SUSE Linux

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Start-Up

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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 about your system.

Desktop
: Learn more about the your preferred desktop, 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 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. Find an online version of this document at http://www.novell.com/documentation/suse10/.

SUSE Linux *Applications*
: This guide features a selection of the most important tools offered by your SUSE Linux. Find an online version of this document at http://www.novell.com/documentation/suse101/.

Novell AppArmor 2.0 Administration Guide
: This guide contains in-depth information about the use of *AppArmor* in your environment. Find an online version of this document 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; keys are shown in uppercase as on a keyboard
- *File*, *File* → *Save As*: menu items, buttons
- *Dancing Penguins* (Chapter Penguins, ↑*Reference*): This is a reference to a chapter in another book.

4 About the Making of This Manual

This book is written in Novdoc, a subset of DocBook (see `http://www.docbook.org`). The XML source files were validated by `xmllint`, processed by `xsltproc`, and converted into XSL-FO using a customized version of Norman Walsh's stylesheets. The final PDF is formatted through XEP from RenderX.

5 Acknowledgments

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

The installation of a SUSE Linux system is performed by the system assistant YaST. Adjust the default settings as described here to install a system that meets your needs. Background information is provided where appropriate.

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.

1.1.1 Selecting the Source of the Installation Data

You can install from a local installation source, such as the SUSE Linux CDs or DVD or get the installation sources from an FTP, HTTP, or NFS server. Any of these approaches require physical access to the system to install and user interaction during the installation. The installation procedure is basically the same, no matter which installation source or method you prefer.

Installing from the SUSE Linux Media

Install from physical boot media (your SUSE Linux media kit) as follows:

1. Insert the media into your CD or DVD drive.

2 Reboot the system.

3 At the boot screen, select *Installation* and follow the instructions given in Section 1.2, “The Boot Screen” (page 5) and the following sections.

Installing from a Network Server Using SLP

If your network setup supports OpenSLP and your network installation source has been configured to announce itself via OpenSLP (see Section “Setting Up the Server Holding the Installation Sources” (Chapter 1, *Remote Installation*, ↑Reference)), proceed as follows to install SUSE Linux.

1 Set up an installation server as described in Section “Setting Up the Server Holding the Installation Sources” (Chapter 1, *Remote Installation*, ↑Reference).

2 Insert the first CD of the media kit into the CD-ROM drive an reboot the machine.

3 At the boot screen, select *Installation*, press F4 then select *SLP*.

The installation program retrieves the location of the network installation source using OpenSLP and configures the network connection with DHCP. If the DHCP network configuration fails, you are prompted to enter the appropriate parameters manually. The installation then proceeds normally.

4 Finish the installation as if you had chosen to install from physical media.

Installing from a Network Server

To perform a manual installation using a network installation source, proceed as follows:

1 Set up an installation server as described in Section “Setting Up the Server Holding the Installation Sources” (Chapter 1, *Remote Installation*, ↑Reference).

2 Insert the first CD or DVD of the media kit into the corresponding drive then reboot the machine.

3 At the boot screen, select *Installation* and use the boot options prompt to pass additional information, such as:

- Location of the installation server:

  `install=`*`protocol`*`:`*`inst_source`*

  Replace *`protocol`* with the protocol prefix for the service used by the installation server (`nfs`, `http`, or `ftp`). Replace *`inst_source`* with the IP address of the installation server.

- Network configuration parameters if your setup does not support DHCP configuration (see Section "Using Custom Boot Options" (Chapter 1, *Remote Installation*, ↑Reference) for reference).

4. Press Enter to boot for installation. If no network parameters have been specified at the boot options prompt, the installation routines try to set up the network using DHCP. If this fails, you are prompted for these parameters. After you have provided them, the installation proceeds.

5. Finish the installation as if you had chosen to install from the physical media.

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
: Get context-sensitive help for the active element of the boot screen.

F2
: Select the display language for the installation.

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 detected automatically. In this case, use the keyboard for the time being. Navigation with the keyboard is similar to the description in Section 2.11.1, “Navigation in Modules” (page 74).

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 the license agreement that is displayed on screen thoroughly. 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 System Analysis

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 a new installation.

The following sections describe the procedure of installing a new system. Find detailed instructions for a system update in Section 2.3.7, “Updating the System” (page 41). Find a description of the system repair options in Section “Using YaST System Repair” (page 239).

1.6 Time Zone

In this dialog, select your region and time zone from the lists. During installation, both are preselected 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 finished, click *Next* to continue the installation.

1.7 Desktop Selection

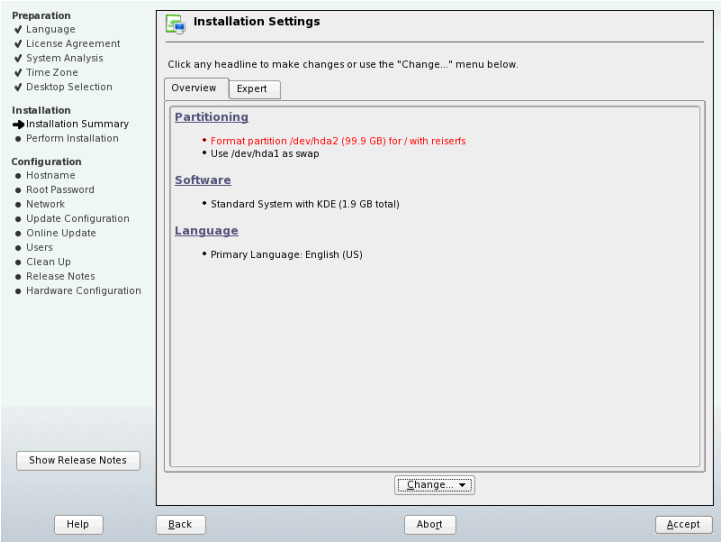
In SUSE Linux, you can choose from various desktops. *KDE* and *GNOME* are powerful graphical desktop environments similar to Windows©. Find information about these in Chapter 5, *Getting Started with the KDE Desktop* (page 137) and Chapter 7, *Getting Started with the GNOME Desktop* (page 175). If you 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 win-

dows but does not provide the usual integrated desktop functionality. In *Text Mode*, only console terminals are available.

1.8 Installation Summary

After a thorough system analysis, YaST presents reasonable suggestions for all installation settings. The options that sometimes need manual intervention in 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 summary window, which is updated accordingly. The individual settings are discussed in the following sections.

Figure 1.1 *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.

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 proposed partition settings. Accept these current settings as they are or change them before continuing. Alternatively, discard all the settings and start over from scratch.

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 2.5.6, “Partitioner” (page 53). The original setup as proposed by YaST is offered there as a starting point.

Selecting *Create Custom Partition Setup* opens the dialog for hard disk selection. 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.

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 11). If desired, go to the *Expert Partitioner* dialog to create a custom partition setup as described in Section 2.5.6, "Partitioner" (page 53).

WARNING: Using the Entire Hard Disk for Installation

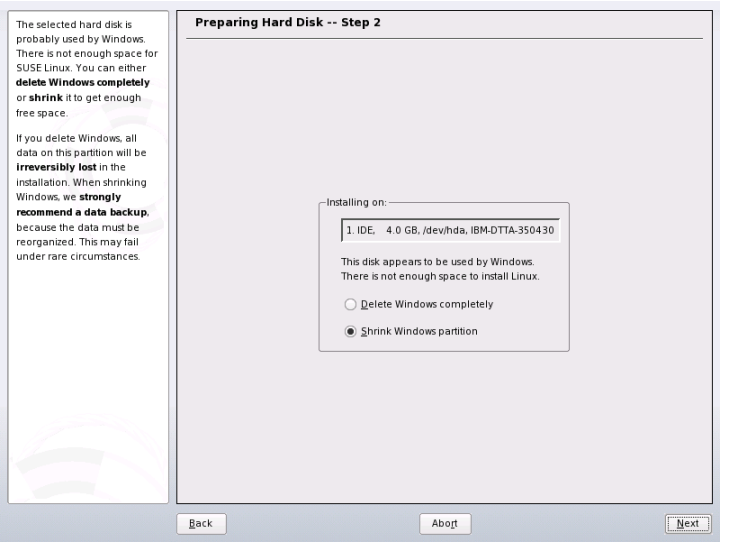
If you choose *Use Entire Hard Disk*, all existing data on that disk is completely erased later in the installation process and is then lost.

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 is 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 1.2 *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.

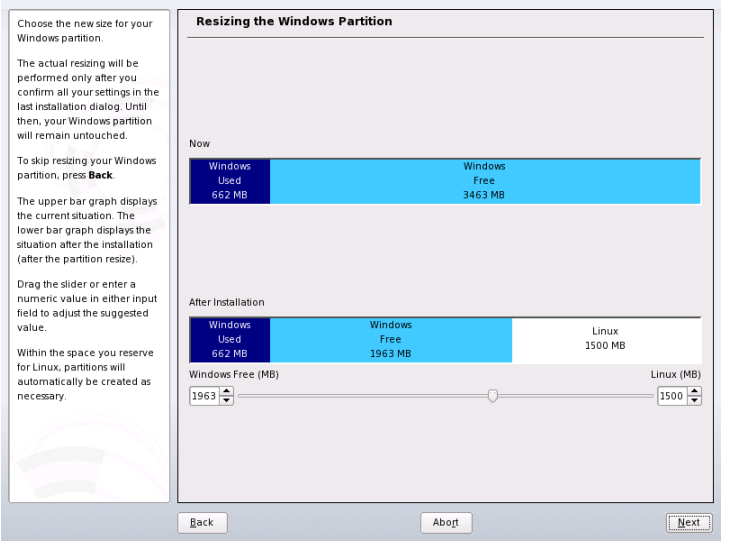
NTFS File System
: In Windows, run scandisk and defrag to move the files to the beginning of the hard disk. In contrast to the FAT file system, you must perform these steps. Otherwise the NTFS partition cannot be resized.

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 1.3 *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 1.3, “Resizing the Windows Partition” (page 13). 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.

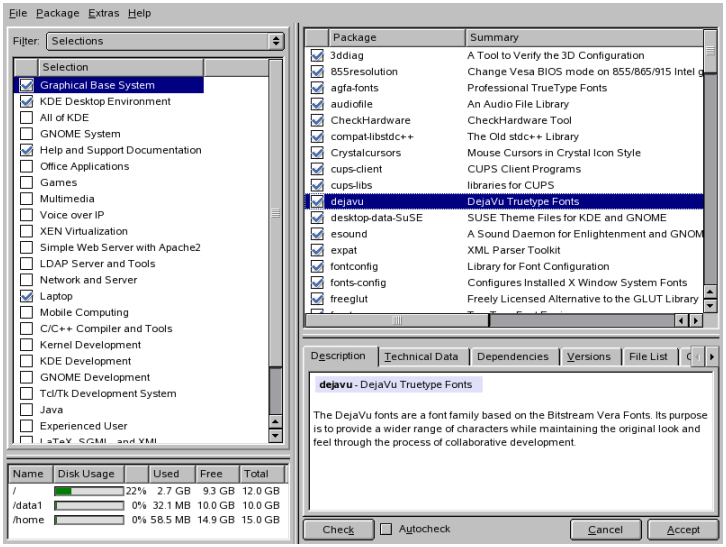
IMPORTANT: Windows Systems Installed on NTFS Partitions

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 selection and modify the installation scope according to your needs. Select your categories from the list in the middle and see the description in the right window. Each category contains a number of software packages that meet most requirements for that category. For more detailed selection of software packages to install, select *Details* to switch to the YaST Package Manager. See Figure 1.4, “Installing and Removing Software with the YaST Package Manager” (page 15).

Figure 1.4 *Installing and Removing Software with the YaST Package Manager*



Changing the Installation Scope

If you have specific software needs, modify the current 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. The default filter is *Selections*. It sorts program packages by application purpose, such as multimedia or office applications. These groups are listed under the filter selection box. The packages included in the current system type are preselected. Click the check boxes to select or deselect entire groups for installation.

The right part of the window displays a table listing the individual packages included in the current group. 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 2.3.1, “Installing and Removing Software” (page 31).

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 2.3.1, "Installing and Removing Software" (page 31).

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 installing SUSE Linux for the first time or if you do not understand the alerts, read Section 2.3.1, "Installing and Removing Software" (page 31), 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 6). 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 are unset.

Make the setting for the locale explicitly with *Detailed Locale Setting*.

The list in the lower part of the language dialog allows for selection of additional languages to install. For all the languages selected in this list, YaST checks if there are any language-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. To set special options regarding keyboard behavior, click *Expert Settings*. Find more information about that in Section 2.4.9, “Keyboard Layout” (page 46). 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 9, *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 2.5.11, “System Services (Runlevel)” (page 58) for information about runlevel configuration.

1.8.8 Time Zone

In this dialog, change your region and time zone by selecting them from the lists. 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 finished, click *Accept* to return to the installation settings dialog.

1.8.9 Performing 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 Configuration

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 Hostname

The hostname is the computer's name in the network. The fully qualified domain name, needed here, includes the name of the domain to which the computer belongs. Each server and client in the network should have a unique hostname.

If you are located in a local network, you might receive your hostname over DHCP, in which case you should not modify the name. To receive the hostname over DHCP, select *Change Hostname via DHCP*.

1.9.2 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. 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.

1.9.3 Network Configuration

You can now choose whether to use NetworkManager or the traditional method to manage all your network devices. NetworkManager is the new tool enabling automatic connection establishment with minimal user intervention. It is ideal for mobile computing. Also configure the network devices of your system and make security settings, for example, for a firewall or proxy. To configure your network hardware at this stage, refer to Section “Configuring a Network Connection with YaST” (Chapter 18, *Basic Networking*, ↑Reference). Otherwise, select *Skip Configuration* and click *Next*. Network hardware can also be configured after the system installation has been completed.

NOTE: Network Devices and Update

If you skip the network device configuration, your system will be offline and unable to retrieve any available updates or include them in the installation.

As well as device configuration, configure network accessibility–related settings:

Firewall Configuration
: When you connect to a network, a firewall is started automatically on the configured interface. 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 dialog that opens, 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 4, *Security in Linux*, ↑Reference).

VNC Remote Administration
: To administer your machine remotely by VNC, click *Change → VNC Remote Administration*, enable remote administration, and open the port in the firewall. If you have multiple network devices and want to select on which to open the port, click *Firewall Details* and select the network device. You can also use SSH, a more secure option, for remote administration.

Proxy
: If you have a proxy server in your network to control access to the network, enter the server name and all other required information to enable access to the Internet.

Internet Connection Test

If you have configured an Internet connection, you can test it now. For this purpose, YaST establishes a connection to the SUSE Linux 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.

To start the test, select *Yes, Test Connection to the Internet* and click *Next*. In the next dialog, view the progress of the test and the results of the test. If the test fails, click *Back* to return in the previous dialog and correct the configuration or skip the test. If you need more information about the test process, click *View Logs*.

If you do not want to test the connection at this point, select *No, Skip This Test* then *Next*. This also skips downloading product updates and release notes.

If you have multiple network interfaces in your system, verify that the the right card is used to connect to the Internet. To do so, click *Change device*.

1.9.4 Online Update Configuration

To get technical support and product updates, first register and activate your product. *Online Update Configuration* provides assistance for doing so. If you are offline or want to skip this step, select *Configure Later*.

In *Include for Convenience*, select whether to obtain some of the necessary information from your system. This simplifies the registration process. If you want to see what is required to register your system or what happens with your data, use *Details*.

1.9.5 Online Update

If YaST was able to connect to the SUSE Linux 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.

