File	Description
`/var/log/messages`	Ongoing messages from the kernel and system log daemon when running.
`/var/log/SaX.log`	Hardware messages from the SaX display and KVM system.
`/home/`*`user`*`/.xsession-errors`	Messages from the desktop applications currently running. Replace *`user`* with the actual username.
`/var/log/warn`	All messages from the kernel and system log daemon assigned WARNING level or higher.
`/var/log/wtmp`	Binary file containing user login records for the current machine session. View it with `last`.
`/var/log/Xorg.*.log`	Various start-up and runtime logs from the X Window system. It is useful for debugging failed X start-ups.
`/var/log/YaST2/`	Directory containing YaST's actions and their results.
`/var/log/samba/`	Directory containing Samba server and client log messages.

Linux comes with a number of tools for system analysis and monitoring. See Chapter *System Monitoring Utilities* (↑Reference) for a selection of the most important ones used in system diagnostics.

Each scenario included in the following begins with a header describing the problem followed by a paragraph or two offering suggested solutions, available references for more detailed solutions, and cross-references to other scenarios that might be related.

9.2 Installation Problems

Installation problems are situations when a machine fails to install. It may fail entirely or it may not be able to start the graphical installer. This section highlights some of the typical problems you might run into and offers possible solutions or workarounds for this kind of situations.

9.2.1 No Bootable CD-ROM Drive Available

If your computer does not contain a bootable CD or DVD-ROM drive or if the one you have is not supported by Linux, there are several options for installing your machine without a need for a built-in CD or DVD drive:

Booting from a Floppy Disk
Create a boot floppy and boot from floppy disk instead of CD or DVD.

Using an External Boot Device
If it is supported by the machine's BIOS and the installation kernel, boot for installation from external CD or DVD drives.

Network Boot via PXE
If a machines lacks a CD or DVD drive, but provides a working ethernet connection, perform a completely network-based installation. See Section “Remote Installation via VNC—PXE Boot and Wake on LAN” (Chapter 1, *Remote Installation*, ↑Reference) and Section “Remote Installation via SSH—PXE Boot and Wake on LAN” (Chapter 1, *Remote Installation*, ↑Reference) for details.

Booting from a Floppy Disk (SYSLINUX)

On some older computers, there is no bootable CD-ROM drive available, but a floppy disk drive. To install on such a system, create boot disks and boot your system with them. See Section 3.7.3, “Boot and Rescue Disks” (page 85) for directions for creating boot disks with YaST.

The boot disks include the loader SYSLINUX and the program linuxrc. SYSLINUX enables the selection of a kernel during the boot procedure and the specification of any parameters needed for the hardware used. The program linuxrc supports the loading of kernel modules for your hardware and subsequently starts the installation.

When booting from a boot disk, the boot procedure is initiated by the boot loader SYSLINUX (package `syslinux`). When the system is booted, SYSLINUX runs a minimum hardware detection that mainly consists of the following steps:

1. The program checks if the BIOS provides VESA 2.0–compliant framebuffer support and boots the kernel accordingly.

2. The monitor data (DDC info) is read.

3. The first block of the first hard disk (MBR) is read to map BIOS IDs to Linux device names during the boot loader configuration. The program attempts to read the block by means of the the lba32 functions of the BIOS to determine if the BIOS supports these functions.

If you keep Shift pressed when SYSLINUX starts, all these steps are skipped. For troubleshooting purposes, insert the line

```
verbose 1
```

in `syslinux.cfg` for the boot loader to display which action is currently being performed.

If the machine does not boot from the floppy disk, you may need to change the boot sequence in the BIOS to `A,C,CDROM`.

External Boot Devices

Most CD-ROM drives are supported. If problems arise when booting from the CD-ROM drive, try booting CD 2 of the CD set.

If the system does not have a CD-ROM or floppy disk, it is still possible that an external CD-ROM, connected with USB, FireWire, or SCSI, can be used to boot the system. This depends largely on the interaction of the BIOS and the hardware used. Sometimes a BIOS update may help if you encounter problems.

9.2.2 Installation Fails or Machine Does Not Boot from the Installation Media

There are two possible reasons for a machine not to boot for installation:

CD or DVD-ROM Drive Unable to Read the Boot Image

Your CD-ROM drive might not be able to read the boot image on CD 1. In this case, use CD 2 to boot the system. CD 2 contains a conventional 2.88 MB boot image that can be read even by unsupported drives and allows you to perform the installation over the network as described in Chapter *Remote Installation* (↑Reference).

Incorrect Boot Sequence in BIOS

The BIOS boot sequence must have CD-ROM set as the first entry for booting. Otherwise the machine would try to boot from another medium, typically the hard disk. Guidance for changing the BIOS boot sequence can be found the documentation provided with your motherboard or in the following paragraphs.

The BIOS is the software that enables the very basic functions of a computer. Motherboard vendors provide a BIOS specifically made for their hardware. Normally, the BIOS setup can only be accessed at a specific time—when the machine is booting. During this initialization phase, the machine performs a number of diagnostic hardware tests. One of them is a memory check, indicated by a memory counter. When the counter appears, look for a line, usually below the counter or somewhere at the bottom, mentioning the key to press to access the BIOS setup. Usually the key to press is [Del], [F1], or [Esc]. Press this key until the BIOS setup screen appears.

Procedure 9.1 *Changing the BIOS Boot Sequence*

1. Enter the BIOS using the proper key as announced by the boot routines and wait for the BIOS screen to appear.

2. To change the boot sequence in an AWARD BIOS, look for the *BIOS FEATURES SETUP* entry. Other manufacturers may have a different name for this, such as *ADVANCED CMOS SETUP*. When you have found the entry, select it and confirm with [Enter].

3. In the screen that opens, look for a subentry called *BOOT SEQUENCE*. The boot sequence is often set to something like `C,A` or `A,C`. In the former case, the ma-

chine first searches the hard disk (C) then the floppy drive (A) to find a bootable medium. Change the settings by pressing PgUp or PgDown until the sequence is `A,CDROM,C`.

4 Leave the BIOS setup screen by pressing Esc. To save the changes, select *SAVE & EXIT SETUP* or press F10. To confirm that your settings should be saved, press Y.

Procedure 9.2 *Changing the Boot Sequence in a SCSI BIOS (Adaptec Host Adapter)*

1 Open the setup by pressing Ctrl + A.

2 Select *Disk Utilities*, which displays the connected hardware components.

   Make note of the SCSI ID of your CD-ROM drive.

3 Exit the menu with Esc.

4 Open *Configure Adapter Settings*. Under *Additional Options*, select *Boot Device Options* and press Enter.

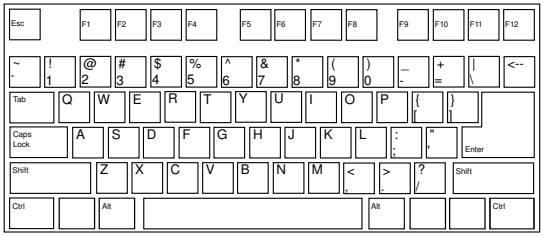
5 Enter the ID of the CD-ROM drive and press Enter again.

6 Press Esc twice to return to the start screen of the SCSI BIOS.

7 Exit this screen and confirm with *Yes* to boot the computer.

Regardless of what language and keyboard layout your final installation will be using, most BIOS configurations use the US keyboard layout as depicted in the following figure:

Figure 9.1 *US Keyboard Layout*



9.2.3 Installation Fails and Machine Fails to Boot

Some hardware types, mainly fairly old or very recent ones, fail to install. In many cases, this might happen because missing support for this type of hardware in the installation kernel or due to certain functionalities included in this kernel, such as ACPI, that still cause problems on some hardware.

If your system fails to install using the standard *Installation* mode from the first installation boot screen, try the following:

1. With the first CD or DVD still in the CD-ROM drive, reboot the machine with Ctrl + Alt + Del or using the hardware reset button.

2. When the boot screen appears, use the arrow keys of your keyboard to navigate to *Installation--ACPI Disabled* and press Enter to launch the boot and installation process. This option disables the support for ACPI power management techniques.

3. Proceed with the installation as described in Chapter 1, *Installation with YaST* (page 3).

If this fails, proceed as above, but choose *Installation--Safe Settings* instead. This option disables ACPI and DMA support. Most hardware should boot with this option.

If both of these options fail, use the boot options prompt to pass any additional parameters needed to support this type of hardware on to the installation kernel. For more information about the parameters available as boot options, refer to the kernel documen-

tation located in `/usr/src/kernel_version/Documentation/kernel-parameters.txt`.

There are various other ACPI-related kernel parameters that can be entered at the boot prompt prior to booting for installation:

`acpi=off`
This parameter disables the complete ACPI subsystem on your computer. This may be useful if your computer cannot handle ACPI at all or if you think ACPI in your computer causes trouble.

`acpi=oldboot`
Switch off ACPI for everything but those parts that are necessary for booting.