1.9.6 Users

This step has two parts. In the first part, choose the user authentication method. The second part depends on the selected authentication method.

User Authentication

If 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 (/etc/passwd)
: Users are administered locally on the installed host. This is a suitable option for stand-alone workstations. User data is managed by the local file `/etc/passwd`. All users who are entered in this file can log in to the system even if no network is available.

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.

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

NOTE: Content of the Authentication Menu

If you use the custom package selection and one or more authentication methods are missing from the menu, you probably did not select the packages required for it.

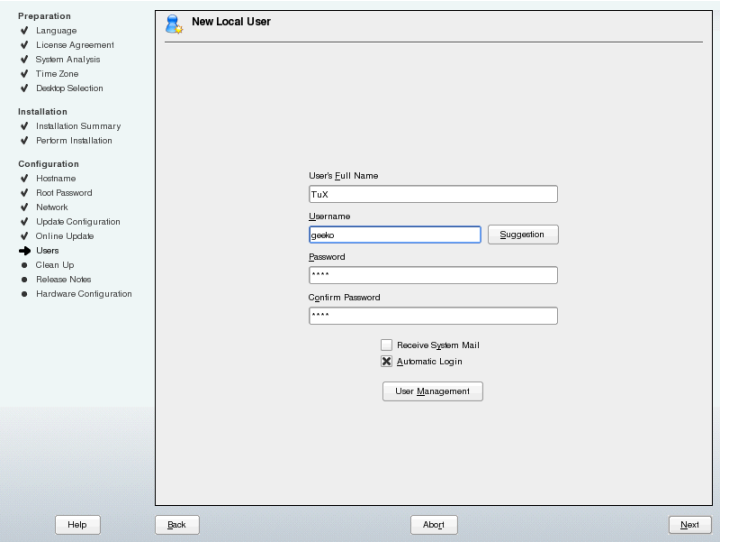
If all requirements are met, YaST opens a dialog in which to select the user administration method. If you do not have the necessary network connection, create local user accounts.

Creating Local User Accounts

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.

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.

Figure 1.5 *Entering the Username and Password*



A local user account can be created using the dialog shown in Figure 1.5, “Entering the Username and Password” (page 24). 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 2.9.1, "User Management" (page 67) for more information about user management.

Configuring the Host as an LDAP Client

To implement user administration by LDAP, configure an LDAP client in the next step. This section only describes the configuration of the client side. Configuration of an LDAP server is described in Chapter *LDAP—A Directory Service* (↑Reference).

Click *Use LDAP* to enable the use of LDAP. Select *Use LDAP but Disable Logins* instead if you want to use LDAP for authentication, but do not want other users to log in to this client. Enter the IP address of the LDAP server to use and the LDAP base DN to select the search base on the LDAP server. To retrieve the base DN automatically, click *Fetch DN*. YaST then checks for any LDAP database on the specified server address. Choose the appropriate base DN from the search results given by YaST. If TLS or SSL protected communication with the server is required, select *LDAP TLS/SSL*. If the LDAP server still uses LDAPv2, explicitly enable the use of this protocol version by selecting *LDAP Version 2*. Select *Start Automounter* to mount remote directories on your client, such as a remotely managed home directory. Click *Finish* to apply your

settings. LDAP client configuration is discussed in further detail in Section “The YaST LDAP Client” (Chapter 25, *LDAP—A Directory Service*, ↑Reference).

Configuring the Host as a NIS Client

To implement user administration by 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).

In the NIS client dialog, first select whether the host has a static IP address or gets one with 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`.

Configuring the Host as a Windows Domain Member

To implement user administration using a Samba or Windows server, configure a Samba client in the next step. This section only describes the configuration of the client side. Samba configuration is described in further detail in Chapter *Samba* (↑Reference).

In the *Windows Domain Membership* dialog, enter the NT or Active Directory domain or Samba workgroup to join or use *Browse* to select from a list of available domains. Select *Create Home Directory on Login* if you want to create home directories for any user logging in to the domain from your local machine. Click *Finish* to apply your settings and provide the necessary credentials.

1.9.7 Cleanup

This step does not require any user interaction. The installation program launches the SuSEconfig script to write the system configuration. Depending on the CPU and the amount of memory, this process can take some time.

1.9.8 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 Linux's servers.

1.9.9 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. To skip the configuration, select *Skip Configuration* and click *Next*.

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. To test your new configuration, click *Test the Configuration*.

1.9.10 Completing Installation

After a successful installation, YaST shows the *Installation Completed* dialog. In this dialog, select whether to clone your newly installed system for AutoYaST. To clone your system, select *Clone This System for AutoYaST*. The profile of the current system is stored in `/root/autoyast.xml`.

AutoYaST is a system for installing one or more SUSE Linux systems automatically without user intervention. AutoYaST installations are performed using a control file with installation and configuration data.

Finish the installation of SUSE Linux with *Finish* in the final dialog.

1.10 Graphical Login

SUSE Linux is now installed. Unless you enabled the automatic login function, you should see the graphical login on your screen where you can enter your username and password to log in to the system. If automatic login is activated, the desktop starts automatically.

2 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 similar 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 main menu. 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.

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 as `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`.

To save time, the individual YaST modules can be started directly. To start a module, enter `yast2 module_name`. View a list of all module names available on your system with `yast2 -l` or `yast2 --list`. Start the network module, for example, with `yast2 lan`.

2.1 YaST Language

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. This also changes the language for the entire system.

If you need work in a different language but do not want to change the system language setting, you can temporarily change the `LANG` variable. To do so, export `LANG` with your preferred language. For example, for English, enter the command:

```
export LANG="en_US"; yast2
```

This command changes the `LANG` setting only in your current session. The language setting of other users and your other sessions, like terminal windows, remains unchanged.

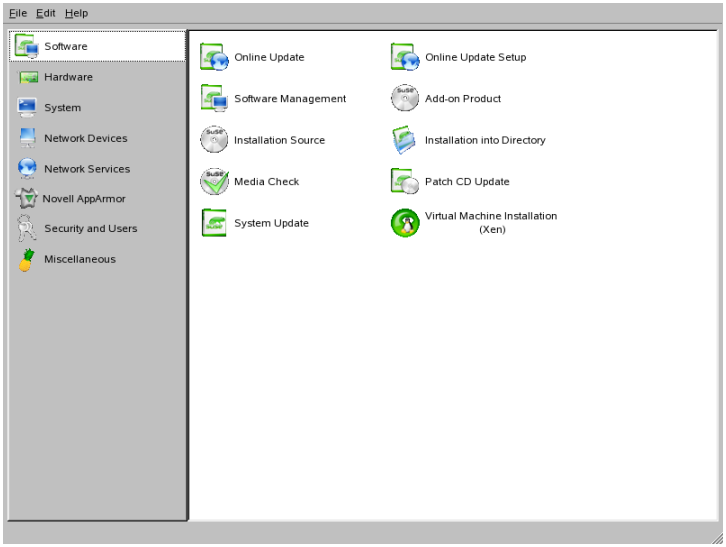
If you run YaST remotely over SSH, YaST uses the language settings of your local system.

2.2 The YaST Control Center

When you start YaST in the graphical mode, the YaST Control Center, as shown in Figure 2.1, “The YaST Control Center” (page 31), 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 2.1 *The YaST Control Center*

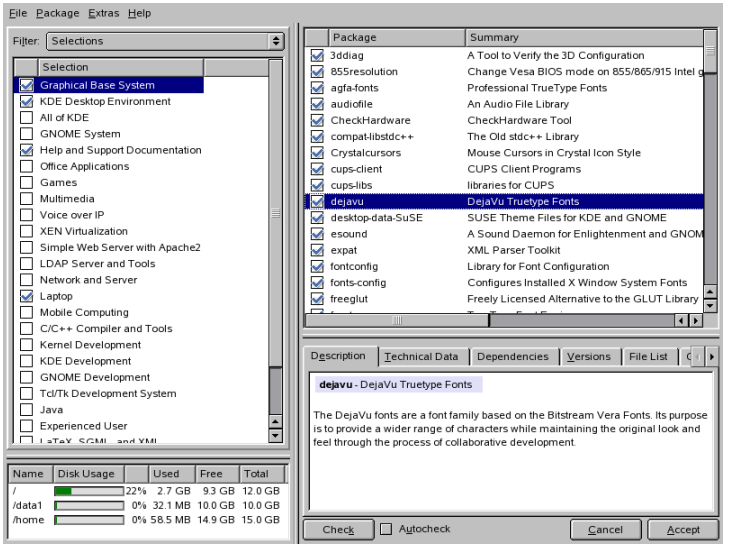


2.3 Software

2.3.1 Installing and Removing Software

To install, uninstall, and update software on your machine, use *Software* → *Software Management*. This opens a package manager dialog as shown in Figure 2.2, “YaST Package Manager” (page 32).

Figure 2.2 *YaST Package Manager*



In SUSE Linux, software is available in the form of RPM packages. Normally, a package contains everything needed for a program: the program itself, the configuration files, and all documentation. 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 *Selections* 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. Change 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 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.

Installing Packages

To install packages, select packages for installation and click *Accept*. Selected packages should have the *Install* status icon . The package manager automatically checks the dependencies and selects any other required packages (resolution of dependencies). To view other packages required for installation before clicking *Accept*, choose *Extras* → *Show Automatic Package Changes* from the main menu. After installing packages, continue working with the package manager by clicking *Install More* or close it by clicking *Finish*.

The package manager provides preselected groups for installation. You can select an entire group instead of single packages. To view these groups, use *Filter* in the left frame.

TIP: List of All Available Packages

To display all packages on your installation media, use the filter *Package Groups* and 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.

The *Selections* filter 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 install or uninstall this pattern. Select a status directly by right-clicking the pattern and using the context menu. From the individual package overview to the right, which displays the packages included in the current pattern, select and deselect individual packages.

To find language-specific packages, such as translated texts for the user interface of programs, documentation, and fonts, use the *Language* filter. 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.

Packages and Installation Sources

If you want to find only packages from the specific source, use the *Installation Sources* filter. In the default configuration, this filter shows a list of all packages from the selected source. To restrict the list, use a secondary filter.

To view a list of the all installed packages from the selected installation source, select the filter *Installation Sources* then select *Installation Summary* from *Secondary Filters* and deactivate all check boxes except *Keep*.

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

Installing Source Packages

A package containing the source files for the program is usually 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.

To install sources for selected program, mark the check box in the *Source* column. If you cannot see a check box, your installation sources do not contain the source of the package.

Removing Packages

To remove packages, assign the correct status to the packages to remove and click *Accept*. Selected packages should have the *Delete* status. If a package required by other installed packages is marked for deletion, the package manager issues an alert with detailed information and alternative solutions.

Reinstalling Packages

If you find damaged files that belong to package or you want to reinstall the original version of a package from your installation media, reinstall the package. To reinstall packages, select packages for reinstallation and click *Accept*. Selected packages should have the *Update* status . If any dependency issues arise with installed packages, the package manager issues an alert with detailed information and alternative solutions.

Searching for Packages, Applications, and Files

To find a specific package, use the *Search* filter. Enter a search string and click *Search*. By specifying various search criteria, you can restrict the search to display a few or even only one package. You can also define special search patterns using wild cards and regular expressions in *Search Mode*.

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).

To find a package by name, select *Name*, enter the name of the package to find in the search field, and click *Search*. To find a package by text in the description, select *Summary* and *Descriptions*, enter a search string, and click *Search*.

To search for the package that contains a certain file, enter the name of the file, select *RPM "Provides"*, and click *Search*. To find all packages that depend on a particular package, select *RPM "Requires"*, enter the name of package, and click *Search*.

If you are familiar with the package structure of SUSE Linux, you can use the *Package Groups* filter to find packages by subject. 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.

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, 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*.

Information about Packages

Get information about the selected package with the tabs in the bottom right frame. If another version of the package is available, you get information about both versions.

The *Description* tab with the description of the selected package is automatically active. To view information about package size, version, installation media, and other technical details, select *Technical Data*. Information about provided and required files is in *Dependencies*. To view available versions with their installation sources, click *Versions*.

Disk Usage

During the selection of the software, the resource window at the bottom left of the module displays the prospective disk 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.

Checking Dependencies

Some packages depend on other packages. This means that the software of the package only works properly if another package is also installed. 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).

When the package manager starts, it examines the system and displays installed packages. When you select to install and remove packages, the package manager automatically checks the dependencies and selects any other required packages (resolution of dependencies). If you select or deselect conflicting packages, the package manager indicates this and submits suggestions for solving the problem (resolution of conflicts).

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.

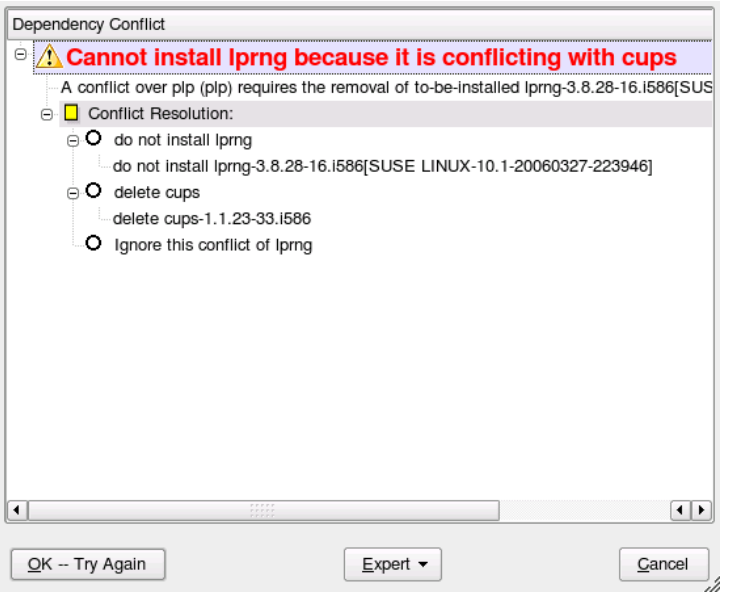
If you activate *Autocheck*, any change of a package status triggers an automatic check. This is a useful feature, because the consistency of the package selection is monitored permanently. However, this process consumes resources and can slow down the package manager. For this reason, the autocheck 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 2.3, "Conflict Management of the Package Manager" (page 38) 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 2.3 *Conflict Management of the Package Manager*



Installing -devel Packages

The package manager provides functions for quick and easy installation of devel and debug packages. To install all devel packages for your installed system, choose *Extras → Install All Matching — -devel Packages*. To install all debug packages for your installed system, choose *Extras → Install All Matching — -debuginfo Packages*.

2.3.2 Installing Add-On Products

Add-on products are extensions for your system. You can install a third party add-on product or a special extension of your SUSE Linux, for example, the SDK add-on or a CD with binary drivers. To install a new add-on, use *Software → Add-On Product*. You can select various types of product media, like CD, FTP or local directory. You can work also directly with ISO files. To add an add-on as ISO file media, select *Local Directory* then choose *ISO Images*.

After successfully adding the add-on media, the package manager window appears. If the add-on provides a new selection , see the new item in the *Selections* filter. To view

the list of all packages from the selected installation source, select the filter *Installation Sources* and choose the installation source to view. To view packages from a selected add-on by package groups, select the secondary filter *Package Groups*.

Binary Drivers

Some hardware needs binary-only drivers for correct function. If you have such hardware, refer to the release notes for more information about availability of binary drivers for your system. To read the release notes, open YaST and select *Miscellaneous* → *Release Notes*.

2.3.3 Selecting the Installation Source

You can use multiple installation sources of several types. Select them and enable their use for installation or update using *Software* → *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*.

2.3.4 Updating Software Online

Install important updates and improvements with YaST Online Update (YOU). The current patches for your SUSE product are available from the SUSE catalogs. To add or remove catalogs, use the *Software* → *Installation Source* module, described in Section 2.3.3, “Selecting the Installation Source” (page 39).

Find the list of available patches on the left. Patches are sorted by security importance:

Security
: You must install these patches. Not installing the patches is a real security hazard.

Recommended
: You should install these patches, because your computer could be compromised.

Optional
: You can install these patches, but if you do not install them your computer remains secure.

To install a patch, select it in the list and click *Accept*. You can select multiple patches. To cancel your changes, click *Cancel*.

If you need special settings, for example, if your computer is behind a proxy server, use the command line tool rug. It is described in Section 2.12, “Update from the Command Line” (page 76).

2.3.5 Automatic Online Update

Software → Online Update Setup allows you to schedule automatic online updates. First enable automatic online update by activating *Enable Automatic Update* then set the time of the update. If you want to have full control over installed patches, you can schedule only the download of patches and install patches manually later. To download patches only, check *Only Download Patches*.

Some patches need some additional actions, for example, patches for the kernel require a reboot for activation. Information about the additional actions are provided with preinstallation information. To use automatic update only for normal patches without preinstallation information, check *Skip Patches with Preinstall Information*. Click *Finish* to exit the dialog.

2.3.6 Updating from a Patch CD

The *Patch CD Update* module from the *Software* section 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.

2.3.7 Updating the System

Update the version of SUSE Linux installed on your system with *Software → 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*.

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 and Features Based on the Selection
: To update the entire system to the latest versions of software, select one of the predefined selections. These selections 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 2.3.1, “Installing and Removing Software” (page 31).

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*. Optionally, adapt the keyboard layout and time zone to the region where the primary language is spoken. Find more about language selection in Section 2.5.14, “Language Selection” (page 59).

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.

In most cases, YaST replaces old versions with new ones without problems. A backup of the existing system should be performed prior to updating to ensure that existing configurations are not lost during the update. Conflicts can then be resolved manually after the update has finished.

2.3.8 Checking Media

If you encounter any problems using the SUSE Linux installation media, you can check the CDs or DVDs with *Software* → *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.

2.3.9 Registering SUSE Linux

The registration and activation of your product is a precondition for technical support and product updates. If you skipped the registration during installation, you can register later with the help of the *Product Registration* module from *Software*. Before you start registration, prepare your contact e-mail and registration key.

In *Include for Convenience*, select whether to obtain some of the necessary information from your system. This simplifies the registration process. If you want to see what is required to register your system or what happens with your data, use *Details*.

2.4 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.

2.4.1 Bluetooth

Configure Bluetooth devices with *Hardware → Bluetooth*. Click *Enable Bluetooth Services* to begin configuration. Bluetooth configuration is covered in detail in Section "Configuring Bluetooth with YaST" (Chapter 34, *Wireless Communication*, ↑Reference).

2.4.2 Infrared Device

Configure an infrared device with *Hardware → Infrared Device*. Click *Start IrDa* to begin configuration. You can configure *Port* and *Limit Baud Rate* here. Find information about infrared devices in Section “Infrared Data Transmission” (Chapter 34, *Wireless Communication*, ↑Reference).

2.4.3 Graphics Card and Monitor

Configure graphics cards and monitors with *Hardware → Graphics Card and Monitor*. It uses the the SaX2 interface, described in Section 2.13, “SaX2” (page 79).

2.4.4 Printer

Configure a printer with *Hardware → 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 11, *Printer Operation*, ↑Reference).

2.4.5 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 *Hardware → 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.

2.4.6 Hardware Information

Display detected hardware and technical data using *Hardware → 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 a file by clicking *Save to File*. Select the desired directory and filename then click *Save* to create the file.

2.4.7 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 *Hardware → 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.

2.4.8 Joystick

Configure a joystick connected to the sound card with *Hardware → 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.

2.4.9 Keyboard Layout

To configure the keyboard for the console, run YaST in text mode then use *Hardware → 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.

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 2.13.3, “Keyboard Properties” (page 84).

2.4.10 Mouse Model

When configuring the mouse for the graphical environment, click *Mouse Model* to access the SaX2 mouse configuration. Refer to Section 2.13.2, “Mouse Properties” (page 83) 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.

2.4.11 Scanner

Connect and turn on your scanner then select *Hardware* → *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 detected automatically. 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 database article *Scanning in Linux* (`http://en.opensuse.org/SDB:SDB`).

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.

2.4.12 TV and Radio Cards

Configure TV and radio cards with *Hardware* → *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 2.4.13, “Sound” (page 49).

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 your area and click *Scan the Channels*. A list of stations appears. After scanning has been completed, click *OK* to return to the configuration dialog.

2.4.13 Sound

Use *Hardware* → *Sound* to configure a sound card. Most sound cards are detected automatically and listed. Select the one to configure or modify then click *Edit*. 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. With *Add*, configure additional sound cards. If YaST detects another sound card, select it then use *Edit*.

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`.

If YaST is unable to detect your sound card automatically, proceed as follows:

1. 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*.

2. In *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 it and select the joystick type in the following dialog. Click *Next* to continue.

3. In *Sound Card Volume*, 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.

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.

2.5 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.

2.5.1 Backup

Create a backup of both your system and data using *System → 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). 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`.

2.5.2 Restoration

With *System → System Restoration*, 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.

2.5.3 Boot and Rescue Disks

Create boot and rescue disks with *System → 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.

2.5.4 Boot Loader Configuration

To configure booting for systems installed on your computer, use the *System → Boot Loader* module. A detailed description of how to configure the boot loader with YaST is available in Section “Configuring the Boot Loader with YaST” (Chapter 9, *The Boot Loader*, ↑Reference).

2.5.5 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).

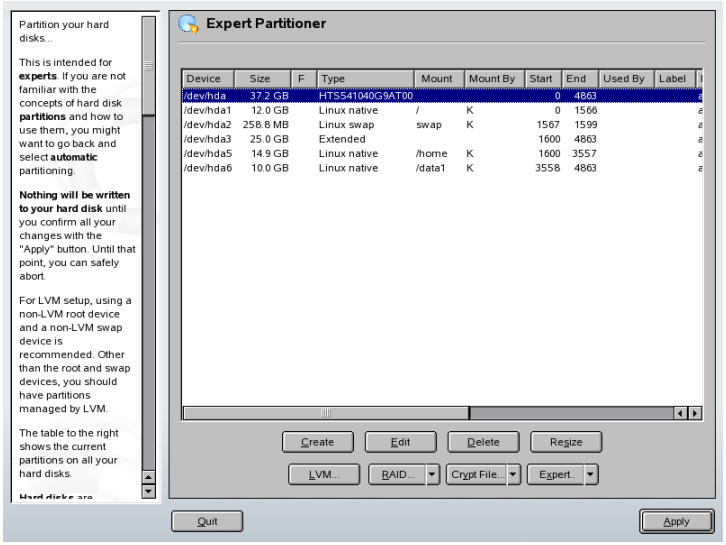
2.5.6 Partitioner

With the expert dialog, shown in Figure 2.4, “The YaST Partitioner” (page 53), 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 2.4 *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 9)).

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 4, *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 2.1 */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.

2.5.7 PCI Device Drivers

Each kernel driver contains a list of device IDs of all devices it supports. If a new device is not in any driver's database, the device is treated as unsupported, even if it can be used with an existing driver. With this YaST module from *System* section, you can add PCI IDs. Only advanced users should attempt to use this YaST module.

To add an ID, click *Add* and select how to assign it: by selecting a PCI device from a list or by manually entering PCI values. In the first option, select the PCI device from the provided list then enter the driver or directory name. If the directory is left empty, the driver name is used as the directory name. When assigning PCI ID values manually, enter the appropriate data to set up a PCI ID. Click *OK* to save your changes.

To edit a PCI ID, select the device driver from the list and click *Edit*. Edit the information and click *OK* to save your changes. To delete an ID, select the driver and click *Delete*. The ID immediately disappears from the list. When finished, click *OK*.

2.5.8 Power Management

The *System → Power Management* module helps you work with saving energy technologies. It is especially important on laptops to extend their operational time. Find detailed information about using this module in Section "The YaST Power Management Module" (Chapter 33, *Power Management*, ↑Reference).

2.5.9 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 *System → 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*.

2.5.10 Profile Manager

Create, manage, and switch among system configurations with *System → 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).

2.5.11 System Services (Runlevel)

Configure runlevels and the services that start in them with *System → System Services (Runlevel)*. 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 8, *Booting and Configuring a Linux System*, ↑Reference).

2.5.12 /etc/sysconfig Editor

The directory `/etc/sysconfig` contains the files with the most important settings for SUSE Linux. Use *System → /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 8, *Booting and Configuring a Linux System*, ↑Reference).

2.5.13 Time and Date Configuration

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

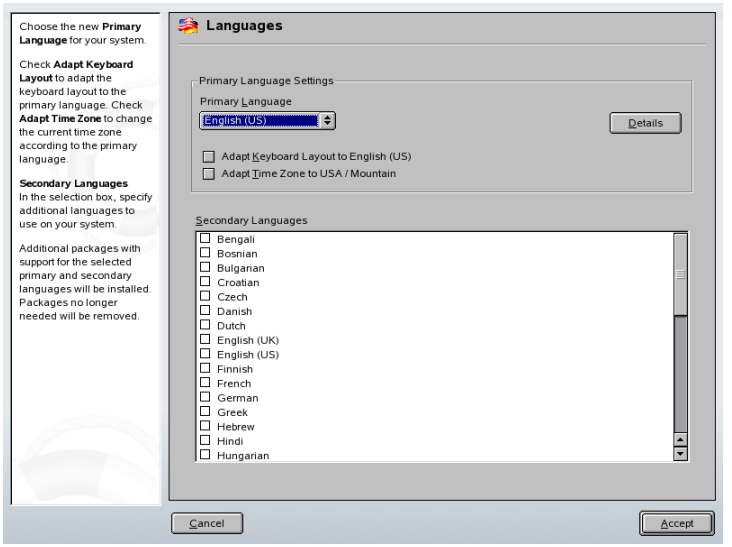
To change the time zone, select the region in the left column and the location or time zone in the right column. With *Hardware Clock Set To*, set whether the system clock should use *Local Time* or *UTC* (Coordinated Universal Time). *UTC* is often used in Linux systems. Machines with additional operating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

2.5.14 Language Selection

The primary and secondary languages for your system are set during installation. However, they can be changed at any time using *System → 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 2.5 *Setting the Language*



Select the main language to use for your system in *Primary Language*. To adjust the 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`.

2.6 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*.

2.6.1 DSL, ISDN, Modem, or Network Card

To configure a DSL, ISDN, or network interface or a modem, select the appropriate module from the *Network Devices* section. 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 18, *Basic Networking*, ↑Reference). For wireless network interfaces, see Chapter *Wireless Communication* (↑Reference).

TIP: CDMA and GPRS Modems

You can configure supported CDMA and GPRS modems as regular modems in the YaST modem module.

2.6.2 Fax

Configure a fax system with *Network Devices → 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.

2.6.3 Phone Answering Machine

Configure your SUSE Linux system to function as a telephone answering machine with *Network Devices → Phone Answering Machine*. 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.

2.7 Network Services

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

2.7.1 Mail Transfer Agent

You can configure your mail settings in *Network Services → 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.

2.7.2 Other Available Services

Many other network modules are available in YaST *Network Services*.

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 20, *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 HTTP 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 18, *Basic Networking*, ↑Reference).

Kerberos Client
: If you have a Kerberos server in your network for network authentication, use *Kerberos Client*.

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 Section “The YaST LDAP Client” (Chapter 25, *LDAP—A Directory Service*, ↑Reference).

NFS Client
: With NFS client, mount directories provided by NFS server in your own file trees. Use *NFS Client* to configure your system to access an NFS server in the network. A description of the YaST module and background information about NFS are provided in Chapter *Sharing File Systems with NFS* (↑Reference).

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. A description of the YaST module and background information about NFS are provided in Chapter *Sharing File Systems with NFS* (↑Reference).

NIS Client
: If you run NIS server to administer user data on a central place and distribute it to the clients, configure the client here. Detailed information about NIS client and configuration with YaST is available in Section “Configuring NIS Clients” (Chapter 21, *Using NIS*, ↑Reference).

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 its configuration with YaST is available in Section “Configuring a NIS Master Server” (Chapter 21, *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 NTP* (↑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 2.13.6, “Remote Access Properties” (page 85).

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
: 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 servers is provided in Chapter *Samba* (↑Reference).

Windows Domain Membership
: In a heterogeneous network consisting of Linux and Windows hosts, Samba controls the communication between the two worlds. With the *Samba Client* module, you can configure your computer as member of a Windows domain. Find information about Samba and the configuration of clients in Chapter *Samba* (↑Reference).

2.8 AppArmor

Novell AppArmor is designed to provide easy-to-use application security for both servers and workstations. Novell AppArmor is an access control system that lets you specify which files each program may read, write, and execute. To enable or disable Novell AppArmor on your system, use *AppArmor Control Panel*. Information about Novell AppArmor and a detailed description of the configuration with YaST are available in *Novell AppArmor 2.0 Administration Guide* (↑Novell AppArmor 2.0 Administration Guide).

2.9 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.

2.9.1 User Management

Create and edit users with *Security and Users → User Management*. It provides an overview of users in the system, including NIS, LDAP, Samba, and Kerberos 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.

TIP: Autologin

If you are the only user of your system, you can configure autologin. Autologin automatically logs a user into the system after it starts. To activate autologin, select the user from the list of users and click *Login Settings*. Then choose *Autologin* and click *OK*.

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* to save all changes without exiting the configuration module.

2.9.2 Group Management

To create and edit groups, select *Security and Users* → *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. Click *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 2.9.1, "User Management" (page 67).

2.9.3 Local Security

To apply a set of security settings to your entire system, use *Security and Users* → *Local Security*. These settings include security for booting, login, passwords, user creation, 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.

2.9.4 Firewall

SuSEfirewall2 can protect your machine against attacks from the Internet. Configure it with *Security and Users → Firewall*.

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.

2.10 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.

2.10.1 Support Query

Miscellaneous → Support Query offers the possibility to collect all system information needed by the support team to find your problem so you can get help to solve it as soon is possible. Regarding your query, select the problem category in the following window. When all information is gathered, attach it to your support request.

2.10.2 Release Notes

The release notes are an important source about installation, update, configuration, and technical issues. The release notes are continuously updated and published through online update. Use *Miscellaneous* → *Release Notes* to view the release notes.

2.10.3 Start-Up Log

View information concerning the start-up of the computer in *Miscellaneous* → *View Start-Up Log*. This is one of the first places you might want to look when encountering problems with the system or when troubleshooting. It shows the boot log `/var/log/boot.msg`, which contains the screen messages displayed when the computer starts. Viewing the log can help determine if the computer started properly and if all services and functions were started correctly.

2.10.4 System Log

Use *Miscellaneous* → *View 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.