`acpi=force`
Always enable ACPI even if your computer has an old BIOS dated before the year 2000. This parameter also enables ACPI if it is set in addition to `acpi=off`.

`pci=noacpi`
Disables PCI IRQ routing of the new ACPI system.

For more information about these issues, search for Support Database articles with the keyword "acpi" at https://portal.suse.com.

Once you have determined the right parameter combination, YaST automatically writes them to the boot loader configuration to make sure that the system boots properly next time.

If unexplainable errors occur when the kernel is loaded or during the installation, select *Memory Test* in the boot menu to check the memory. If *Memory Test* returns an error, it is usually a hardware error.

9.2.4 Machine Fails to Launch the Graphical Installer

After you insert the first CD or DVD into your drive and rebooted your machine, the installation screen comes up, but after you select *Installation*, the graphical installer does not start.

There are several ways to deal with this situation:

- Try to select another screen resolution for the installation dialogs.
- Select *Text Mode* for installation.
- Do a remote installation via VNC using the graphical installer.

To change to another screen resolution for installation, proceed as follows:

1. Boot for installation.
2. Press F3 to open a menu from which to select a lower resolution for installation purposes.
3. Select *Installation* and proceed with the installation as described in Chapter 1, *Installation with YaST* (page 3).

To perform an installation in text mode, proceed as follows:

1. Boot for installation.
2. Press F3 and select *Text Mode*.
3. Select *Installation* and proceed with the installation as described in Chapter 1, *Installation with YaST* (page 3).

To perform a VNC installation, proceed as follows:

1. Boot for installation.
2. Enter the following text at the boot options prompt:

   ```
   vnc=1 vncpassword=some_password
   ```

   Replace `some_password` with the password to use for installation.
3. Select *Installation* then press Enter to start the installation.

   Instead of starting right into the graphical installation routine, the system continues to run in text mode then halts, displaying a message containing the IP address

and port number under which the installer can be reached via a brower interface or a VNC viewer application.

4 If using a browser to access the installer, launch the browser and enter the address information provided by the installation routines on the future SUSE Linux machine and hit Enter:

```
http://ip_address_of_machine:5801
```

A dialog opens in the browser window prompting you for the VNC password. Enter it and proceed with the installation as described in Chapter 1, *Installation with YaST* (page 3).

IMPORTANT

Installation via VNC works with any browser under any operating system, provided Java support is enabled.

If you use any kind of VNC viewer on your preferred operating system, enter the IP address and password when prompted to do so. A window opens, displaying the installation dialogs. Proceed with the installation as usual.

9.2.5 Machine Boots but Starts a Minimalistic Boot Screen

You inserted the first CD or DVD into the drive, the BIOS routines are finished, but the system does not start with the graphical boot screen. Instead it launches a very minimalistic text-based interface. This might happen on any machine not providing sufficient graphics memory for rendering a graphical boot screen.

Although the text boot screen looks minimalistic, it provides nearly the same functionality as the graphical one:

Boot Options

Unlike the graphical interface, the different boot options cannot be selected using the cursor keys of your keyboard. The boot menu of the text mode boot screen offers some keywords to enter at the boot prompt. These keywords map to the options offered in the graphical version. Enter your choice and hit Enter to launch the boot process.

Custom Boot Options

After selecting a boot option, enter the appropriate keyword at the boot prompt or enter some custom boot options as described in Section 9.2.3, "Installation Fails and Machine Fails to Boot" (page 229). To launch the installation process, press Enter.

Screen Resolutions

Use the F keys to determine the screen resolution for installation. If you need to boot in text mode, choose F3.

9.3 Boot Problems

Boot problems are situations when your system does not boot properly (that is, does not boot to the expected runlevel and login screen).

9.3.1 Machine Loads the BIOS Properly but Fails to Load the GRUB Boot Loader

If the hardware is functioning properly, it is possible that the boot loader has become corrupted and Linux cannot start on the machine. In this case, it is necessary to reinstall the boot loader.

To reinstall the boot loader, proceed as follows:

1. Insert the installation media into the drive.
2. Reboot the machine.
3. Select *Installation* from the boot menu.
4. In the first installation screen, select *Expert* and set the installation mode to *Repair Installed System*.
5. Once in the YaST System Repair module, select *Expert Tools* then select *Install New Boot Loader*.
6. Restore the original settings and reinstall the boot loader.

7 Leave YaST System Repair and reboot the system.

Other reasons for the machine not booting may be BIOS-related:

BIOS Settings
Check your BIOS for references to your hard drive. GRUB might simply not be started if the hard drive itself cannot be found with the current BIOS settings.

BIOS Boot Order
Check whether your system's boot order includes the hard disk. If the hard disk option was not enabled, your system might install properly, but fail to boot when access to the hard disk is required.

9.3.2 Machine Loads GRUB Properly and Boots Linux but Text-Based Login Is Presented Instead of Graphical Login

If the machine comes up, but does not boot into the graphical login manager, anticipate problems either with the choice of the default runlevel or the configuration of the X Window System. To check the runlevel configuration, log in as the root user and check whether the machine is configured to boot into runlevel 5 (graphical desktop). A quick way to check this is to examine the contents of `/etc/inittab`, as follows:

```
nld-machine:~ # grep "id:" /etc/inittab
id:5:initdefault:
nld-machine:~ #
```

The returned line indicates that the machine's default runlevel (`initdefault`) is set to `5` and that it should boot to the graphical desktop. If the runlevel is set to any other number, use the YaST Runlevel Editor module to set it to `5`.

IMPORTANT

Do not edit the runlevel configuration manually. Otherwise SuSEconfig (run by YaST) will overwrite these changes on its next run. If you need to make manual changes here, disable future SuSEconfig changes by setting *`CHECK_INITTAB`* in `/etc/sysconfig/suseconfig` to `no`.

If the runlevel is set to `5`, you might have corruption problems with your desktop or X Windows software. Examine the log files at `/var/log/Xorg.*.log` for detailed messages from the X server as it attempted to start. If the desktop fails during start, it might log error messages to `/var/log/messages`. If these error messages hint at a configuration problem in the X server, try to fix these issues. If the graphical system still does not come up, consider reinstalling the graphical desktop. For more information about X server configuration, refer to Chapter *The X Window System* (↑Reference).

One quick test: the `startx` command should force the X Window System to start with the configured defaults if the user is currently logged in on the console. If that does not work, it should log errors to the console. For more information about the X Window system configuration, refer to Chapter *The X Window System* (↑Reference).

9.4 Login Problems

Login problems are those where your machine does, in fact, boot to the expected welcome screen or login prompt, but refuses to accept the username and password or accepts them but then does not behave properly (fails to start the graphic desktop, produces errors, drops to a command line, etc.).

9.4.1 User Cannot Log In—Valid Username and Password Combinations Not Accepted

This usually occurs when the system is configured to use network authentication or directory services and, for some reason, is unable to retrieve results from its configured servers. The root user, as the only local user, is the only user that can still log in to these machines. The following are some common reasons why a machine might appear functional but be unable to process logins correctly:

- The network is not working. For further directions on this, turn to Section 9.5, “Network Problems” (page 240).

- DNS is not working at the moment (which prevents GNOME or KDE from working and the system from making validated requests to secure servers). One indication that this is the case is that the machine takes an extremely long time to respond to

any action. More information about this topic can be found in Section 9.5, "Network Problems" (page 240).

- If the system is configured to use Kerberos, the system's local time might have drifted past the accepted variance with the Kerberos server time (this is typically 300 seconds). If NTP (network time protocol) is not working properly or local NTP servers are not working, Kerberos authentication ceases to function because it depends on common clock synchronization across the network.

- The system's authentication configuration is misconfigured. Check the PAM configuration files involved for any typos or misordering of directives. For additional background information about PAM and the syntax of the configuration files involved, refer to Chapter *Authentication with PAM* (↑Reference).

In all cases that do not involve external network problems, the solution is to reboot the system into a single-user mode and repair the configuration before booting again into operating mode and attempting to log in again.

To boot into single-user mode:

1. Reboot the system. The boot screen appears, offering a prompt.

2. Enter `1` at the boot prompt to make the system boot into single-user mode.

3. Enter the username and password for `root`.

4. Make all the necessary changes.

5. Boot into the full multiuser and network mode by entering `telinit 5` at the command line.

9.4.2 User Cannot Log In—Particular Valid Username and Password Not Accepted

This is by far the most common problem users encounter, because there are many reasons this can occur. First, if using network authentication, determine that the user's username and password do, in fact, work on other (properly functioning) machines. See if another

user can log in to the misbehaving machine. If another user can log in without difficulty or if root can log in, log in and examine the `/var/log/messages` file. Locate the time stamps that correspond to the login attempts and determine if PAM has produced any coherent error messages.