2.10.5 Vendor Driver CD

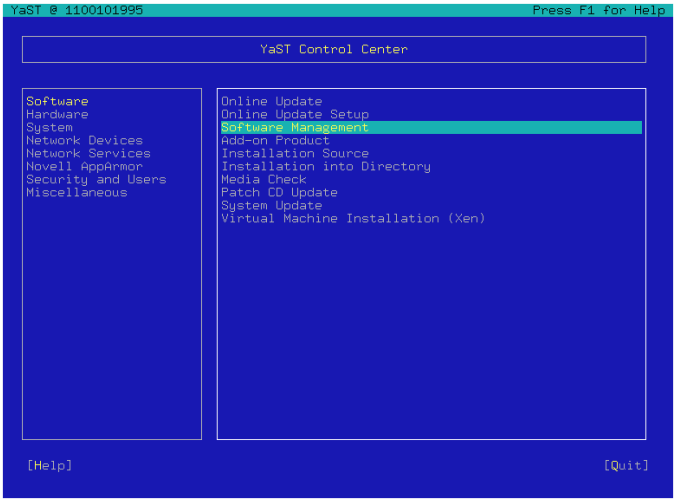
Install device drivers from a Linux driver CD that contains drivers for SUSE Linux with *Miscellaneous → Vendor Driver CD*. When installing SUSE Linux from scratch, use this YaST module to load the required drivers from the vendor CD after the installation.

2.11 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 2.6, “Main Window of YaST in Text Mode” (page 73). 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, provides an overview of the modules available in the active category. The bottom frame contains the buttons for *Help* and *Exit*.

Figure 2.6 *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 .

2.11.1 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 2.11.2, “Restriction of Key Combinations” (page 75) 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.

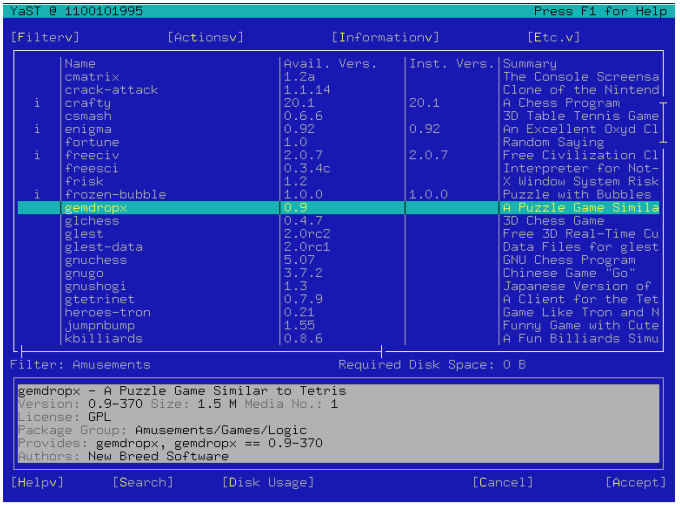
Buttons, Radio Buttons, and Check Boxes

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 2.7 *The Software Installation Module*



2.11.2 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.

2.11.3 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`.

2.12 Update from the Command Line

SUSE Linux comes with a new command line tool for installing and updating packages, rug. It works with the rcd daemon to install, update, and remove software according to the commands given. It can install software from local files or from servers. You may use one or more remote servers, known as services. Supported services are mount for local files and yum or ZENworks for servers.

rug sorts software from services into catalogs (also known as channels), groups of similar software. For example, one catalog might contain software from an update server and another some software from a third-party software vendor. Subscribe to individual catalogs to control the display of available packages and prevent the accidental installation of unwanted software. Operations are normally performed only on software from catalogs to which you are subscribed.

The most commonly used command is `rug update`, which downloads and installs patches in catalogs to which you are subscribed. If you only want to update software, this is the only command you need. To obtain a list of all packages from one catalog, use `rug pa catalogname`. Replace `catalogname` with name of your catalog. To list all available services, use `rug sl`. Some other useful rug commands and their functions are shown in Table 2.1, “rug Commands” (page 76).

Table 2.1 *rug Commands*

Command	Function
ca	List the catalogs

Command	Function
sa	Add a service
reg	Register a service
sub	Subscribe to a catalog
refresh	Refresh the lists of patches

2.12.1 rug User Management

One of the biggest advantages of rug is user management. Normally only `root` can update or install new packages. With rug, you can distribute the right to update the system to other users and restrict them, for example, only to the update right without the possibility to remove software. Privileges you can grant are:

install
: User may install new software

lock
: User may set package locks

remove
: User may remove software

subscribe
: User may change channel subscriptions

trusted
: User is considered trusted, so may install packages without package signatures

upgrade
: User may update software packages

view
: This allows the user to see which software is installed on the machine and which software is in available channels. The option is relevant only to remote users, local users are normally permitted to view installed and available packages.

superuser
: Permits all rug commands except user management and settings, which must be done locally.

To give a user permission to update the system, use the command `rug ua` *`username`* `upgrade`. Replace `username` with the name of the user. To revoke the privileges of a user, use command `rug ud` *`username`*. To list users with their rights, use `rug ul`.

To change the current privileges of a user, use `rug ue` *`username`*. Replace `username` with name of the desired user. The edit command is interactive. It lists privileges of the selected user and the offers you a prompt. Enter the plus (+) or minus (-) symbol and the name of the privilege then press Enter . For example, to permit the user to delete software, enter `+remove`. To save and quit, press Enter on a blank line.

2.12.2 Scheduling Updates

Using `rug`, the system can be updated automatically, for example, with scripts. The simplest example is the fully automatic update. To do this, as `root` configure a cron job that executes `rug up -y`. The `up -y` option downloads and installs the patches from your catalogs without confirmation.

However, you may not want the patches installed automatically. Instead, you may want to retrieve the patches and select the patches for installation at a later time. To download patches only, use the command `rug up -dy`. The `up -dy` option downloads the patches from your catalogs without confirmation and saves them to the rug cache. The default location of the rug cache is `/var/cache/redcarpet`.

2.12.3 Configuring rug

rug comes with many preferences to provide the update functionality in different network configurations. To list the preferences that may be set, use `rug get`. To set a preference variable, enter `rug set`. For example, adjust settings if you need to update your system, but the computer is behind a proxy server. Before downloading updates, send your username and password to the proxy server. To do so, use the commands:

```
rug set proxy-url url_path
rug set proxy-username name
rug set proxy-password password
```

Replace `url_path` with the name of your proxy server. Replace `name` with your username. Replace `password` with your password.

2.12.4 For More Information

For more information about updating from the command line, enter `rug --help` or see the `rug(1)` man page. The `--help` option is also available for all rug commands. If, for example, you want to read help for `rug update`, enter `rug update --help`.

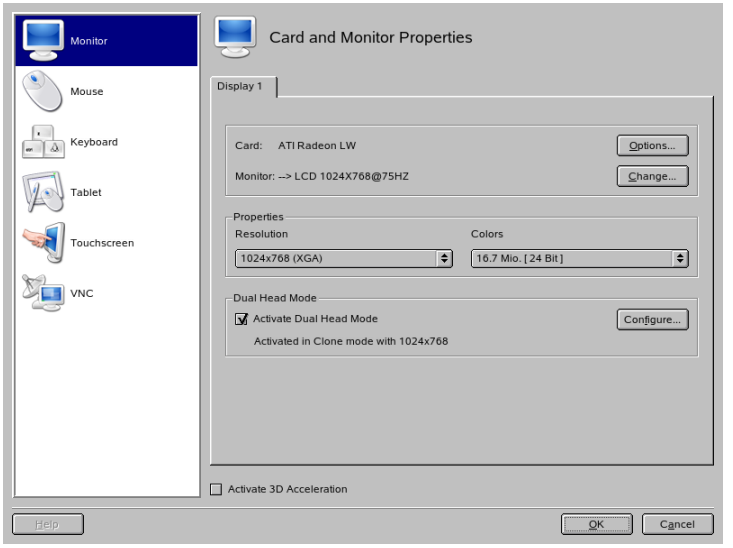
2.13 SaX2

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*.

2.13.1 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 during installation. However, you can tune many parameters manually or even change the display device completely.

Figure 2.8 *Card and Monitor Properties*



TIP: Autodetecting New Display Hardware

If you change your display hardware after installation, use `sax2 -r` on the command line to cause SaX2 to detect your hardware. You must be `root` to run SaX2 from the command line.

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 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.

TIP: Using a Beamer with Laptop Computers

To connect a beamer to a laptop computer, activate dual head mode. In this case, SaX2 configures the external output with a resolution of 1024x768 and a refresh rate of 60 Hz. These values suit most beamers very well.

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.

2.13.2 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.

2.13.3 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.

2.13.4 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.

2.13.5 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.

2.13.6 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.

2.14 Troubleshooting

All error messages and alerts are logged in the directory `/var/log/YaST2`. The most important file for finding YaST problems is `y2log`.

2.15 For More Information

More information about YaST can be found on the following Web sites and directories:

- `/usr/share/doc/packages/yast2`—Local YaST development documentation
- `http://www.opensuse.org/YaST_Development`—The YaST project page in the openSUSE wiki
- `http://forge.novell.com/modules/xfmod/project/?yast`—Another YaST project page

Part II. Basics

3 Working with the Shell

When booting your Linux system, you are usually directed to a graphical user interface that guides you through the login process and the following interactions with the system. Although graphical user interfaces have become very important and user-friendly, using them is not the only way to communicate with your system. You can also use a text-oriented communication like a command line interpreter, usually called the shell, where you can enter commands. Because Linux provides options to start shell windows from the graphical user interface, you can easily use both methods.

In administration, shell-based applications are especially important for controlling computers over slow network links or if you want to perform tasks as `root` on the command line. For Linux "newbies" it might be rather unusual to enter commands in a shell, but you will soon realize that the shell is not only for administrators—in fact, using the shell is often the quickest and easiest way to perform some daily tasks.

There are several shells for UNIX or Linux. The default shell in SUSE Linux is Bash (GNU Bourne-Again Shell).

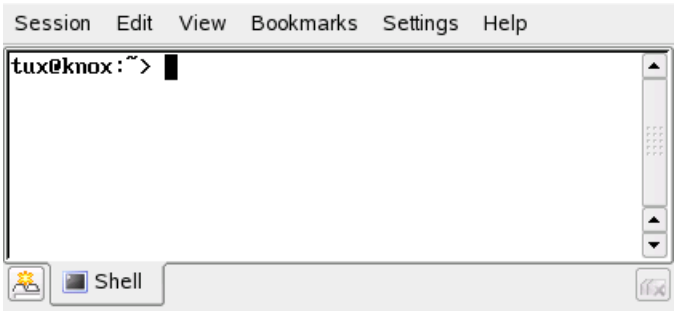
This chapter deals with a couple of basics you need to know for using the shell. This includes the following topics: how to enter commands, the directory structure of Linux, how to work with files and directories and how to use some basic functions, the user and permission concept of Linux, an overview of important shell commands, and a short introduction to the vi editor, which is a default editor always available in Unix and Linux systems.

3.1 Getting Started with the Bash Shell

In Linux, you can use the command line parallel to the graphical user interface and easily switch between them. To start a terminal window from the graphical user interface in KDE, click the Konsole icon in the panel. In GNOME, click the GNOME Terminal icon in the panel.

The Konsole or the GNOME Terminal window appears, showing the prompt on the first line like in Figure 3.1, “Example of a Bash Terminal Window” (page 90). The prompt usually shows your login name (in this example, `tux`), the hostname of your computer (here, `knox`), and the current path (in this case, your home directory, indicated by the tilde symbol, `~`). When you are logged in on a remote computer this information always shows you which system you are currently working on. When the cursor is after this prompt, you can send commands directly to your computer system.

Figure 3.1 *Example of a Bash Terminal Window*



3.1.1 Entering Commands

A command consists of several elements. The first element is always the actual command, followed by parameters or options. You can type a command and edit it by using ← , → , <— , Del , and Space . You can also add options or correct typing errors. The command is executed when you press Enter .

IMPORTANT: No News Is Good News

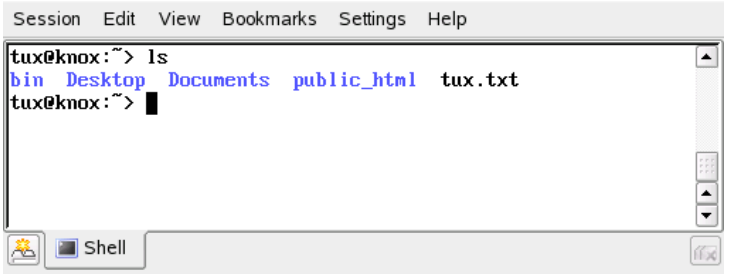
The shell is not verbose: in contrast to some graphical user interfaces, it usually does not provide confirmation messages when commands have been executed. Messages only appear in case of problems or errors.

Also keep this in mind for commands to delete objects. Before entering a command like `rm` for removing a file, you should know if you really want to get rid of the object: it will be deleted irretrievably, without enquiry.

Using Commands without Options

Look at the structure of commands using a simple example: the `ls` command, used to list the contents of a directory. The command can be used with or without options. Entering the plain `ls` command shows the contents of the current directory:

Figure 3.2 *The ls Command*



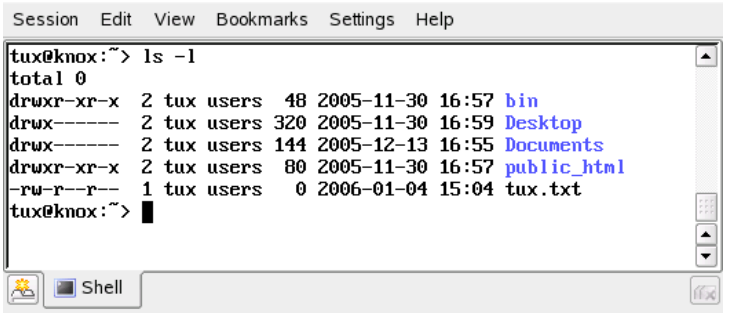
Unlike in MS Windows, files in Linux may have a file extension, such as `.txt`, but do not need to have one. This makes it difficult to differentiate between files and folders in this output of the `ls`. By default, the colors can give you a hint: directories are usually shown in blue, files in black.

Using Commands with Options

A better way to get more details about the contents of a directory is using the `ls` command with a string of options. Options modify the way a command works so that you can get it to do specific tasks. Options are separated from the command with a blank

and are prefixed with a hyphen. The `ls -l` command shows the contents of the same directory in full detail (long listing format):

Figure 3.3 *The ls -l Command*



On the left of each object name, information about the object is shown in several columns. The most important are the following: The first column shows the file type of the object (in this example, `d` for directory or `-` for normal files). The next nine columns show the user permissions for the object. Columns 11 and 12 show the name of the file owner and the group (in this case, `tux` and `users`). Find information about user permissions and the user concept of Linux in Section 3.2, "Users and Access Permissions" (page 102). The next column shows the file size in bytes. Then date and time of the last change are displayed. The last column shows the object name.

If you want to see even more, you can combine two options for the `ls` command and enter `ls -la`. The shell now also shows hidden files in the directory, indicated by a dot in front (for example, `.hiddenfile`).

Getting Help

Nobody is expected to know all options of all commands by heart. If you remember the command name but are not sure about the options, you can enter the command followed by a blank and `--help`. This `--help` option exists for many commands. Entering `ls --help` displays all the options for the `ls` command.

3.1.2 Linux Directory Structure

Because the shell does not offer a graphical overview of directories and files like the tree view in a file manager, it is useful to have some basic knowlegde of the default directory structure in a Linux system. You can think of directories as electronic folders in which files, programs, and subdirectories are stored. The top level directory in the hierarchy is the root directory, referred to as `/`. This is the place from which all other directories can be accessed.