The following are some common reasons why authentication for a particular user might fail on a specific machine:

- The username exists in the machine's local authentication files and is also provided by a network authentication system, causing conflicts.
- The home directory exists but is corrupt or unavailable. Perhaps it is write protected or is on a server that is inaccessible at the moment.
- The user does not have permission to log in to that particular host in the authentication system.
- The machine has changed hostnames, for whatever reason, and the user does not have permission to log in to that host.
- The machine cannot reach the authentication server or directory server that contains that user's information.
- There might be problems with the X Window System authenticating this particular user, especially if the user's home has been used with another Linux distribution prior to installing the current one.
- Check whether the user remembered his password correctly before trying to debug the whole authentication mechanism on the misbehaving machine. If the user indeed entered the wrong password, use the YaST User Management module to change the user's password.

To locate the cause of the login problems, try the following options:

1 Try to log in from a console (using Ctrl + Alt + F1).

If this is successful, the blame cannot be put on PAM or the directory server on which the user's home is hosted, because it is possible to authenticate this user on this machine. Try to locate any problems with the X Window System or the desktop (GNOME or KDE). For more information, refer to Section 9.4.3, “ Login

Successful but GNOME Desktop Fails ” (page 238) and Section 9.4.4, “ Login Successful but KDE Desktop Fails” (page 239).

2 If the user's home directory has been used with another Linux distribution, remove the `Xauthority` file in the user's home. Use a console login via Ctrl + Alt + F1 and run `rm .Xauthority` as this user. This should eliminate X authentication problems for this user. Try a graphical login again.

3 If graphical login still fails, do a console login with Ctrl + Alt + F1. Try to start an X session on another display, the first one (`:0`) is already in use:

```
startx -- :1
```

This should bring up a graphical screen and your desktop. If it does not, check the log files of the X Window System (`/var/log/Xorg.`*`displaynumber`*`.log`) or the log file for your desktop applications (`.xsession-errors` in the user's home directory) for any irregularities.

4 If the desktop could not start because of corrupt configuration files, proceed with Section 9.4.3, “ Login Successful but GNOME Desktop Fails ” (page 238) or Section 9.4.4, “ Login Successful but KDE Desktop Fails” (page 239).

9.4.3 Login Successful but GNOME Desktop Fails

If this is true for a particular user, it is likely that the user's GNOME configuration files have become corrupted. Some symptoms might include the keyboard failing to work, the screen geometry becoming distorted, or even the screen coming up as a bare gray field. The important distinction is that if another user logs in, the machine works normally. If this is the case, it is likely that the problem can be fixed relatively quickly by simply moving the user's GNOME configuration directory to a new location, which causes GNOME to initialize a new one. Although the user is forced to reconfigure GNOME, no data is lost.

1 Log in as root.

2 `cd` to the user's home directory.

3 Move the user's GNOME configuration directories to a temporary location:

```
mv ./gconf ./gconf-ORIG-RECOVER
      mv ./gnome2 ./gnome2-ORIG-RECOVER
```

4 Log out.

5 Have the user log in, but do not allow him to run any applications.

6 Recover the user's individual application configuration data (including the Evolution e-mail client data) by copying the `~/gconf-ORIG-RECOVER/apps/` directory back into the new `~/gconf` directory as follows:

```
cp -a ./gconf-ORIG-RECOVER/apps ./gconf/
```

If this causes the login problems, attempt to recover only the critical application data and force the user to reconfigure the remainder of the applications.

9.4.4 Login Successful but KDE Desktop Fails

There are several reasons why a KDE desktop would not allow users to login. Corrupted cache data can cause login problems as well as corrupt KDE desktop configuration files.

Cache data is used at desktop start-up to increase performance. If this data is corrupted, start-up is slowed down or fails entirely. Removing them forces the desktop start-up routines to start from scratch. This takes more time than a normal start-up, but data is intact after this and the user can login.

To remove the cache files of the KDE desktop, issue the following command as root:

```
rm -rf /tmp/kde-user /tmp/socket-user
```

Replace *user* with the actual username. Removing these two directories just removes the corrupted cache files, no real data is harmed using this procedure.

Corrupted desktop configuration files can always be replaced with the initial configuration files. If you want to recover the user's adjustments, carefully copy them back from their temporary location, after the configuration has been restored using the default configuration values.

To replace a corrupted desktop configuration with the initial configuration values, proceed as follows:

1. Log in as root.

2. Enter the user's home directory:

   ```
   cd /home/user
   ```

3. Move the KDE configuration directory and the `.skel` files to a temporary location:

   ```
   mv .kde.kde-ORIG-RECOVER
   mv .skel .skel-ORIG-RECOVER
   ```

4. Log out.

5. Let the user log in to this machine.

6. After the desktop has started successfully, copy the user's own configurations adjustments back into place:

   ```
   user@nld-machine:~ > cp -a .kde-ORIG-RECOVER/share .kde/share
   ```

IMPORTANT

If the user's own adjustments caused the login to fail and continue to do so, repeat the procedure as described above, but do not copy the `.kde/share` directory.

9.5 Network Problems

Many problems of your system may be network-related, even though they do not seem to be at first. For example, the reason for a system not allowing users to log in might be a network problem of some kind. This section introduces a simple check list you can apply to identify the cause of any network problem encountered.

When checking the network connection of your machine, proceed as follows:

1 If using an ethernet connection, check the hardware first. Make sure that your network cable is properly plugged into your computer. The control lights next to your Ethernet connector, if available, should both be active.

   If the connection fails, check whether your network cable works with another machine. If it does, your network card causes the failure. If hubs or switches are included in your network setup, suspect them to be the culprits as well.

2 If using a wireless connection, check whether the wireless link can be established by other machines. If this is not the case, contact the wireless network's administrator.

3 Once you have checked your basic network connectivity, try to find out which service is not responding.

   Gather the address information of all network servers needed in your setup. Either look them up in the appropriate YaST module or ask your system administrator. The following list gives some of the typical network servers involved in a setup together with the symptoms of an outage.

   DNS (Name Service)
   A broken or malfunctioning name service affects the network's functioning in many ways. If the local machine relies on any network servers for authentication and these servers cannot be found due to name resolution issues, users would not even be able to log in. Machines in the network managed by a broken name server would not be able to “see” each other and communicate.

   NTP (Time Service)
   A malfunctioning or completely broken NTP service could affect Kerberos authentication and X server functionality.

   NFS (File Service)
   If any application needed data stored in an NFS mounted directory, it would not be able to start up or function properly if this service was down or misconfigured. In a worst case scenario, a user's personal desktop configuration would not come up if his home directory containing his `.gconf` or `.kde` subdirectories could not be found due to an outage of the NFS server.

   Samba (File Service)
   If any application needed data stored in a directory on a Samba server, it would not be able to start or function properly if this service was down.

NIS (User Management)
If your SUSE Linux system relied on a NIS server to provide the user data, users would not be able to log in to this machine if the NIS service was down.

LDAP (User Management)
If your SUSE Linux system relied on an LDAP server to provide the user data, users would not be able to log in to this machine if the LDAP service was down.

Kerberos (Authentication)
Authentication would not work and login to any machine would fail.

CUPS (Network Printing)
Users would not be able to print.

4 Check whether the network servers are running and whether your network setup allows you to establish a connection:

a Use `ping hostname` (replace *`hostname`* with the hostname of the server) to check whether each one of them is up and responding to the network. If this command is successful, it tells you that the host you were looking for is up and running and that the name service for your network is configured correctly.

If ping fails with `destination host unreachable`, either your system or the desired server is not properly configured or down. Check whether your system is reachable by running `ping your_hostname` from another machine. If you succeed to reach your machine from another machine, it is the server that is not running at all or not configured correctly.

If ping fails with `unknown host`, the name service is not configured correctly or the hostname used was incorrect. Use `ping -n ipaddress` to try to connect to this host without name service. If this is successful, check the spelling of the hostname and for a misconfigured name service in your network. For further checks on this matter, refer to Step 4.b (page 242). If ping still fails, either your network card is not configured correctly or your network hardware is faulty. Refer to Step 4.c (page 244) for information about this.

b Use `host hostname` to check whether the hostname of the server you are trying to connect to is properly translated into an IP address and vice

versa. If this command returns the IP address of this host, the name service is up and running. If this the `host` command fails, check all network configuration files relevant to name and address resolution on your host:

`/etc/resolv.conf`

This file is used to keep track of the name server and domain you are currently using. It can be modified manually or be automatically adjusted by YaST or DHCP. Automatic adjustment is preferable. However, make sure that this file has the following structure and all network addresses and domain names are correct:

```
search fully_qualified_domain_name
nameserveripaddress_of_nameserver
```

This file can contain more than one name server address, but at least one of them must be correct to provide name resolution to your host. If needed, adjust this file using the YaST DNS and Hostname module.

If your network connection is handled via DHCP, enable DHCP to change hostname and name service information by selecting *Change Hostname via DHCP* and *Update Name Servers and Search List via DHCP* in the YaST DNS and Hostname module.