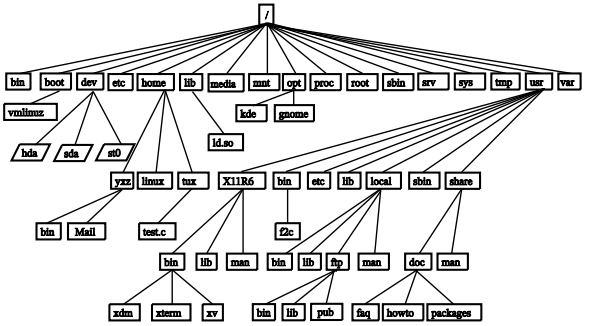
Figure 3.4, “Excerpt from a Standard Directory Tree” (page 94) shows the standard directory tree in Linux, with the home directories of the example users `xyz`, `linux`, and `tux`. The `/home` directory contains the directories in which the individual users can store their personal files.

NOTE: Home Directory in a Network Environment

If you are working in a network environment, your home directory may not be called `/home`. It can be mapped to any directory in the file system.

The following list provides a brief description of the standard directories in Linux.

Figure 3.4 *Excerpt from a Standard Directory Tree*



`/`
: Root directory, starting point of the directory tree

`/home`
: Personal directories of users

`/dev`
: Device files that represent hardware components

`/etc`
: Important files for system configuration

`/etc/init.d`
: Boot scripts

`/usr/bin`
: Generally accessible programs

`/bin`
: Programs needed early in the boot process

`/usr/sbin`
: Programs reserved for the system administrator

`/sbin`
: Programs reserved for the system administrator and needed for booting

`/usr/include`
: Header files for the C compiler

`/usr/include/g++`
: Header files for the C++ compiler

`/usr/share/doc`
: Various documentation files

`/usr/share/man`
: System manual pages (man pages)

`/usr/src`
: Source code of system software

`/usr/src/linux`
: Kernel source code

`/tmp`, `/var/tmp`
: Temporary files

`/usr`
: All application programs

`/var`
: Configuration files (such as those linked from `/usr`)

`/var/log`
: System log files

`/var/adm`
: System administration data

`/lib`
Shared libraries (for dynamically linked programs)

`/proc`
Process file system

`/sys`
System file system where all device information for the kernel is gathered

`/usr/local`
Local, distribution-independent extensions

`/opt`
Optional software, larger add-on program packages (such as KDE, GNOME, and Netscape)

3.1.3 Working with Directories and Files

To address a certain file or directory, you must specify the path leading to that directory or file. There are two ways to specify a path:

- The entire (absolute) path from the root directory to the respective file
- A path starting from the current directory (relative path)

Absolute paths always start with a slash. Relative paths do not have a slash at the beginning.

NOTE: Linux Is Case-Sensitive

Linux distinguishes between uppercase and lowercase in the file system. For example, entering `test.txt` or `Test.txt` makes a difference in Linux. Keep this in mind when entering filenames or paths.

To change directories, use the `cd` command. Enter the directory to go to as an option of the command. Refer to the current directory with a dot (`.`). The next higher level in the tree is represented by two dots (`..`). To switch to the parent directory of your current directory, enter `cd ..`. Do not forget to enter a blank after the `cd` command to separate the command from the options. Your prompt now shows the path to the parent of the

directory where you ran the command. To switch to a directory two levels higher than the current directory, enter `cd ../..`. `ls -l ../..` lists the contents of the directory two levels higher.

Examples of Addressing a File

The `cd` commands in Section 3.1.3, "Working with Directories and Files" (page 96) used relative paths. You can use also absolute paths. For example, suppose you want to copy a file from your home directory to a subdirectory of `/tmp`:

1. First, from your home directory create a subdirectory in `/tmp`:

   a. If your current directory is not your home directory, enter `cd ~` to switch to it. From anywhere in the file system, you can reach your home directory by entering `cd ~`.

   b. In your home directory, enter `mkdir /tmp/test`. `mkdir` stands for "make directory". This command creates a new directory named `test` in the `/tmp` directory. In this case, use an absolute path to create the directory.

   c. To check what happened, now enter `ls -l /tmp`. The new directory `test` should appear in the list of contents of the `/tmp` directory.

2. Now create a new file in your home directory and copy it to the `/tmp/test` directory by using a relative path.

   a. Enter `touch myfile.txt`. The `touch` command with the `myfile.txt` option creates a new, empty file named `myfile.txt` in your current directory.

   b. Check this by entering `ls -l`. The new file should appear in the list of contents.

   c. Enter `cp myfile.txt ../tmp/test`. This copies `myfile.txt` to the directory `/tmp/test` without changing the name of the file.

   d. Check this by entering `ls -l /tmp/test`. The file `myfile.txt` should appear in the list of contents for `/tmp/test`.

To list the contents of home directories of other users, enter `ls ~username` . In the example directory tree in Figure 3.4, “Excerpt from a Standard Directory Tree” (page 94), one of the sample users is `tux`. In this case, `ls ~tux` would list the contents of the home directory of `tux`.

NOTE: Handling Blanks in Filenames or Directory Names

If a filename contains a space, either escape the space using a back slash (`\`) in front of the blank or enclose the filename in single or double quotes. Otherwise Bash interprets a filename like `My Documents` as the names of two files or directories. The difference between single and double quotes is that variable expansion takes place within double quotes. Single quotes ensure that the shell sees the quoted string literally.

3.1.4 Useful Features of the Shell

Entering commands in Bash can include a lot of typing. In the following, get to know some features of the Bash that can make your work a lot easier and save a lot of typing.

History and Completion

By default, Bash “remembers” commands you have entered. This feature is called `history`. To repeat a command that has been entered before, press [↑] until the previous command appears at the prompt. You can also move forward through the list of previously entered commands by pressing [↓]. You always have the chance to edit this command, for example, changing the name of a file, before you execute the command by pressing [Enter]. To edit the command line, just move the cursor to the desired position using the arrow keys and start typing. Use [Ctrl] + [R] to search in the history.

Completing a filename or directory name to its full length after typing its first letters is another helpful feature of Bash. To do so, type the first letters then press [→|] . If the filename or path can be uniquely identified it is completed at once and the cursor moves to the end of the filename. You can then enter the next option of the command, if necessary. If the filename or path cannot be uniquely identified (because there are several filenames starting with the same letters), the filename or path is only completed up to the point where again several options are possible. You can then obtain a list of them by pressing [→|] a second time. After this, you can enter the next letters of the file or path then try completion again by pressing [→|] . When completing filenames

and paths with the help of →|, you can simultaneously check whether the file or path you want to enter really exists (and you can be sure of getting the spelling right).

Wild Cards

Another convenience offered by the shell is wild cards for pathname expansion. Wild cards are characters that can stand for other characters. There are three different types of these in Bash:

?
: Matches exactly one arbitrary character

*
: Matches any number of characters

[set]
: Matches one of the characters from the group specified inside the square brackets, which is represented here by the string *set*. As part of *set* you can also specify character classes using the syntax *[:class:]*, where a class is one of `alnum`, `alpha`, `ascii`, etc.

  Using `!` or `^` at the beginning of the group ([!*set*]) matches one character other than those identified by *set*.

Assuming that your `test` directory contains the files `Testfile`, `Testfile1`, `Testfile2`, and `datafile`, the command `ls Testfile?` lists the files `Testfile1` and `Testfile2`. With `ls Test*`, the list also includes `Testfile`. `ls *fil*` shows all the sample files. Finally, you can use the `set` wild card to address all sample files whose last character is a number: `ls Testfile[1-9]` or, using classes, `ls Testfile[[:digit:]]`.

Of the four types of wild cards, the most inclusive one is the asterisk. It could be used to copy all files contained in one directory to another one or to delete all files with one command. The command `rm *fil*`, for instance, would delete all files in the current directory whose name includes the string *fil*.

Viewing Files with Less and More

Linux includes two small programs for viewing text files directly in the shell: `less` and `more`. Rather than starting an editor to read a file like `Readme.txt`, simply enter `less Readme.txt` to display the text in the console window. Use Space to scroll down one page. Use Page ↑ and Page ↓ to move forward or backward in the text. To exit less, press Q .

Instead of less, you can also use the older program more. However, it is less convenient because it does not allow you to scroll backwards.

The program less got its name from the the precept that *less is more* and can also be used to view the output of commands in a convenient way. To see how this works, read Section “Redirection and Pipes” (page 100).

Redirection and Pipes

Normally, the standard output in the shell is your screen or the console window and the standard input is the keyboard. However, the shell provides functions by which you can redirect the input or the output to another object, such as a file or another command. With the help of the symbols > and <, for example, you can forward the output of a command to a file (output redirection) or use a file as input for a command (input redirection). For example, if you want to write the output of a command such as `ls` to a file, enter `ls -l > file.txt`. This creates a file named `file.txt` that contains the list of contents of your current directory as generated by the `ls` command. However, if a file named `file.txt` already exists, this command overwrites the existing file. To prevent this, use >>. Entering `ls -l >> file.txt` simply appends the output of the `ls` command to an already existing file named `file.txt`. If the file does not exist, it is created.

Sometimes it is also useful to use a file as the input for a command. For example, with the `tr` command, you can replace characters redirected from a file and write the result to the standard output, your screen. Suppose you want to replace all characters `t` of your `file.txt` from the example above with `x` and print this to your screen. Do so by entering `tr t x < file.txt`.

Just like the standard output, the standard error output is sent to the console. To redirect the standard error output to a file named `errors`, append `2> errors` to the corre-

sponding command. Both standard output and standard error are saved to one file named `alloutput` if you append `>& alloutput`.

Using *pipelines* or *pipes* is also a sort redirection, although the use of the pipe is not constrained to files. With a pipe (`|`), you can combine several commands, using the output of one command as input for the next command. For example, to view the contents or your current directory in `less`, enter `ls | less`. This only makes sense if the normal output with `ls` would be too lengthy. For instance, if you view the contents of the `dev` directory with `ls /dev`, you only see a small portion in the window. View the entire list with `ls /dev | less`.

3.1.5 Archives and Data Compression

Now that you have already created a number of files and directories, consider the subject of archives and data compression. Suppose you want to have the entire `test` directory packed in one file that you can save on a USB stick as a backup copy or send by e-mail. To do so, use the command `tar` (for *tape archiver*). With `tar --help`, view all the options for the `tar` command. The most important of these options are explained here:

-c
: (for create) Create a new archive.

-t
: (for table) Display the contents of an archive.

-x
: (for extract) Unpack the archive.

-v
: (for verbose) Show all files on screen while creating the archive.

-f
: (for file) Choose a filename for the archive file. When creating an archive, this option must always be given as the last one.

To pack the `test` directory with all its files and subdirectories into an archive named `testarchive.tar`, use the options `-c` and `-f`. For testing purposes, also add `-v` to follow the progress of the archiving, although this option is not mandatory. After using `cd` to change to your home directory where the `test` directory is located, enter

`tar -cvf testarchive.tar test`. After that, view the contents of the archive file with `tar -tf testarchive.tar`. The `test` directory with all its files and directories has remained unchanged on your hard disk. To unpack the archive, enter `tar -xvf testarchive.tar`, but do not try this yet.

For file compression, the obvious choice is `gzip` or, for a even better compression ratio, `bzip2`. Just enter `gzip testarchive.tar` (or `bzip2 testarchive.tar`, but `gzip` is used in this example). With `ls`, now see that the file `testarchive.tar` is no longer there and that the file `testarchive.tar.gz` has been created instead. This file is much smaller and therefore much better suited for transfer via e-mail or storage on a USB stick.

Now, unpack this file in the `test2` directory created earlier. To do so, enter `cp testarchive.tar.gz test2` to copy the file to that directory. Change to the directory with `cd test2`. A compressed archive with the `.tar.gz` extension can be unzipped with the `gunzip` command. Enter `gunzip testarchive.tar.gz`, which results in the file `testarchive.tar`, which then needs to be extracted or *untarred* with `tar -xvf testarchive.tar`. You can also unzip and extract a compressed archive in one step with `tar -xvf testarchive.tar.gz` (adding the `-z` option is no longer required). With `ls`, you can see that a new `test` directory has been created with the same contents as your `test` directory in your home directory.

3.1.6 Cleaning Up

After this crash course, you should be familiar with the basics of the Linux shell or command line. You may want to clean up your home directory by deleting the various test files and directories using the `rm` and `rmdir` commands. In Section 3.3, “Important Linux Commands” (page 106), find a list of the most important commands and a brief description of their functions.

3.2 Users and Access Permissions

Since its inception in the early 1990s, Linux has been developed as a multiuser system. Any number of users can work on it simultaneously. Users need to log in to the system before starting a session at their workstations. Each user has a username with a corresponding password. This differentiation of users guarantees that unauthorized users cannot see files for which they do not have permission. Larger changes to the system,

such as installing new programs, are also usually impossible or restricted for normal users. Only the root user, or *super user*, has the unrestricted capacity to make changes to the system and unlimited access to all files. Those who use this concept wisely, only logging in with full `root` access when necessary, can cut back the risk of unintentional loss of data. Because under normal circumstances only root can delete system files or format hard disks, the threat from the *Trojan horse effect* or from accidentally entering destructive commands can be significantly reduced.

3.2.1 File System Permissions

Basically, every file in a Linux file system belongs to a user and a group. Both of these proprietary groups and all others can be authorized to write, read, or execute these files.

A group, in this case, can be defined as a set of connected users with certain collective rights. For example, call a group working on a certain project `project3`. Every user in a Linux system is a member of at least one proprietary group, normally `users`. There can be as many groups in a system as needed, but only `root` is able to add groups. Every user can find out, with the command `groups`, of which groups he is a member.

File Access

The organization of permissions in the file system differs for files and directories. File permission information can be displayed with the command `ls -l`. The output could appear as in Example 3.1, “Sample Output Showing File Permissions” (page 103).

Example 3.1 *Sample Output Showing File Permissions*

```
-rw-r----- 1 tux project3 14197 Jun 21  15:03 Roadmap
```

As shown in the third column, this file belongs to user `tux`. It is assigned to the group `project3`. To discover the user permissions of the `Roadmap` file, the first column must be examined more closely.

-	rw-	r--	---
Type	Users Permissions	Group Permissions	Permissions for Other Users

This column consists of one leading character followed by nine characters grouped in threes. The first of the ten letters stands for the type of file system component. The hyphen (`-`) shows that this is a file. A directory (`d`), a link (`l`), a block device (`b`), or a character device could also be indicated.

The next three blocks follow a standard pattern. The first three characters refer to whether the file is readable (`r`) or not (`-`). A `w` in the middle portion symbolizes that the corresponding object can be edited and a hyphen (`-`) means it is not possible to write to the file. An `x` in the third position denotes that the object can be executed. Because the file in this example is a text file and not one that is executable, executable access for this particular file is not needed.

In this example, `tux` has, as owner of the file `Roadmap`, read (`r`) and write access (`w`) to it, but cannot execute it (`x`). The members of the group `project3` can read the file, but they cannot modify it or execute it. Other users do not have any access to this file. Other permissions can be assigned by means of ACLs (access control lists).

Directory Permissions
: Access permissions for directories have the type `d`. For directories, the individual permissions have a slightly different meaning.

Example 3.2 *Sample Output Showing Directory Permissions*

```
drwxrwxr-x 1 tux project3 35 Jun 21 15:15  ProjectData
```

In Example 3.2, "Sample Output Showing Directory Permissions" (page 104), the owner (`tux`) and the owning group (`project3`) of the directory `ProjectData` are easy to recognize. In contrast to the file access permissions from File Access (page 103), the set reading permission (`r`) means that the contents of the directory can be shown. The write permission (`w`) means that new files can be created. The executable permission (`x`) means that the user can change to this directory. In the above example, the user `tux` as well as the members of the group `project3` can change to the `ProjectData` directory (`x`), view the contents (`r`), and add or delete files (`w`). The rest of the users, on the other hand, are given less access. They may enter the directory (`x`) and browse through it (`r`), but not insert any new files (`w`).