`/etc/nsswitch.conf`

This file tells Linux where to look for name service information. It should look like this:

```
...
hosts: files dns
networks: files dns
...
```

The `dns` entry is vital. It tells Linux to use an external name server. Normally, these entries are automatically made by YaST, but it never hurts to check.

If all the relevant entries on the host are correct, let your system administrator check the DNS server configuration for the correct zone information. For detailed information about DNS, refer to Chapter *The Domain Name System* (↑Reference). If you have made sure that the DNS configuration of your host and the DNS server are correct, proceed with checking the configuration of your network and network device.

c If your system cannot establish a connection to a network server and you have excluded name service problems from the list of possible culprits, check the configuration of your network card.

Use the command `ifconfig network_device` (executed as root) to check whether this device was properly configured. Make sure that both `inet address` and `Mask` are configured correctly. An error in the IP address or a missing bit in your network mask would render your network configuration unusable. If necessary, perform this check on the server as well.

d If name service and network hardware are properly configured and running, but some external network connections still get long time-outs or fail entirely, use `traceroute fully_qualified_domain_name` (executed as root) to track the network route these requests are taking. This command lists any gateway (hop) a request from your machine passes on its way to its destination. It lists the response time of each hop and whether this hop is reachable at all. Use a combination of traceroute and ping to track down the culprit and let the administrators know.

Once you have identified the cause of your network trouble, you can resolve it yourself (if the problem is located on your machine) or let the system administrators of your network know about your findings so they can reconfigure the services or repair the necessary systems.

9.6 Data Problems

Data problems are when the machine might or might not boot properly but, in either case, it is clear that there is data corruption on the system and that the system needs to be recovered. These situations call for a backup of your critical data, enabling you to recover the status quo once your system failed. SUSE Linux offers dedicated YaST modules for system backup and restoration as well as a rescue system that can be used to recover a corrupted system from the outside.

9.6.1 Backing Up Critical Data

System backups can be easily managed using the YaST System Backup module:

1. As root, start YaST and select *System → System Backup*.

2. Create a backup profile holding all details needed for the backup, filename of the archive file, scope, and type of the backup:

   a. Select *Profile Management → Add*.

   b. Enter a name for the archive.

   c. Enter the path to the location of the backup if you want to keep a local backup. For your backup to be archived on a network server (via NFS), enter the IP address or name of the server and the directory that should hold your archive.

   d. Determine the archive type and click *Next*.

   e. Determine the backup options to use, such as whether files not belonging to any package should be backed up and whether a list of files should be displayed prior to creating the archive. Also determine whether changed files should be identified using the time-consuming MD5 mechanism.

      Use *Expert* to enter a dialog for the backup of entire hard disk areas. Currently, this option only applies to the Ext2 file system.

   f. Finally, set the search constraints to exclude certain system areas from the backup area that do not need to be backed up, such as lock files or cache files. Add, edit, or delete items, until your needs are met and leave with *OK*.

3. Once you have finished the profile settings, you can start the backup right away with *Start* or configure automatic backup. It is also possible to create other profiles tailored for various other purposes.

To configure automatic backup for a given profile, proceed as follows:

1. Select *Automatic Backup* from the *Profile Management* menu.

2. Select *Start Backup Automatically*.

3. Determine the backup frequency. Choose *daily*, *weekly*, or *monthly*.

4 Determine the backup start time. These settings depend on the backup frequency selected.

5 Decide whether to keep old backups and how many should be kept. To receive an automatically generated status message of the backup process, check *Send Summary Mail to user root*.

6 Click *OK* for your settings to be applied and the first backup started at the time specified.

9.6.2 Restoring a System Backup

Use the YaST System Restoration module to restore the system configuration from a backup. Restore the entire backup or select specific components that were corrupted and need to be reset to their old state.

1 Start *YaST* → *System* → *System Restoration*.

2 Enter the location of the backup file. This could be a local file, a network mounted file, or a file on a removable device, such as a floppy or a CD. Then click *Next*.

   The following dialog displays a summary of the archive properties, such as the filename, date of creation, type of backup and optional comments.

3 Review the archived content by clicking *Archive Content*. Clicking *OK* returns you to the *Archive Properties* dialog.

4 *Expert Option* opens a dialog in which to fine-tune the restore process. Return to the *Archive Properties* dialog by clicking *OK*.

5 Click *Next* to open the view of packages to restore.

   Press *Accept* to restore all files in the archive or use the various *Select* buttons for a fine-tuning of your selection. Only check the *Restore RPM database* option if it is corrupted or deleted and if this file is included in the backup.

6 After you click *Accept*, the backup is restored. Click *Finish* to leave the module after the restore process is completed.

9.6.3 Recovering a Corrupted System

There are several reasons why a system could fail to come up and run properly. A corrupted file system after a system crash, corrupted configuration files, or a corrupted boot loader configuration are the most common ones.

SUSE Linux offers a graphical front-end for system repair. The following section introduces the YaST System Repair module.

Using YaST System Repair

Before launching the YaST System Repair module, determine in which mode to run it to best fit your needs. Depending on the severeness and cause of your system failure and your expertise, there are three different modes to choose from:

Automatic Repair
If your system failed due to an unknown cause and you basically do not know which part of the system is to blame for the failure, use *Automatic Repair*. An extensive automated check will be performed on all components of your installed system. For a detailed description of this procedure, refer to Section "Automatic Repair" (page 248).

Customized Repair
If your system failed and you already know which component is to blame, you can cut the lengthy system check with *Automatic Repair* short by limiting the scope of the system analysis to those components. For example, if the system messages prior to the failure seem to indicate an error with the package database, you can limit the analysis and repair procedure to checking and restoring this aspect of your system. For a detailed description of this procedure, refer to Section "Customized Repair" (page 249).

Expert Tools
If you already have a clear idea of what component failed and how this should be fixed, you can skip the analysis runs and directly apply the tools necessary for the repair of the respective component. For details, refer to Section "Expert Tools" (page 250).

Choose one of the repair modes as described above and proceed with the system repair as outlined in the following sections.

Automatic Repair

To start the automatic repair mode of YaST System Repair, proceed as follows:

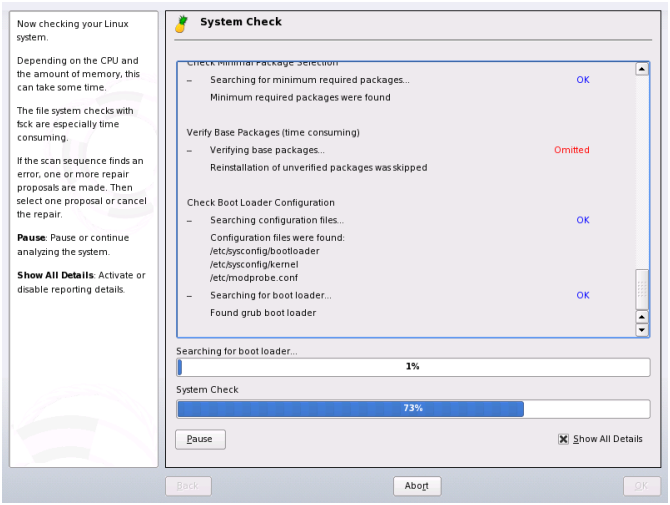
1. Boot the system with the original installation medium used for the initial installation (as outlined in Chapter 1, *Installation with YaST* (page 3)).

2. Select the *Repair Installed System* installation mode.

3. Select *Automatic Repair*.

   YaST now launches an extensive analysis of the installed system. The progress of the procedure is displayed at the bottom of the screen with two progress bars. The upper bar shows the progress of the currently running test. The lower bar shows the overall progress of the analysis. The log window in the top section tracks the currently running test and its result. See Figure 9.2, "Automatic Repair Mode" (page 248). The following main test runs are performed with every run. They contain, in turn, a number of individual subtests.

   Figure 9.2 *Automatic Repair Mode*



Partition Tables of All Hard Disks

Checks the validity and coherence of the partition tables of all detected hard disks.

Swap Partitions
The swap partitions of the installed system are detected, tested, and offered for activation where applicable. The offer should be accepted for the sake of a higher system repair speed.

File Systems
All detected file systems are subjected to a file system–specific check.

Entries in the File `/etc/fstab`
The entries in the file are checked for completeness and consistency. All valid partitions are mounted.

Boot Loader Configuration
The boot loader configuration of the installed system (GRUB or LILO) is checked for completeness and coherence. Boot and root devices are examined and the availability of the initrd modules is checked.

Package Database
This checks whether all packages necessary for the operation of a minimal installation are present. While it is optionally possible also to analyze the base packages, this takes a long time because of their vast number.

4 Whenever an error is encountered, the procedure stops and a dialog opens outlining the details and possible solutions.

Read the screen messages carefully before accepting the proposed fix. If you decide to decline a proposed solution, your system remains unchanged.

5 After the repair process has been terminated successfully, click *OK* and *Finish* and remove the installation media. The system automatically reboots.

Customized Repair

To launch the *Customized Repair* mode and selectively check certain components of your installed system, proceed as follows:

1 Boot the system with the original installation medium used for the initial installation (as outlined in Chapter 1, *Installation with YaST* (page 3)).

2 Select the *Repair Installed System* installation mode.

3 Select *Customized Repair*.

Choosing *Customized Repair* shows a list of test runs that are all marked for execution at first. The total range of tests matches that of automatic repair. If you already know where no damage is present, unmark the corresponding tests. Clicking *Next* starts a narrower test procedure that probably has a significantly shorter running time.

Not all test groups can be applied individually. The analysis of the fstab entries is always bound to an examination of the file systems, including existing swap partitions. YaST automatically resolves such dependencies by selecting the smallest number of necessary test runs.

4 Whenever an error is encountered, the procedure stops and a dialog opens outlining the details and possible solutions.

Read the screen messages carefully before accepting the proposed fix. If you decide to decline a proposed solution, your system remains unchanged.

5 After the repair process has been terminated successfully, click *OK* and *Finish* and remove the installation media. The system automatically reboots.

Expert Tools

If you are knowledgeable with SUSE Linux and already have a very clear idea of what needs to be repaired in your system, directly apply the tools skipping the system analysis.

To make use of the *Expert Tools* feature of the YaST System Repair module, proceed as follows:

1 Boot the system with the original installation medium used for the initial installation (as outlined in Chapter 1, *Installation with YaST* (page 3)).

2 Select the *Repair Installed System* installation mode.

3 Select *Expert Tools*.

Choose one or more of the following options to repair your faulty system:

Install New Boot Loader

This starts the YaST boot loader configuration module. Find details in Section "Configuring the Boot Loader with YaST" (Chapter 29, *The Boot Loader*, ↑Reference).

Run Partitioning Tool

This starts the expert partitioning tool in YaST. Find details in Section 3.7.5, "Partitioner" (page 86).

Fix File System

This checks the file systems of your installed system. You are first offered a selection of all detected partitions and can then choose the ones to check.

Restore Lost Partitions

It is possible to attempt to reconstruct damaged partition tables. A list of detected hard disks is presented first for selection. Clicking *OK* starts the examination. This can take a while depending on the processing power and size of the hard disk.

IMPORTANT: Reconstructing a Partition Table

The reconstruction of a partition table is tricky. YaST attempts to recognize lost partitions by analyzing the data sectors of the hard disk. The lost partitions are added to the rebuilt partition table when recognized. This is, however, not successful in all imaginable cases.

Save System Settings to Disk

This option saves important system files to a floppy disk. If one of these files become damaged, it can be restored from disk.

Check Installed Software

This checks the consistency of the package database and the availability of the most important packages. Any damaged installed packages can be reinstalled with this tool.

4 After the repair process has been terminated successfully, click *OK* and *Finish* and remove the installation media. The system automatically reboots.

9.7 Support for SUSE Linux

Useful support information for SUSE Linux is available in a number of sources. If you encounter problems with the installation or use of SUSE Linux that you are unable to solve, our experienced support staff can offer practical assistance with the free installation support for registered products and the incident-based support by phone or e-mail. Nearly all common customer problems can be eliminated quickly and competently.

9.7.1 Advanced Support

Qualified support is available by phone and e-mail at transparent rates. SUSE Linux 10.0 comes with 90-day installation support. Additionally, if you are running SUSE Linux for personal use, you can take advantage of our at-home Advanced Support program. You can reach us by phone:

- Germany: 0190-86 28 00 (1.86 €/minute)
- Austria: 0900-47 01 10 (1.80 €/minute)
- Switzerland: 0900-70 07 10 (3.13 SFr/minute)
- Rest of Europe: Phone: +44-1344-326-666, Price: € 46 including VAT. Monday-Friday from 12:00 to 18:00 CET
- United States and Canada: Phone: +1-800-796-3700. Price: $39 including tax. Monday-Friday from 09:00 a.m. to 06:00 p.m. EST or 06:00 a.m. to 03:00 p.m. PST.
- All other countries: Phone: +44-1344-326-666, Price: € 46 including VAT, Monday-Friday, 12:00-18:00 CET

One incident covers up to twenty minutes of assistance from our experienced support staff. The payment is credit-card based. Visa, Eurocard, and Mastercard are accepted. Financial transactions may be handled by our service partner, Stream / ECE EMEA Ltd.

Please be aware that the phone numbers may change during the sales cycle of SUSE Linux 10.0. Current numbers as well as a detailed listing of the subjects covered by the

Advanced Support Service can be found at http://www.novell.com/usersupport.

NOTE

While our expert staff will do their best to provide top-quality support, we cannot guarantee a solution.

We endeavor to help you as quickly and precisely as possible. The effort and time needed is considerably reduced if the question is formulated clearly. Please have answers to the following questions ready before contacting us:

1. Which program and version are you using? During which process does the problem occur?
2. What exactly is the problem? Try to describe the error as precisely as possible, using phrases with words such as *when* (for example, "When X is pressed, this error appears").
3. What hardware do you use (graphics card, monitor, printer, ISDN card, etc.)?

Detailed documentation can be found in manuals, online help, and the Support Database. In most cases, even problems that seem more difficult to solve are covered in the comprehensive documentation included with SUSE Linux. The SUSE Help Center on your desktop provides additional information about installed packages, the vital HOWTOs, and info pages.

You can access the latest Support Database articles online at http://www.novell.com/usersupport. By means of the Support Database, which is one of the most frequently used databases in the Linux world, we offer our customers a wealth of analysis and solution approaches. You can retrieve tested solutions using the keyword search, history function, or version-dependent search.

9.7.2 Free Installation Support

Our free installation support is provided for a period of 90 days following the activation of your registration code (starting latest with the release of a new version). If you cannot find an answer to your question in any of the available information sources, we will gladly provide assistance for the following issues:

- Installation on a typical private workstation or laptop equipped with a single processor, at least 256 MB RAM, and 3 GB of free hard disk space.
- Resizing of one Windows partition that occupies the entire hard disk.
- Installation of a local ATAPI CD or DVD drive.
- Installation on the first or second hard disk in an IDE-only system (`/dev/hda` or `/dev/hdb`) or supported S-ATA system, excluding RAID.
- Integration of a standard keyboard and standard mouse.
- Configuration of the graphical user interface (without the hardware acceleration feature of the graphics card).
- Installation of the boot manager in the MBR of the first hard disk or on a floppy disk without modifying the BIOS mapping.
- Setup of Internet access with a supported PCI ISDN card or external serial modem (not USB). Alternatively, setup of DSL based on PPPoE with a supported NIC.
- Basic configuration of an ALSA-supported PCI sound card.
- Basic configuration of a locally-attached compatible printer with YaST.
- Basic configuration of an IDE CD writer for use with k3b (CD burning application) without changing the jumper setting.
- Configuration of a supported PCI ethernet card for LAN access with either DHCP (client) or static IP. This does not include the configuration of the LAN or any other computers or network components. It also does not cover the configuration of the computer as a router. Fault analysis is limited to checking for proper loading of the kernel module and the correct local network settings.
- Configuration of an e-mail client (only Evolution and KMail) for collecting mail from a POP3 account. Fault analysis is limited to checking for proper settings in the e-mail client.
- Support for the package selection Standard System.
- Upgrade from the previous version of the product.

- Kernel updates (only official SUSE Linux update RPMs).
- Installation of bug fixes and security updates from ftp.suse.com or a SUSE FTP mirror using YOU or the manual method.

For a detailed listing of the subjects covered by the free installation support, please check http://www.novell.com/usersupport.

Contact Information for Free Installation Support

- http://www.novell.com/usersupport
- usersupport@novell.com
- Germany: Phone: 0180-500 36 12 (12 Cent/min) (Monday through Friday from 13:00 to 17:00 CET)
- Austria: Phone: +43 1 36 77 4440 (Monday through Friday from 13:00 to 17:00 CET)
- Switzerland: Phone: +41 43 299 7800 (Monday through Friday from 13:00 to 17:00 CET)
- UK: Phone: +44-1344-326-666 (Monday through Friday from 13:00 to 17:00 GMT)
- United States and Canada: Phone: +1-800-796-3700 (Monday through Friday from 12:00 p.m. to 6:00 p.m. EST or 09:00 a.m. to 03:00 p.m. PST)
- France: Phone: +33 1 55 62 50 50 (Monday through Friday from 13:00 to 17:00 CET)
- Spain: Phone: +34 (0)91 375 3057 (Monday through Friday from 13:00 to 17:00 CET)
- Italy: Phone: +39 02 2629 5555, support is available in Italian (Monday through Friday from 13:00 to 17:00 CET)
- Czech Republic: E-mail: support@portal.suse.cz (Monday through Friday)
- All other countries: Support is provided in English only. Phone: +44-1344-326-666 (Monday through Friday from 12:00 to 18:00 CET)

For the most recent contact information, refer to http://www.novell.com/products/linuxprofessional/support/contact.html.