3.2.2 Modifying File Permissions

Changing Access Permissions

The access permissions of a file or directory can be changed by the owner and, of course, by `root` with the command `chmod` followed by the parameters changing the permissions and one or more filenames. The parameters form different categories:

1. Users concerned

- `u` (*user*)—owner of the file
- `g` (*group*)—group that owns the file
- `o` (*others*)—additional users (if no parameter is given, the changes apply to all categories)

2. A character for deletion (`-`), setting (`=`), or insertion (`+`)

3. The abbreviations

- `r`—*read*
- `w`—*write*
- `x`—*execute*

4. Filename or filenames separated by spaces

If, for example, the user `tux` in Example 3.2, “Sample Output Showing Directory Permissions” (page 104) also wants to grant other users write (`w`) access to the directory `ProjectData`, he can do this using the command `chmod o+w ProjectData`.

If, however, he wants to deny all users other than himself write permissions, he can do this by entering the command `chmod go-w ProjectData`. To prohibit all users from adding a new file to the folder `ProjectData`, enter `chmod -w ProjectData`. Now, not even the owner can create a new file in the directory without first reestablishing write permissions.

Changing Ownership Permissions

Other important commands to control the ownership and permissions of the file system components are `chown` (change owner) and `chgrp` (change group). The command `chown` can be used to transfer ownership of a file to another user. However, only `root` is permitted to perform this change.

Suppose the file `Roadmap` from Example 3.2, "Sample Output Showing Directory Permissions" (page 104) should no longer belong to `tux`, but to the user `geeko`. `root` should then enter `chown geeko Roadmap`.

`chgrp` changes the group ownership of the file. However, the owner of the file must be a member of the new group. In this way, the user `tux` from Example 3.1, "Sample Output Showing File Permissions" (page 103) can switch the group owning the file `ProjectData` to `project4` with the command `chgrp project4 ProjectData`, as long as he is a member of this new group.

3.3 Important Linux Commands

This section gives insight into the most important commands of your SUSE Linux system. There are many more commands than listed in this chapter. Along with the individual commands, parameters are listed and, where appropriate, a typical sample application is introduced. To learn more about the various commands, use the manual pages, accessed with `man` followed by the name of the command, for example, `man ls`.

In the man pages, move up and down with PgUp and PgDn. Move between the beginning and the end of a document with Home and End. End this viewing mode by pressing Q. Learn more about the `man` command itself with `man man`.

In the following overview, the individual command elements are written in different typefaces. The actual command and its mandatory options are always printed as `command option`. Specifications or parameters that are not required are placed in `[square brackets]`.

Adjust the settings to your needs. It makes no sense to write `ls file` if no file named `file` actually exists. You can usually combine several parameters, for example, by writing `ls -la` instead of `ls -l -a`.

3.3.1 File Commands

The following section lists the most important commands for file management. It covers anything from general file administration to manipulation of file system ACLs.

File Administration

`ls [options] [files]`
If you run `ls` without any additional parameters, the program lists the contents of the current directory in short form.

`-l`
Detailed list

`-a`
Displays hidden files

`cp [options] source target`
Copies `source` to `target`.

-i
Waits for confirmation, if necessary, before an existing `target` is overwritten

-r
Copies recursively (includes subdirectories)

`mv [options] source target`
Copies `source` to `target` then deletes the original `source`.

-b
Creates a backup copy of the `source` before moving

-i
Waits for confirmation, if necessary, before an existing `targetfile` is overwritten

`rm [options] files`
Removes the specified files from the file system. Directories are not removed by `rm` unless the option `-r` is used.

`-r`
: Deletes any existing subdirectories

`-i`
: Waits for confirmation before deleting each file

`ln [options] source target`
: Creates an internal link from `source` to `target`. Normally, such a link points directly to `source` on the same file system. However, if `ln` is executed with the `-s` option, it creates a symbolic link that only points to the directory in which `source` is located, enabling linking across file systems.

-s
: Creates a symbolic link

`cd [options] [directory]`
: Changes the current directory. `cd` without any parameters changes to the user's home directory.

`mkdir [options] directory`
: Creates a new directory.

`rmdir [options] directory`
: Deletes the specified directory if it is already empty.

`chown [options] username[:[group]] files`
: Transfers ownership of a file to the user with the specified username.

`-R`
: Changes files and directories in all subdirectories

`chgrp [options] groupname files`
: Transfers the group ownership of a given `file` to the group with the specified group name. The file owner can only change group ownership if a member of both the current and the new group.

`chmod [options] mode files`
: Changes the access permissions.

The `mode` parameter has three parts: `group`, `access`, and `access type`. `group` accepts the following characters:

u
: User

g
: Group

o
: Others

For `access`, grant access with + and deny it with –.

The `access type` is controlled by the following options:

r
: Read

w
: Write

x
: Execute—executing files or changing to the directory

s
: Setuid bit—the application or program is started as if it were started by the owner of the file

As an alternative, a numeric code can be used. The four digits of this code are composed of the sum of the values 4, 2, and 1—the decimal result of a binary mask. The first digit sets the set user ID (SUID) (4), the set group ID (2), and the sticky (1) bits. The second digit defines the permissions of the owner of the file. The third digit defines the permissions of the group members and the last digit sets the permissions for all other users. The read permission is set with 4, the write permission with 2, and the permission for executing a file is set with 1. The owner of a file would usually receive a 6 or a 7 for executable files.

`gzip [parameters] files`
: This program compresses the contents of files using complex mathematical algorithms. Files compressed in this way are given the extension `.gz` and need to be uncompressed before they can be used. To compress several files or even entire directories, use the `tar` command.

-d
: Decompresses the packed gzip files so they return to their original size and can be processed normally (like the command `gunzip`)

`tar options archive files`
: `tar` puts one or more files into an archive. Compression is optional. `tar` is a quite complex command with a number of options available. The most frequently used options are:

  `-f`
  : Writes the output to a file and not to the screen as is usually the case

  `-c`
  : Creates a new tar archive

  `-r`
  : Adds files to an existing archive

  `-t`
  : Outputs the contents of an archive

  `-u`
  : Adds files, but only if they are newer than the files already contained in the archive

  `-x`
  : Unpacks files from an archive (*extraction*)

  `-z`
  : Packs the resulting archive with `gzip`

  `-j`
  : Compresses the resulting archive with `bzip2`

  `-v`
  : Lists files processed

  The archive files created by `tar` end with `.tar`. If the tar archive was also compressed using `gzip`, the ending is `.tgz` or `.tar.gz`. If it was compressed using `bzip2`, the ending is `.tar.bz2`. Application examples can be found in Section 3.1.5, “Archives and Data Compression” (page 101).

`locate patterns`
: This command is only available if you have installed the `findutils-locate` package. The `locate` command can find in which directory a specified file is located. If desired, use wild cards to specify filenames. The program is very speedy, because it uses a database specifically created for the purpose (rather than searching through the entire file system). This very fact, however, also results in a major drawback: locate is unable to find any files created after the latest update of its database. The database can be generated by `root` with `updatedb`.

`updatedb [options]`
: This command performs an update of the database used by `locate`. To include files in all existing directories, run the program as `root`. It also makes sense to place it in the background by appending an ampersand (`&`), so you can immediately continue working on the same command line (`updatedb &`). This command usually runs as a daily cron job (see `cron.daily`).

`find [options]`
: With `find`, search for a file in a given directory. The first argument specifies the directory in which to start the search. The option `-name` must be followed by a search string, which may also include wild cards. Unlike `locate`, which uses a database, `find` scans the actual directory.

Commands to Access File Contents

`file [options] [files]`
: With `file`, detect the contents of the specified files.

  -z
  : Tries to look inside compressed files

`cat [options] files`
: The `cat` command displays the contents of a file, printing the entire contents to the screen without interruption.

  -n
  : Numbers the output on the left margin

`less [options] files`
: This command can be used to browse the contents of the specified file. Scroll half a screen page up or down with PgUp and PgDn or a full screen page down with

Space . Jump to the beginning or end of a file using Home and End . Press Q to exit the program.

`grep [options] searchstring files`
: The grep command finds a specific search string in the specified files. If the search string is found, the command displays the line in which `searchstring` was found along with the filename.

`-i`
: Ignores case

`-H`
: Only displays the names of the respective files, but not the text lines

`-n`
: Additionally displays the numbers of the lines in which it found a hit

`-l`
: Only lists the files in which `searchstring` does not occur

`diff [options] file1 file2`
: The `diff` command compares the contents of any two files. The output produced by the program lists all lines that do not match. This is frequently used by programmers who need only send their program alterations and not the entire source code.

`-q`
: Only reports whether the two files differ

`-u`
: Produces a "unified" diff, which makes the output more readable

File Systems

`mount [options] [device] mountpoint`
: This command can be used to mount any data media, such as hard disks, CD-ROM drives, and other drives, to a directory of the Linux file system.

`-r`
: Mount read-only

`-t filesystem`
: Specify the file system, commonly `ext2` for Linux hard disks, `msdos` for MS-DOS media, `vfat` for the Windows file system, and `iso9660` for CDs

For hard disks not defined in the file `/etc/fstab`, the device type must also be specified. In this case, only `root` can mount it. If the file system should also be mounted by other users, enter the option `user` in the appropriate line in the `/etc/fstab` file (separated by commas) and save this change. Further information is available in the `mount(1)` man page.

`umount [options] mountpoint`
: This command unmounts a mounted drive from the file system. To prevent data loss, run this command before taking a removable data medium from its drive. Normally, only `root` is allowed to run the commands `mount` and `umount`. To enable other users to run these commands, edit the `/etc/fstab` file to specify the option `user` for the respective drive.

3.3.2 System Commands

The following section lists a few of the most important commands needed for retrieving system information and controlling processes and the network.

System Information

`df [options] [directory]`
: The `df` (disk free) command, when used without any options, displays information about the total disk space, the disk space currently in use, and the free space on all the mounted drives. If a directory is specified, the information is limited to the drive on which that directory is located.

`-h`
: Shows the number of occupied blocks in gigabytes, megabytes, or kilobytes—in human-readable format

`-T`
: Type of file system (ext2, nfs, etc.)

`du [options] [path]`
: This command, when executed without any parameters, shows the total disk space occupied by files and subdirectories in the current directory.

  `-a`
  : Displays the size of each individual file

  `-h`
  : Output in human-readable form

  `-s`
  : Displays only the calculated total size

`free [options]`
: The command `free` displays information about RAM and swap space usage, showing the total and the used amount in both categories. See Section “The free Command” (Chapter 10, *Special Features of SUSE Linux*, ↑Reference) for more information.

  `-b`
  : Output in bytes

  `-k`
  : Output in kilobytes

  `-m`
  : Output in megabytes

`date [options]`
: This simple program displays the current system time. If run as `root`, it can also be used to change the system time. Details about the program are available in the date(1) man page.

Processes

`top [options]`
: `top` provides a quick overview of the currently running processes. Press H to access a page that briefly explains the main options for customizing the program.

`ps [options] [process ID]`
If run without any options, this command displays a table of all your own programs or processes—those you started. The options for this command are not preceded by hyphen.

aux
Displays a detailed list of all processes, independent of the owner

`kill [options] process ID`
Unfortunately, sometimes a program cannot be terminated in the normal way. In most cases, you should still be able to stop such a runaway program by executing the `kill` command, specifying the respective process ID (see `top` and `ps`). `kill` sends a *TERM* signal that instructs the program to shut itself down. If this does not help, the following parameter can be used:

-9
Sends a *KILL* signal instead of a *TERM* signal, bringing the specified process to an end in almost all cases

`killall [options] processname`
This command is similar to `kill`, but uses the process name (instead of the process ID) as an argument, killing all processes with that name.

Network

`ping [options] hostname or IP address`
The `ping` command is the standard tool for testing the basic functionality of TCP/IP networks. It sends a small data packet to the destination host, requesting an immediate reply. If this works, `ping` displays a message to that effect, which indicates that the network link is basically functioning.

`-c` *`number`*
Determines the total number of packages to send and ends after they have been dispatched (by default, there is no limitation set)

`-f`
flood ping: sends as many data packages as possible; a popular means, reserved for `root`, to test networks

`-i value`
: Specifies the interval between two data packages in seconds (default: one second)

`nslookup`
: The domain name system resolves domain names to IP addresses. With this tool, send queries to name servers (DNS servers).

`telnet [options] hostname or IP address [port]`
: Telnet is actually an Internet protocol that enables you to work on remote hosts across a network. telnet is also the name of a Linux program that uses this protocol to enable operations on remote computers.

WARNING

Do not use telnet over a network on which third parties can "eavesdrop." Particularly on the Internet, use encrypted transfer methods, such as `ssh`, to avoid the risk of malicious misuse of a password (see the man page for `ssh`).

Miscellaneous

`passwd [options] [username]`
: Users may change their own passwords at any time using this command. The administrator `root` can use the command to change the password of any user on the system.

`su [options] [username]`
: The `su` command makes it possible to log in under a different username from a running session. Specify a username and the corresponding password. The password is not required from `root`, because `root` is authorized to assume the identity of any user. When using the command without specifying a username, you are prompted for the `root` password and change to the superuser (`root`).

`-`
: Use `su -` to start a login shell for the different user.

`halt [options]`
: To avoid loss of data, you should always use this program to shut down your system.

`reboot [options]`
: Does the same as `halt` except the system performs an immediate reboot.

`clear`
: This command cleans up the visible area of the console. It has no options.

3.3.3 For More Information

There are many more commands than listed in this chapter. For information about other commands or more detailed information, the O'Reilly publication *Linux in a Nutshell* is recommended.

3.4 The vi Editor

Text editors are still used for many system administration tasks as well as for programming. In the world of Unix, vi stands out as an editor that offers comfortable editing functions and is more ergonomic than many editors with mouse support.

3.4.1 Operating Modes

NOTE: Display of Keys

In the following, find several commands that you can enter in vi by just pressing keys. These appear in uppercase as on a keyboard. If you need to enter a key in uppercase, this is stated explicitly by showing a key combination including the Shift key.

Basically, vi makes use of three operating modes: *insert* mode, *command* mode, and *extended* mode. The keys have different functions depending on the mode. On start-up, vi is normally set to the *command* mode. The first thing to learn is how to switch between the modes:

Command Mode to Insert Mode
: There are many possibilities, including A for append, I for insert, or O for a new line under the current line.

Insert Mode to Command Mode
: Press Esc to exit the *insert* mode. vi cannot be terminated in *insert* mode, so it is important to get used to pressing Esc .

Command Mode to Extended Mode
: The *extended* mode of vi can be activated by entering a colon (:). The *extended* or *ex* mode is similar to an independent line-oriented editor that can be used for various simple and more complex tasks.

Extended Mode to Command Mode
: After executing a command in *extended* mode, the editor automatically returns to *command* mode. If you decide not to execute any command in *extended* mode, delete the colon with <— . The editor returns to *command* mode.

It is not possible to switch directly from *insert* mode to *extended* mode without first switching to *command* mode.

vi, like other editors, has its own procedure for terminating the program. You cannot terminate vi while in *insert* mode. First, exit *insert* mode by pressing Esc . Subsequently, you have two options:

1. *Exit without saving:* To terminate the editor without saving the changes, enter : – Q – ! in *command* mode. The exclamation mark (!) causes vi to ignore any changes.

2. *Save and exit:* There are several possibilities to save your changes and terminate the editor. In *command* mode, use Shift + Z Shift + Z . To exit the program saving all changes using the *extended* mode, enter : – W – Q . In *extended* mode, `w` stands for write and `q` for quit.

3.4.2 vi in Action

vi can be used as a normal editor. In *insert* mode, enter text and delete text with the <— and Del keys. Use the arrow keys to move the cursor.

However, these control keys often cause problems, because there are many terminal types that use special key codes. This is where the *command* mode comes into play. Press Esc to switch from *insert* mode to *command* mode. In *command* mode, move the cursor with H , J , K , and L . The keys have the following functions:

H

Move one character to the left

J

Move one line down

K

Move one line up

L

Move one character to the right

The commands in *command* mode allow diverse variations. To execute a command several times, simply enter the number of repetitions before entering the actual command. For example, enter 5 L to move the cursor five characters to the right.

A selection of important commands is shown in Table 3.1, "Simple Commands of the vi Editor" (page 119) This list is far from complete. More complete lists are available in the documentation found in Section 3.4.3, "For More Information" (page 120)

Table 3.1 *Simple Commands of the vi Editor*

Esc	Change to command mode
I	Change to insert mode (characters appear at the current cursor position)
A	Change to insert mode (characters are inserted after the current cursor position)
Shift + A	Change to insert mode (characters are added at the end of the line)
Shift + R	Change to replace mode (overwrite the old text)
R	Replace the character under the cursor
O	Change to insert mode (a new line is inserted after the current one)

Shift + O	Change to insert mode (a new line is inserted before the current one)
X	Delete the current character
D – D	Delete the current line
D – W	Delete up to the end of the current word
C – W	Change to insert mode (the rest of the current word is overwritten by the next entries you make)
U	Undo the last command
Ctrl + R	Redo the change that was undone
Shift + J	Join the following line with the current one
.	Repeat the last command

3.4.3 For More Information

vi supports a wide range of commands. It enables the use of macros, shortcuts, named buffers, and many other useful features. A detailed description of the various options would exceed the scope of this manual. SUSE Linux comes with vim (vi improved), an improved version of vi. There are numerous information sources for this application:

- vimtutor is an interactive tutor for vim.
- In vim, enter the command `:help` to get help for many subjects.
- A book about vim is available online at `http://www.truth.sk/vim/vimbook-OPL.pdf`.
- The Web pages of the vim project at `http://www.vim.org` feature all kinds of news, mailing lists, and other documentation.

- A number of vim sources are available on the Internet: http://www.selflinux.org/selflinux/html/vim.html, http://www.linuxgazette.com/node/view/9039, and http://www.apmaths.uwo.ca/~xli/vim/vim_tutorial.html. See http://linux-universe.com/HOWTO/Vim-HOWTO/vim-tutorial.html for further links to tutorials.

IMPORTANT: The VIM License

vim is "charityware," which means that the authors do not charge any money for the software but encourage you to support a nonprofit project with a monetary contribution. This project solicits help for poor children in Uganda. More information is available online at http://iccf-holland.org/index.html, http://www.vim.org/iccf/, and http://www.iccf.nl/.

4 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.

4.1 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 4.1, "The Main Window of the SUSE Help Center" (page 124) is displayed. The dialog window consists of three main areas:

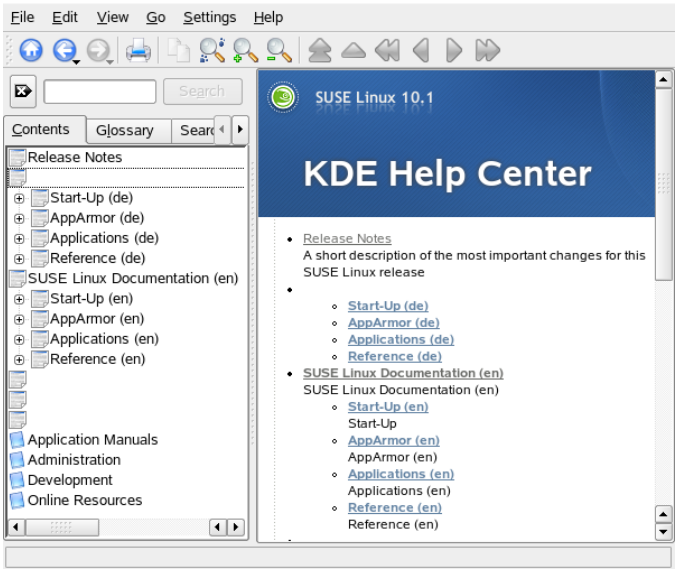
Menu Bar and Toolbar
: The menu bar provides the main editing, navigation, and configuration options. *File* contains the option for printing the currently displayed content. Under *Edit*, access the search function. *Go* contains all navigation possibilities: *Table of Contents* (home page of the Help 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

configuration of the search function in the *Search* tab are presented in Section 4.1.2, “The Search Function” (page 125). 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 4.1 *The Main Window of the SUSE Help Center*



NOTE: Language Selects View

The documentation available in the SUSE Help Center depends on the current language. Changing your language changes the tree view.

4.1.1 Contents

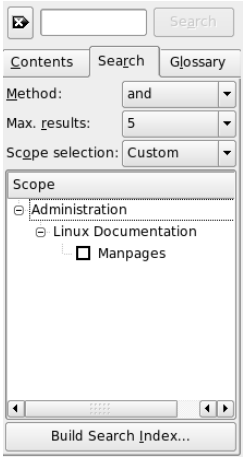
The SUSE Help Center provides access to useful information from various sources. It contains special documentation for SUSE Linux (*Start-Up* and *Reference*), all available information sources for your workstation environment, online help for the installed

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.

4.1.2 The Search Function

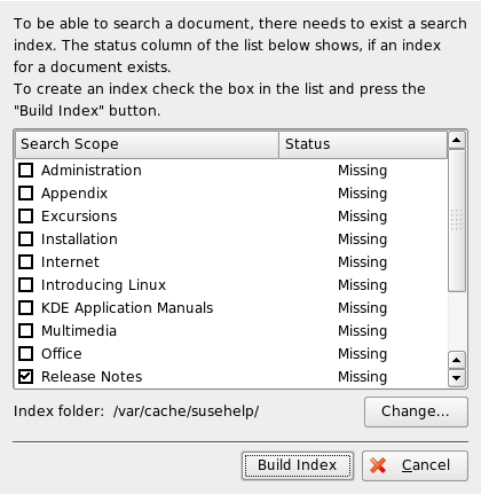
To search all installed information sources of SUSE Linux, generate a search index and set a number of search parameters. To do this, use the *Search* tab, shown in Figure 4.2, “Configuring the Search Function” (page 125).

Figure 4.2 *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 4.3, “Generating a Search Index” (page 126), use the check boxes to determine the information sources to index. The index is generated when you exit the dialog with *Build Index*.

Figure 4.3 *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.

4.2 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 4.1, "Man Pages—Categories and Descriptions" (page 127) (taken from the man page for man itself).

Table 4.1 *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), for example, 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.

4.3 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`.

4.4 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.

4.4.1 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`

4.4.2 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.

4.5 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.

4.6 Guides and Books

A broad range of guides and books are available for Linux topics.

4.6.1 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 the DVD in the directory `docu`. For HTML, install the package `suselinux-manual_LANG` (replace *`LANG`* with your preferred language.) After the installation, find them in the SUSE Help Center.

4.6.2 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.

4.7 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, or other things available. Usually you can find the following files, but they are not standard and sometimes not all files are available.

`AUTHORS`
: The list of the main developers of this package and usually their tasks.

`BUGS`
: Known bugs or malfunctions of this package. Usually also 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`
: Licensing information.

`FAQ`
: Question and answers collected from mailing lists or newsgroups.

`INSTALL`
: 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 such as how to use it and what you can do with this package.

`TODO`
: Things that are not implemented yet, but probably will be in the future.

`MANIFEST`
: List of files with a brief summary.

`NEWS`
: Description of what is new in this version.

4.8 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/`.

4.9 Standards and Specifications

There are various sources that provide information about standards or specifications.

`http://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 institution 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

Getting Started with the KDE Desktop

5

KDE stands for *K Desktop Environment* and is a graphical user interface that has many applications designed to help you in your daily work. This chapter assists you in becoming familiar with the KDE desktop of your Linux system and in performing basic tasks. KDE also offers many choices to modify your desktop according to your needs and wishes. Read more about configuring your desktop individually in Chapter 6, *Customizing Your KDE Desktop* (page 165).

The following description is based on the default configuration of the KDE desktop shipped with your product. If you or your system administrator has modified the defaults, some aspects, such as appearance or keyboard shortcuts, may be different.

5.1 Logging In and Selecting a Desktop

If more than one user account is configured on your computer, all users must authenticate. When you start your system, you are prompted to enter your username and password. This is the username and password you created when you installed your system. If you did not install your system, check with your system administrator for your username and password.

NOTE: Auto Login

If your computer is not run in a networking environment and you are the only person using it, you can automatically log in to the desktop environment on

boot. In this case, you do not see any login screen. This feature, called *auto login*, can be enabled or disabled during installation or at any time using the YaST user management module.

The program managing the login process depends on the desktop environment installed on your system. For KDE, it is KDM.

The KDM login screen has input fields for username and password and the following menu items:

Session Type
: Specifies the desktop to run when you log in. If desktops other than KDE are installed, they appear in the list. Make changes only if you want to use a session type other than your default (usually KDE). Future sessions are automatically of the same type unless you change the session type manually.

System
: Performs a system action, such as shutting down the computer or starting different login actions. *Remote Login* enables you to log in on a remote machine.

5.1.1 Controlling a Session

The Session Manager starts after your username and password are authenticated by the login process. The Session Manager lets you save certain settings for each session. It also lets you save the state of your most recent session and return to that status the next time you log in.

The Session Manager can save and restore the following settings:

- Appearance and behavior settings, such as fonts, colors, and mouse settings.
- Applications that you were running, such as a file manager or OpenOffice.org.

IMPORTANT: Saving and Restoring Applications

You cannot save and restore applications that Session Manager does not manage. For example, if you start the vi editor from the command line in a terminal window, Session Manager cannot restore your editing session.

For information about configuring session preferences, see Section 6.2.4, "KDE Components" (page 170).

5.1.2 Switching Desktops

If you installed both the KDE and the GNOME desktops, use the following instructions to switch desktops.

1. If you are logged in to KDE, select *Log Out* → *End Current Session* from the main menu. On the login screen, click *Session Type*.
2. Select the GNOME desktop then click *OK*.
3. Enter your username.
4. Enter your password.
5. Click *Make Default* to make the desktop you chose in Step 2 (page 139) your new default desktop or click *Just For This Session* to leave your previous desktop as the default the next time you log in.

   See Chapter 7, *Getting Started with the GNOME Desktop* (page 175) for more information about using the GNOME desktop.

5.1.3 Locking Your Screen

To lock the screen, do either of the following:

- From the main menu, select *Lock Session*.
- Use the keyboard shortcut defined in the Control Center (see Section 6.2.7, "Regional & Accessibility" (page 171)). Usually, this is Ctrl + Alt + L .

TIP: Looking Up and Defining KDE Keyboard Shortcuts

If you want to look up the keyboard shortcuts defined in KDE, select *Personal Settings* → *Regional & Accessibility* → *Keyboard Shortcuts* from the

main menu. Alter a shortcut by double-clicking it and entering a new shortcut. See also Section 6.2.7, “Regional & Accessibility” (page 171).

For quick access, you can also add the *Lock* and *Logout* icons to the panel. To do so, right-click the panel then click *Add to Panel* → *Applet* → *Lock/Logout Applet*.

When you lock your screen, the screensaver starts. To unlock the screen, move your mouse to display the locked screen dialog. Enter your username and password then press Enter .

For information about configuring your screensaver, see Section 6.2.1, “Appearance & Themes” (page 167).

5.2 Logging Out

When you are finished using the computer, you can log out and leave the system running or restart or shut down the computer. If your system provides power management, you can also suspend the computer, making the next system start much faster than a complete boot.

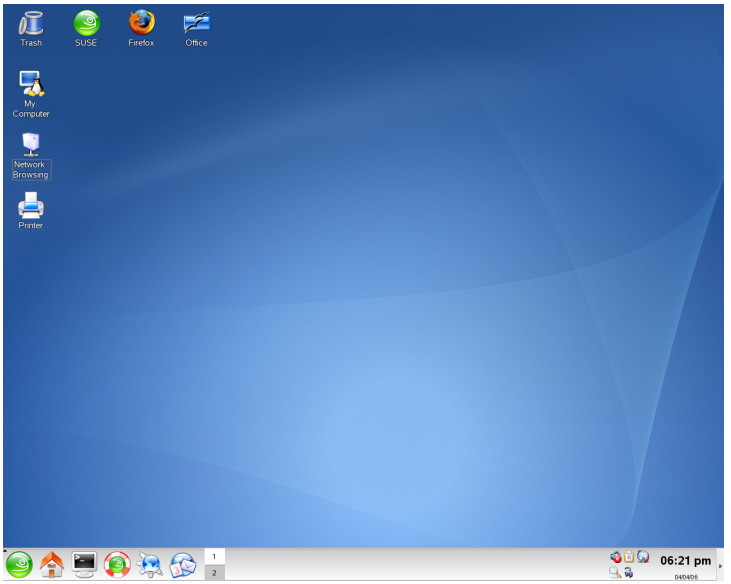
To log out and leave the system running, do one of the following:

- From the main menu select *Log Out* → *End Current Session*.
- Use the keyboard shortcut that is defined in the Control Center Section 6.2.7, “Regional & Accessibility” (page 171). Usually, this is Ctrl + Alt + Del . Then click *End Current Session*.
- Click the *Logout* icon in the panel. If your panel does not include the logout icon, you can add it to the panel as described in Section 5.1.3, “Locking Your Screen” (page 139).

5.3 Desktop Components

The graphical desktop environment should not pose any problems for former Windows or Macintosh users. The main components of the desktop are the icons on the desktop and the panel at the bottom of the screen.

Figure 5.1 *An Example KDE Desktop*

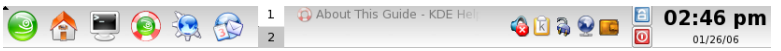


Desktop icons represent files, directories, applications, functions, and removable media, like CDs or DVDs.

For information about configuring your desktop elements, see Chapter 6, *Customizing Your KDE Desktop* (page 165).

The panel (in KDE also called “Kicker”) is a bar, typically located at the top or the bottom of the screen. It is designed to provide all vital information needed about running applications or the system and easy access to some important functions or applications. If you hold your pointer over an icon, a short description is displayed.

Figure 5.2 *KDE Panel (Kicker)*



The panel typically consists of the following areas:

Main Menu Icon
: By default, the left end of the panel has an icon that opens the main menu, similar to the *start button* on the MS Windows desktop. The main menu has a well-ordered

structure for accessing the main applications. It also contains menu items for major functions like logging out or searching for applications. See Section 5.3.3, “Accessing the Main Menu” (page 143).

Quick Launcher
: Next to the main menu icon, find the quick launcher. It holds some icons for the most important functions or applications to enable you to start them without going through the main menu. It also contains an icon for the SUSE Help Center, which provides online help for your system. See Chapter 4, *Help and Documentation* (page 123).

Desktop Previewer
: Next to the quick launcher, find the desktop previewer, which shows your different desktops. These virtual desktops enable you to organize your work. If you use many programs simultaneously, you might want to run some programs in one desktop and other programs in the other desktop. To switch between desktops, click the desktop symbol in the panel.

Taskbar
: The taskbar is located next to the desktop previewer. By default, all started applications are displayed in the taskbar, which allows you to access any application regardless of the currently active desktop. If you click a window title in the taskbar, the application is moved to the foreground. If it is already in the foreground, clicking minimizes the application.