Important Notes

1. Only customers with a valid, activated registration code are entitled to free support. You can activate your registration code at http://www.novell.com/usersupport.

2. The registration code is not transferable to another person.

3. The free support covers only the initial installation on one computer. Refer to our Web site for further information.

4. We can provide support only for hardware supported by SUSE Linux. Refer to our Component Database at www.novell.com/usersupport/hardware for information about supported hardware components.

5. There are no guaranteed turnaround times for mail inquiries.

Contact Recommendations

Misspelled commands, links, or directory names often cause frustrating problems and are particularly common during phone conversations. To help prevent this problem, please send us a brief description of your question or problem by e-mail. You will receive a reply soon after that provides a practical solution.

10 File System Checking

Each Linux file system comes with its own set of analysis and repair utilities. Use these tools in the event of a system failure to first analyze then repair the corrupted file system. Because their documentation (man pages) is only available in a running system, it is included in this manual for printed reference.

10.1 Manual Page of reiserfsck

```
REISERFSCK(8)                                        REISERFSCK(8)

NAME
       reiserfsck - The checking tool for the ReiserFS filesystem.

SYNOPSIS
       reiserfsck [ -afprVy ] [ --rebuild-sb |  --check  |  --fix-
       fixable  |  --rebuild-tree  |  --clean-attributes  ] [ -j |
       --journal device ] [ -z | --adjust-size ] [ -n | --nolog  ]
       [  -B  |  --badblocks file ] [ -l | --logfile file ] [ -q |
       --quiet ] [ -y | --yes ] [ -S | --scan-whole-partition ]  [
       --no-journal-available ] device

DESCRIPTION
       Reiserfsck  searches for a Reiserfs filesystem on a device,
       replays any necessary transactions, and  either  checks  or
       repairs the file system.

       device is  the special file corresponding to a device or to
              a partition (e.g /dev/hdXX for an IDE disk partition
              or /dev/sdXX for a SCSI disk partition).

OPTIONS
       --rebuild-sb
```

This option recovers the superblock on a Reiserfs partition. Normally you only need this option if mount reports "read_super_block: can't find a reiserfs file system" and you are sure that a Reiserfs file system is there. But remember that if you have used some partition editor program and now you cannot find a filesystem, probably something has gone wrong while repartitioning and the start of the partition has been changed. If so, instead of rebuilding the super block on a wrong place you should find the correct start of the partition first.

--check

This default action checks filesystem consistency and reports, but does not repair any corruption that it finds. This option may be used on a read-only file system mount.

--fix-fixable

This option recovers certain kinds of corruption that do not require rebuilding the entire file system tree (--rebuild-tree). Normally you only need this option if the --check option reports "corruption that can be fixed with --fix-fixable". This includes: zeroing invalid data-block pointers, correcting st_size and st_blocks for directories, and deleting invalid directory entries.

--rebuild-tree

This option rebuilds the entire filesystem tree using leaf nodes found on the device. Normally you only need this option if the reiserfsck --check reports "Running with --rebuild-tree is required". You are strongly encouraged to make a backup copy of the whole partition before attempting the --rebuild-tree option. Once reiserfsck --rebuild-tree is started it must finish its work (and you should not interrupt it), otherwise the filesystem will be left in the unmountable state to avoid subsequent data corruptions.

--clean-attributes

This option cleans reserved fields of Stat-Data items. There were days when there were no extended attributes in reiserfs. When they were implemented old partitions needed to be cleaned first -- reiserfs code in the kernel did not care about not used fields in its strutures. Thus if you have used one of the old (pre-attrbutes) kernels with a ReiserFS filesystem and you want to use extented attribues there, you should clean the filesystem first.

--journal device , -j device

This option supplies the device name of the current file system journal. This option is required when the journal resides on a separate device from the main data device (although it can be avoided with the expert option --no-journal-available).

--adjust-size, -z
This option causes reiserfsck to correct file sizes that are larger than the offset of the last discovered byte. This implies that holes at the end of a file will be removed. File sizes that are smaller than the offset of the last discovered byte are corrected by --fix-fixable.

--badblocks file, -B file
This option sets the badblock list to be the list of blocks specified in the given `file`. The filesystem badblock list is cleared before the new list is added. It can be used with --fix-fixable to fix the list of badblocks (see debugreiserfs -B). If the device has bad blocks, every time it must be given with the --rebuild-tree option.

--logfile file, -l file
This option causes reiserfsck to report any corruption it finds to the specified log file rather than to stderr.

--nolog, -n
This option prevents reiserfsck from reporting any kinds of corruption.

--quiet, -q
This option prevents reiserfsck from reporting its rate of progress.

--yes, -y
This option inhibits reiserfsck from asking you for confirmation after telling you what it is going to do. It will assuem you confirm. For safety, it does not work with the --rebuild-tree option.

-a, -p These options are usually passed by fsck -A during the automatic checking of those partitions listed in /etc/fstab. These options cause reiserfsck to print some information about the specified filesystem, to check if error flags in the superblock are set and to do some light-weight checks. If these checks reveal a corruption or the flag indicating a (possibly fixable) corruption is found set in the superblock, then reiserfsck switches to the fix-fixable mode. If the flag indicating a fatal corruption is found set in the superblock, then reiserfsck

finishes with an error.

-V This option prints the reiserfsprogs version and then exit.

-r, -f These options are not yet operational and therefore are ignored.

EXPERT OPTIONS

DO NOT USE THESE OPTIONS UNLESS YOU KNOW WHAT YOU ARE DOING. WE ARE NOT RESPONSIBLE IF YOU LOSE DATA AS A RESULT OF THESE OPTIONS.

--no-journal-available
This option allows reiserfsck to proceed when the journal device is not available. This option has no effect when the journal is located on the main data device. NOTE: after this operation you must use reiserfstune to specify a new journal device.

--scan-whole-partition, -S
This option causes --rebuild-tree to scan the whole partition but not only the used space on the partition.

AN EXAMPLE OF USING reiserfsck

1. You think something may be wrong with a reiserfs partition on /dev/hda1 or you would just like to perform a periodic disk check.

2. Run reiserfsck --check --logfile check.log /dev/hda1. If reiserfsck --check exits with status 0 it means no errors were discovered.

3. If reiserfsck --check exits with status 1 (and reports about fixable corruptions) it means that you should run reiserfsck --fix-fixable --logfile fixable.log /dev/hda1.

4. If reiserfsck --check exits with status 2 (and reports about fatal corruptions) it means that you need to run reiserfsck --rebuild-tree. If reiserfsck --check fails in some way you should also run reiserfsck --rebuild-tree, but we also encourage you to submit this as a bug report.

5. Before running reiserfsck --rebuild-tree, please make a backup of the whole partition before proceeding. Then run reiserfsck --rebuild-tree --logfile rebuild.log /dev/hda1.

6. If the reiserfsck --rebuild-tree step fails or does not recover what you expected, please submit this as a bug report. Try to provide as much information as possible including your platform and Linux kernel version. We will try to help solve the problem.

```
EXIT CODES
       reiserfsck uses the following exit codes:
          0 - No errors.
          1 - File system errors corrected.
          2 - Reboot is needed.
          4 - File system fatal errors left uncorrected,
              reiserfsck --rebuild-tree needs to be launched.
          6 - File system fixable errors left uncorrected,
              reiserfsck --fix-fixable needs to be launched.
          8 - Operational error.
          16 - Usage or syntax error.

AUTHOR
       This version of reiserfsck has been written by Vitaly Fert-
       man <vitaly@namesys.com>.

BUGS
       Please report bugs to the  ReiserFS  developers  <reiserfs-
       dev@namesys.com>,  providing  as much information as possi-
       ble--your hardware, kernel, patches, settings, all  printed
       messages,  the  logfile;  check  the  syslog  file  for any
       related information.

TODO
       Faster recovering, signal handling.

SEE ALSO
       mkreiserfs(8),  reiserfstune(8)  resize_reiserfs(8),  debu-
       greiserfs(8),



Reiserfsprogs-3.6.18       February 2004             REISERFSCK(8)
```

10.2 Manual Page of e2fsck

```
E2FSCK(8)                                                  E2FSCK(8)



NAME
       e2fsck - check a Linux ext2/ext3 file system

SYNOPSIS
       e2fsck  [ -pacnyrdfkvstDFSV ] [ -b superblock ] [ -B block-
       size ] [ -l|-L bad_blocks_file ] [ -C fd ] [  -j  external-
       journal ] [ -E extended_options ] device

DESCRIPTION
```

e2fsck is used to check a Linux second extended file system (ext2fs). E2fsck also supports ext2 filesystems containing a journal, which are also sometimes known as ext3 filesystems, by first applying the journal to the filesystem before continuing with normal e2fsck processing. After the journal has been applied, a filesystem will normally be marked as clean. Hence, for ext3 filesystems, e2fsck will normally run the journal and exit, unless its superblock indicates that further checking is required.

device is the device file where the filesystem is stored (e.g. /dev/hdc1).

OPTIONS

-a This option does the same thing as the -p option. It is provided for backwards compatibility only; it is suggested that people use -p option whenever possible.

-b superblock

Instead of using the normal superblock, use an alternative superblock specified by superblock. This option is normally used when the primary superblock has been corrupted. The location of the backup superblock is dependent on the filesystem's blocksize. For filesystems with 1k blocksizes, a backup superblock can be found at block 8193; for filesystems with 2k blocksizes, at block 16384; and for 4k blocksizes, at block 32768.

Additional backup superblocks can be determined by using the mke2fs program using the -n option to print out where the superblocks were created. The -b option to mke2fs, which specifies blocksize of the filesystem must be specified in order for the superblock locations that are printed out to be accurate.

If an alternative superblock is specified and the filesystem is not opened read-only, e2fsck will make sure that the primary superblock is updated appropriately upon completion of the filesystem check.

-B blocksize

Normally, e2fsck will search for the superblock at various different block sizes in an attempt to find the appropriate block size. This search can be fooled in some cases. This option forces e2fsck to only try locating the superblock at a particular blocksize. If the superblock is not found, e2fsck will terminate with a fatal error.

-c This option causes e2fsck to run the badblocks(8)

program to find any blocks which are bad on the filesystem, and then marks them as bad by adding them to the bad block inode. If this option is specified twice, then the bad block scan will be done using a non-destructive read-write test.

-C fd This option causes e2fsck to write completion information to the specified file descriptor so that the progress of the filesystem check can be monitored. This option is typically used by programs which are running e2fsck. If the file descriptor specified is 0, e2fsck will print a completion bar as it goes about its business. This requires that e2fsck is running on a video console or terminal.

-d Print debugging output (useless unless you are debugging e2fsck).

-D Optimize directories in filesystem. This option causes e2fsck to try to optimize all directories, either by reindexing them if the filesystem supports directory indexing, or by sorting and compressing directories for smaller directories, or for filesystems using traditional linear directories.

-E extended_options
Set e2fsck extended options. Extended options are comma separated, and may take an argument using the equals ('=') sign. The following options are supported:

ea_ver=extended_attribute_version
Assume the format of the extended attribute blocks in the filesystem is the specified version number. The version number may be 1 or 2. The default extended attribute version format is 2.

-f Force checking even if the file system seems clean.

-F Flush the filesystem device's buffer caches before beginning. Only really useful for doing e2fsck time trials.

-j external-journal
Set the pathname where the external-journal for this filesystem can be found.

-k When combined with the -c option, any existing bad blocks in the bad blocks list are preserved, and any new bad blocks found by running badblocks(8) will be added to the existing bad blocks list.

-l filename
Add the block numbers listed in the file specified by filename to the list of bad blocks. The format of this file is the same as the one generated by the badblocks(8) program. Note that the block numbers are based on the blocksize of the filesystem. Hence, badblocks(8) must be given the blocksize of the filesystem in order to obtain correct results. As a result, it is much simpler and safer to use the -c option to e2fsck, since it will assure that the correct parameters are passed to the badblocks program.

-L filename
Set the bad blocks list to be the list of blocks specified by filename. (This option is the same as the -l option, except the bad blocks list is cleared before the blocks listed in the file are added to the bad blocks list.)

-n Open the filesystem read-only, and assume an answer of `no' to all questions. Allows e2fsck to be used non-interactively. (Note: if the -c, -l, or -L options are specified in addition to the -n option, then the filesystem will be opened read-write, to permit the bad-blocks list to be updated. However, no other changes will be made to the filesystem.)

-p Automatically repair ("preen") the file system without any questions.

-r This option does nothing at all; it is provided only for backwards compatibility.

-s This option will byte-swap the filesystem so that it is using the normalized, standard byte-order (which is i386 or little endian). If the filesystem is already in the standard byte-order, e2fsck will take no action.

-S This option will byte-swap the filesystem, regardless of its current byte-order.

-t Print timing statistics for e2fsck. If this option is used twice, additional timing statistics are printed on a pass by pass basis.

-v Verbose mode.

-V Print version information and exit.

-y Assume an answer of `yes' to all questions; allows e2fsck to be used non-interactively.

EXIT CODE

The exit code returned by e2fsck is the sum of the following conditions:

```
0    - No errors
1    - File system errors corrected
2    - File system errors corrected, system should
       be rebooted
4    - File system errors left uncorrected
8    - Operational error
16   - Usage or syntax error
32   - E2fsck canceled by user request
128  - Shared library error
```

SIGNALS

The following signals have the following effect when sent to e2fsck.

SIGUSR1

This signal causes e2fsck to start displaying a completion bar. (See discussion of the -C option.)

SIGUSR2

This signal causes e2fsck to stop displaying a completion bar.

REPORTING BUGS

Almost any piece of software will have bugs. If you manage to find a filesystem which causes e2fsck to crash, or which e2fsck is unable to repair, please report it to the author.

Please include as much information as possible in your bug report. Ideally, include a complete transcript of the e2fsck run, so I can see exactly what error messages are displayed. If you have a writeable filesystem where the transcript can be stored, the script(1) program is a handy way to save the output of e2fsck to a file.

It is also useful to send the output of dumpe2fs(8). If a specific inode or inodes seems to be giving e2fsck trouble, try running the debugfs(8) command and send the output of the stat(1u) command run on the relevant inode(s). If the inode is a directory, the debugfs dump command will allow you to extract the contents of the directory inode, which can sent to me after being first run through uuencode(1).

Always include the full version string which e2fsck displays when it is run, so I know which version you are running.

AUTHOR

This version of e2fsck was written by Theodore Ts'o <tytso@mit.edu>.

```
SEE ALSO
       mke2fs(8), tune2fs(8), dumpe2fs(8), debugfs(8)


E2fsprogs version 1.36     February 2005                E2FSCK(8)
```

Glossary

access permissions
: The access permissions of a file determine whether a user or group can read, write, or execute a file or directory. They are set by the system administrator or the owner of a file.

account
: The account is defined by the username or login name and the password. An account corresponds to a user ID (UID).

ACL (Access Control List)
: Extension of the conventional permission concept for files and directories. These allow a more fine-grained control of the access permissions.

ADSL (Asymmetric Digital Subscriber Line)
: Fast transmission protocol using the telephone network.

AGP (Accelerated Graphics Port)
: A high-speed slot for graphics cards, offering a higher bandwidth than PCI. AGP graphics cards can revert directly (without routing around the processor) to the random access memory.

ATAPI (Advanced Technology Attachment Packet Interface)
: ATAPI is one of the most frequently used mass storage device interfaces, next to ATA or SCSI. The majority of CD-ROM drives are ATAPI devices.

backup
: A backup is a copy of data used to restore data that has been damaged or lost. Backups of all important data should be made regularly.

bandwidth
: Maximum transfer rate of a channel for data transmission. Usually used with network connections.

BIOS (Basic Input/Output System)
: Small program started after power-on or reboot of a computer. It is responsible for the initialization of hardware components. Most BIOSs allow modifications of low level system parameters via an interactive setup program. The program code resides in a read-only memory (ROM) chip.

bookmark (with browsers)
: In bookmarks, save the URL of frequently visited or important Web sites. They can be sorted in folders or renamed.

booting
: The sequence of computer operations from power-on until the system is ready for use.

browser
: Program that displays the content of local files or Web pages.

client
: A program or computer in a networking environment that connects to and requests information from a server.

command line
: Text-based mode of issuing commands to the computer.

console
: Formerly synonymous with terminal. In Linux, the *virtual consoles* allow the screen to be used for several independent, parallel work sessions without any graphical display running.

CPU (Central Processing Unit)
: See processor.

cursor
: The cursor is a block or underline character that marks the place for text input.

daemon (Disk and Execution Monitor)
: A daemon is a program that runs in the background and is activated automatically when required. For example, the HTTP daemon (httpd) answers HTTP requests.

DDC (Direct Display Channel)
: Communication standard between the monitor and the graphics card that allows transmission of certain parameters, such as monitor name or resolution, to the graphics card.

directory (in a file system)
: A structure containing files or further directories (subdirectories). The directories in a file system build a tree-like structure for organizing files.

DNS (Domain Name System)
: A protocol for converting name-based addresses to IP addresses and vice versa.

driver
: Part of the operating system that is responsible for the communication to hardware components.

e-mail (electronic mail)
: The means of transporting mail electronically between users via a network. An e-mail address has the form `username@domain.org`.

EIDE (Enhanced Integrated Drive Electronics)
: Enhanced IDE standard that allows hard disks with a size over 512 MB.

environment
: The set of environment variables and their values kept by the shell. The user can alter (or unset) the values of existing environment variables and set new variables. Permanent assignments are made by means of the configuration files of the shell.

environment variable
: An element of the environment of the shell.

ethernet
: A standard for data transmission in local computer networks.

EXT2 (Second Extended File System)
: A file system supported by Linux.

FAQ (Frequently Asked Questions)
: Acronym for documents providing answers to frequently asked questions.

firewall
: A mechanism for filtering network traffic that protects a local network from unauthorized access from the outside.

FTP (File Transfer Protocol)
: A protocol based on TCP/IP for transferring files over a network.

GNOME (GNU Network Object Model Environment)
: A graphical desktop environment for Linux.

GNU (GNU Is Not UNIX)
: GNU is a project of the Free Software Foundation (FSF). The aim of the GNU Project is to create a complete and free UNIX-style operating system. It is free not so much in the sense of *free of cost*, but in the sense of *freedom*: having the right to obtain, modify, and redistribute the software. The now classic GNU Manifesto (`http://www.gnu.org/gnu/manifesto.html`) explains the details. In legal terms, GNU software is protected by the GNU General Public License, or *GPL* (`http://www.gnu.org/copyleft/gpl.html`), and by the GNU Lesser General Public License, or *LGPL* (`http://www.gnu.org/copyleft/lgpl.html`). The Linux kernel, which is subject to the GPL, benefits from this project (especially from the tools), but should not be seen as the same thing.

GPL (GNU General Public License)
: See GNU.

GRUB (Grand Unified Boot Loader)
: Small program installed in the boot sector of the hard disk that starts Linux or another operating system.

home directory
: A private directory in the file system that belongs to a specific user (usually in `/home/<username>`). Except for the superuser root, only the owner has full access rights in the home directory.

hostname
: Name of a machine. This often is the name by which it can be reached on the network.

HTML (Hypertext Markup Language)
: A markup language for text documents used in the World Wide Web. HTML documents are usually viewed with a browser.

HTTP (Hypertext Transfer Protocol)
: A network protocol defining how to request and transfer documents in the World Wide Web. The documents are usually HTML pages offered by a server and requested by a user via the browser.

IDE (Integrated Drive Electronics)
: Mass storage device interface, mainly used to attach hard disks.

Internet
: Worldwide computer network based on TCP/IP.

IP address
: A unique (32-bit) address of a computer in a TCP/IP network. Often written as four decimal numbers separated by periods (for example, 192.168.10.1).

IRQ (Interrupt Request)
: An asynchronous request for some action that can be triggered by hardware or software. Most IRQs are handled by the operating system.

ISDN (Integrated Services Digital Network)
: A standard for digital data transfer over a telephone network.

KDE (K Desktop Environment)
: A graphical desktop environment for Linux.

kernel
: The kernel is the core component of the operating system. It manages memory and file systems, contains the drivers for the communication with the hardware devices, and handles processes and networking.

LAN (Local Area Network)
: A LAN is a local network that is usually rather small.

LILO (Linux Loader)
: Small program installed in the boot sector of the hard disk that starts Linux or another operating system.

link
: A link (in a file system) is a pointer to a file. There are *hard* links and *symbolic* links. While *hard* links refer to the exact position in the file system, the symbolic link only points to the respective name.

Linux
: High performance UNIX-like operating system core distributed freely under the GPL (GNU). The name is an acronym (*Linus' Unix*) and refers to its creator, Linus Torvalds. Although the name, in a strict sense, only refers to the kernel itself, the popular understanding of the term *Linux* usually entails the entire system.

login
: Authentication of a user by username and password to gain access to a computer system or network.

logout
: The procedure of closing an interactive Linux session.

main memory
: Volatile physical memory that allows random access with virtually no delay. This is often referred to as RAM (Random Access Memory).

man pages
: Traditional form of documentation for UNIX systems that can be read using the command `man`. Man pages are usually written in the style of a reference.

MBR (Master Boot Record)
: The first physical sector of the hard disk whose content is loaded to the main memory and executed by the BIOS. This code then either loads the operating system from a hard disk partition or a more sophisticated boot loader, such as LILO or GRUB.

MD5
: Algorithm for generating hash values (MD5 checksum of a file). These checksums are generated in a way that makes it virtually impossible to create a file that has a given MD5 checksum but a different content than the original file.

mounting
: The process of attaching a file system into the directory tree of the system.

MP3
: Compression algorithm for audio files that reduces the data size by about a factor of ten in contrast to the uncompressed audio file. It is called a “lossy” compression because information and quality are lost in the process.

multitasking
: The capability of an operating system to run multiple processes (virtually) in parallel.

multiuser
: The capability of an operating system to let multiple users work in parallel on a computer.

network
: A connection of several computers that allows the transfer of data between them. A computer sending a request over the network is often referred to as a client. The computer answering the request, for example, by delivering a document, is referred to as server.

NFS (Network File System)
: A protocol for accessing a file system over a network.

NIS (Network Information Service)
: A centralized user administration system in networks. Usernames and passwords can be managed networkwide by NIS.

operating system
: See kernel.

partition
: A section of a hard disk, containing either a file system or swap space.

path
: Unique description of a file's position in a file system.

plug and play
: Automatic hardware detection and configuration protocol.

process
: A running program. Sometimes referred to as a task.

processor
: The processor (CPU, for Central Processing Unit) is a microchip that executes machine code stored in the main memory. It is the *brain* of the computer.

prompt
: A short (configurable) string that is printed at the start of each command line. It usually contains the current working directory.

protocol
: A standard defining interfaces and communication methods for hardware, software, or networks. Examples are the HTTP and the FTP protocol.

proxy
: Typically refers to a computer that serves as intermediate storage for data transferred from the Internet. If the same document is requested more than once, the second request can be served much faster. Computers intended to take advantage of this must be configured to issue their requests via the proxy.

RAM (Random Access Memory)
: See main memory.

ReiserFS
: A file system type that allows for fast repair of potential inconsistencies. Such inconsistencies can occur when a file system is not unmounted before the operating system is shut down, such as in the event of a power failure.

root
: The superuser account. The superuser has all permissions. This account is used for administrative tasks and should not be used for regular work.

root directory
: The base directory in the file system hierarchy. In UNIX, the root directory is represented as a `/`.

SCSI (Small Computer Systems Interface)
: A standard for attaching hard disks and other devices, such as scanners and tapes.

server
: A computer or program dedicated to offering services, usually over the network. Examples of services are file delivery, name resolution, and graphical rendering.

shell
: A program that allows issuing commands. There are several shells, such as Bash, Zsh, and tcsh. Each type of shell has its own specific programming language.

SMTP (Simple Mail Transfer Protocol)
: Protocol for transferring electronic mail (e-mails) over a network.

SSH (Secure Shell)
: A remote login program that uses encryption. It is a more secure alternative to telnet.

SSL (Secure Socket Layer)
: Encryption protocol for transferring HTTP data.

superuser
: See root.

swap space
: A hard disk partition (swap partition) that is used to store memory pages that are currently unused.

system administrator
: A person responsible for maintaining a system. This person uses the root account to perform administrative tasks.

task
: See process.

TCP/IP
: Communication protocol used for the Internet and most local networks.

telnet
: Telnet is a protocol for the communication with remote hosts. For remote login, telnet is essentially superseded by SSH, which offers encrypted connections.

terminal
: Formerly, the designation of a keyboard and monitor combination connected to a central computer. Today this term is instead used for programs (like xterm) that emulate a real terminal.

Tux
: Name of the Linux penguin. See `http://www.sjbaker.org/tux/`.

UNIX
: UNIX is a type of operating system. It is also a trademark.

URL (Uniform Resource Locator)
: Specification of a resource in the network consisting of a protocol (for example, `http://`), the name of the host and domain (such as `www.suse.de`) and a document (for example, `/us/company/index.html`). The complete URL of this example is `http://www.suse.de/us/company/index.html`.

user directory
: See home directory.

VESA (Video Electronics Standard Association)
: Industrial consortium that defines, among other things, video standards.

wild card
: Placeholder for one (symbol: `?`) or more (symbol: `*`) characters. These are parts of regular expressions.

window manager
: A program running on top of the X Window System that allows for actions, such as resizing windows or moving them around. The window manager is also responsible for the window decoration like window titles and borders. The behavior and look can be customized by the user.

WWW (World Wide Web)
: Based on the HTTP protocol, this is a hyperlinked collection of documents, files, and images that can be viewed with a Web browser.

X Window System
: The X Window System is a network-based window system that runs on a wide range of computers. It offers mechanisms for drawing lines and rectangles. It is the middle layer between the hardware and the window manager.

X11
: Version 11 of the X Window System.

YaST (Yet another Setup Tool)
: The SUSE LINUX administration tool for installing and configuring a system.

YP (Yellow Pages)
: See NIS.

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