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

For information about configuring your panel, see Changing Panel Elements (page 166).

5.3.1 Managing the Trash Bin

The trash bin is a directory for files marked for deletion. Drag icons from the file manager or the desktop to the trash bin icon by keeping the left mouse button pressed. Then release to drop them there. Alternatively, right-click an icon and select *Move to Trash* from the menu. Click the trash bin icon to view its contents. You can retrieve an item from the trash if desired.

Files removed with *Delete* are not moved to the trash bin, but deleted completely. To delete the files in the trash bin completely, right-click the trash bin icon then click *Empty Trash Bin*.

5.3.2 Accessing CD-ROM, DVD-ROM, and Floppy Disks

To access data on removable media, click *My Computer* on the desktop then click the desired drive.

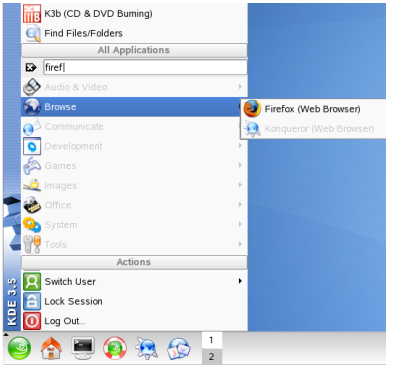
If you click an icon when a media is available, the file manager starts and displays the contents. Display a menu with various options by right-clicking the individual icons. It is also possible to move a file to a different location, such as to the desktop or your home directory, by simply keeping the left mouse button pressed and dragging the file to the appropriate location. You are asked whether you want to move or copy the file or create a link. You can also copy or move files from your home directory to a floppy disk.

5.3.3 Accessing 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*. Applications that you start most often appear in the *Most Used Applications* section.

If you know the name of an application (or at least a part of its name) but are not sure how to start it from the main menu, you can use the search function provided in the *All Applications* section.

Figure 5.3 *Main Menu Search Function*



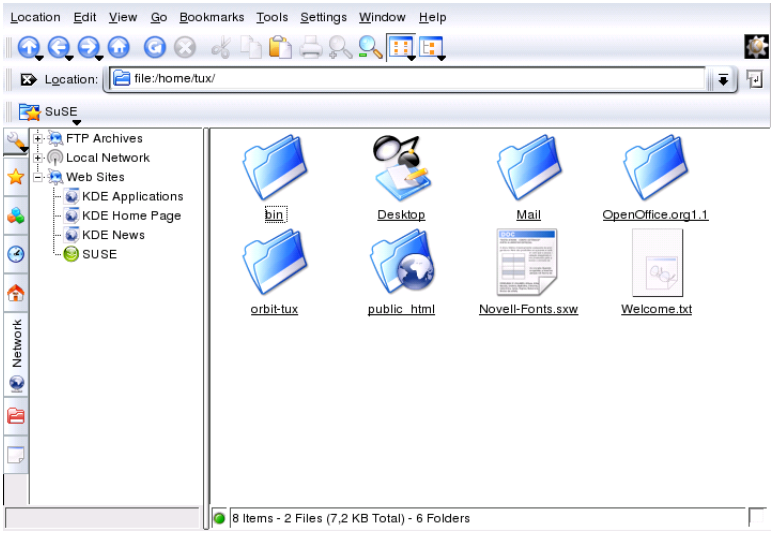
Just type a part of the application name into the search field without pressing the Enter key afterwards. If the application is installed on your system, the menu structure leading to this application is highlighted in the main menu.

5.4 Managing Folders and Files with Konqueror

Konqueror is a unified Web browser, file manager, document viewer, and image viewer. The following sections covers using Konqueror for file management. For information about Konqueror as a Web browser, see Chapter *The Web Browser Konqueror* (↑Applications).

Start Konqueror as a file manager by clicking the house icon in the panel. Konqueror displays the contents of your home directory.

Figure 5.4 *The File Manager Konqueror*



The Konqueror file manager window consists of the following elements:

Menu Bar
: The menu bar holds menu items for actions like copying, moving, or deleting files, changing views, starting additional tools, defining your settings, and getting help.

Toolbar
: The toolbar provides quick access to frequently used functions that can also be accessed via the menu. If you hover the pointer over an icon, a short description is displayed. To the right, the toolbar features the Konqueror icon, which is animated while a directory or Web page is loaded.

Location Bar
: The location bar shows the path to your directory or file in your file system. You can enter a path to a directory directly by typing it in or by clicking one of the directories in the display field. Delete the contents of the line by clicking the black symbol with a white X located left of the location bar. After typing an address, press Enter or click *Go* to the right of the input line.

  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 it. In the following, find a short overview of the most important directories in a Linux file system:

/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.

NOTE: Home Directory in a Network Environment

If you are working in a network environment, your home directory may not be called /home but can be mapped to any directory in the file system.

/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.

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 other manuals and the release notes of the installed version of your Linux system. The packages directory holds the documentation included in the software packages.

/windows only appears if you have both MS Windows and Linux installed on your system. It holds the MS Windows data.

Learn more about the Linux file system concept and find a more comprehensive list of directories in Section 3.1.2, "Linux Directory Structure" (page 93).

Navigation Panel

You can hide and show the navigation panel by pressing F9. The navigation panel displays your information in a tree view. Determine which contents you want to see by clicking one of the symbols in the tab at the left of the navigation panel. If you hold your mouse pointer over an icon, a short description is displayed. For example, you can show the file system as a tree starting at the root folder or at your home folder.

Display Field

The display field shows the contents of the selected directory or file. In the *View* menu, choose between different view modes to display the contents, such as *Icon*

View, *Tree View*, or *Detailed List View*. If you click a file, Konqueror shows a preview of the the contents or loads the file into an application for further processing. If you hold the mouse pointer over the file, Konqueror shows a tooltip with detailed information on the file, such as owner, permissions, or last modification date.

5.4.1 Copying, Moving, or Deleting Files

For performing actions like copying, moving, or deleting files, you need appropriate permissions to the folders and files involved in your action. Read more about file system permissions in Section 3.2, "Users and Access Permissions" (page 102).

TIP: Selecting Objects in Konqueror

Clicking a file or a folder in Konqueror directly starts an action: a preview of the file is displayed or the folder is opened. To former users of MS Windows, this behavior may be rather unusual. If you just want to select one or several files without any other action, press Ctrl then click the object. Alternatively, alter your mouse settings in the Control Center (see Section 6.2.7, "Regional & Accessibility" (page 171)).

To copy or move a file or folder, proceed as follows:

1. Right-click the object and select *Copy To* or *Move To* from the context menu.
2. If you want to copy or move the object to one of the folders offered in the submenu, select the corresponding menu item and click *Copy Here* or *Move Here*. Destination folders you have already used are listed in lower part of the submenu.
3. To copy or move the object to a different folder select *Browse*. A tree view of your file systems opens where you can select the destination folder.

The quickest way to perform actions like copying or moving objects in Konqueror is the drag-and-drop method. For instance, you can easily move objects from one window to another by simply dragging them. When dropping the object, you are asked whether the objects should be moved or copied.

To delete a file or folder, proceed as follows:

- Select the object and press Del or right-click the file then select *Move to Trash* from the context menu. The object is moved to the trash bin. If necessary, you can restore the file or folder from there or delete it completely. See also Section 5.3.1, “Managing the Trash Bin” (page 142).
- To delete the object irretrievably, click *Edit* → *Delete* or press Shift + Del .

5.4.2 Creating a New Folder

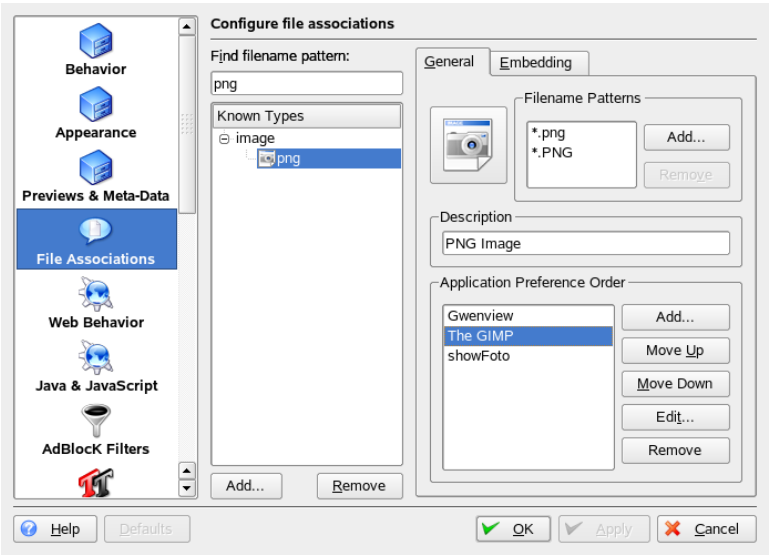
To create a new folder in Konqueror, proceed as follows:

1. Right-click the folder to which to add a subfolder.
2. Select *Create New Folder*.
3. In the *New Folder* dialog, enter a name for the new folder and click *OK*.

5.4.3 Changing File Associations

With Konqueror, you can decide which application should be used to open a file.

Figure 5.5 *Configuring File Associations in Konqueror*



1 In Konqueror, click *Settings* → *Configure Konqueror* → *File Associations*.

2 To search for an extension, enter the extension in *Find Filename Pattern*. Only file types with a matching file pattern appear in the list. For example, to modify the application for *.png files, enter `png` in *Find Filename Pattern*.

3 In the *Known Types* list, click the file type to open the setting dialog for this file type. You can change the icon, the filename patterns, description, and the order of the applications.

   If your tool is not listed, click *Add* in *Application Preference Order* then enter the command.

   To change the order of the list entries, click the program to move then give it a higher or lower priority by clicking *Move Up* or *Move Down*. The application listed at the top is used by default when you click a file of this type.

4 If you need a file type that is not listed in the *Known Types* list, click *Add* to open a dialog where you can select a group and enter a type name.

The group determines the main type, for example, audio, image, text, or video. Your file type can usually be assigned to one of these.

a Click *OK* then determine the extensions of the filename.

b Specify a description in the text field and select which application to use.

5 Click *OK*.

5.5 Opening or Creating Documents with OpenOffice.org

The office suite OpenOffice.org offers a complete set of office tools including a word processor, spreadsheet, presentation, vector drawing, and database components. As OpenOffice.org is available for a number of operating systems, you can use the same data across different computing platforms. You can also open and edit files in Microsoft Office formats then save them back to this format, if needed.

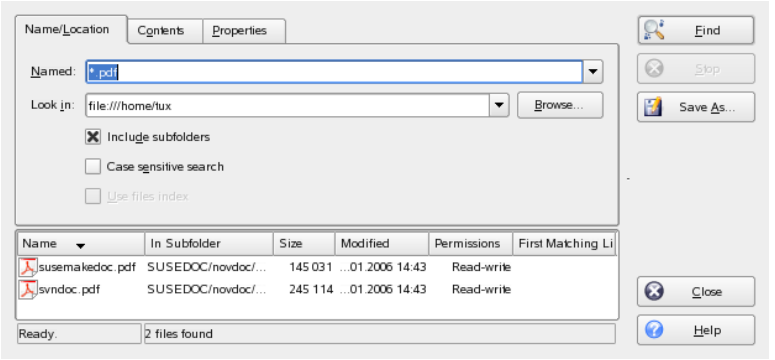
To start OpenOffice.org, press Alt + F2 and enter `OOo` or click the Office icon on the desktop.

For a more in-depth introduction to OpenOffice.org, see Chapter *The OpenOffice.org Office Suite* (↑Applications) or view the help in an OpenOffice.org program.

5.6 Finding Something on Your Computer

For searching files, use the application KFind. Start it from the main menu with *Find Files/Folders*. Alternatively, press Alt + F2 and enter `kfind`. With KFind, you can locate files on your computer using a variety of search criteria, such as file content, dates, owner, or file size.

Figure 5.6 *Finding Files*



5.6.1 Finding Files

To perform a search for certain filenames, proceed as follows:

1. Start KFind from the main menu or command line.

2. Click the *Name/Location* tab to perform a basic search.

3. Specify the name of the file to find in *Named*. You can use the following wild cards:

   Asterisk
   : The asterisk (*) stands for any number of missing characters (even zero). For example, searching for `marc*` can find the files *marc*, *marc.png*, and *marc_must_not_read_this.kwd*. Searching for *mar*.kwd* can find *marketplace.kwd* and *marc_must_not_read_this.kwd*.

   Question Mark
   : The question mark (?) stands for exactly one character. For example, searching for `mar?` can find *marc*, but `marc?` cannot find anything if your files are named *marc* and *marc.png*. You can put as many question marks in the search term as you want. It finds exactly that number of characters.

   You can combine those two wild card symbols in any search term.

4 Specify the folder to search in *Look In* or click *Browse* to find the folder you want. Select *Include Subfolders* to also search all subfolders starting from your specified folder.

5 Press Enter or click *Find*.

5.6.2 Performing an Advanced File Search

For a more detailed search, you can also specify further options, such as a text the file to find must contain:

1 Start KFind from the main menu or the command line.

2 Click the *Name/Location* tab.

3 Specify the name of the file to find in *Named*.

4 Specify the folder where you want to search in *Look In* or click *Browse* to find the folder.

5 Click the *Contents* tab.

6 In *File Type*, specify the type of file to find.

7 In *Containing Text*, enter the word or phrase the file you are searching for must contain.

8 If you want to specify further options, click the *Properties* tab and choose the options you want. If you hold the mouse pointer over the options or fields, a short description is displayed.

9 Click *Find* to perform the search.

For detailed information about the search options available, refer to the KFind online help.

For advanced searches, you may want to use search patterns or regular expressions. KRegExpEditor offers search options based on regular expressions. You can install KRegExpEditor with YaST as the package `kdeutils3-extra`. For more information

about search patterns and the use of wild cards or regular expressions, refer to Section 3.1, “Getting Started with the Bash Shell” (page 90).

5.7 Exploring the Internet

In KDE, the default Web browser is Konqueror. To start Konqueror, click the Konqueror icon on the panel or press Alt + F2 and enter `konqueror`. Learn more about Konqueror as a Web browser in Chapter *The Web Browser Konqueror* (↑Applications).

In addition to Konqueror, you can use a Mozilla-based browser, Firefox. Start Firefox from the main menu or by pressing Alt + F2 and entering `firefox`. You can type an address into the location bar at the top or click links in a page to move to different pages, just like in any other Web browser. For more information about Firefox, see Chapter *The Web Browser Firefox* (↑Applications) .

5.8 E-Mail and Scheduling

KMail is an e-mail client that supports e-mail protocols like POP3 and IMAP. It also has multiple e-mail account support, powerful filters, PGP/GnuPG privacy, and online attachments. Start KMail from the main menu or press Alt + F2 and enter `kmail`.

Kontact is a personal information management (PIM) tool that combines well-known applications like KMail, KOrganizer, and KAddressBook into a single interface. This lets you have easy access to your e-mail, calendar, address book, and other PIM functionality. To launch Kontact, press Alt + F2 and enter `kontact`. For detailed information about using Kontact, see Chapter *Kontact: An E-Mail and Calendar Program* (↑Applications).

5.9 Moving Text between Applications

To copy text to the clipboard and insert it again, former MS Windows users automatically try the shortcut keys Ctrl + C and Ctrl + V , which often work in Linux as well. But copying and inserting texts is even easier in Linux: to copy a text to the clipboard, just select the text with the mouse then move the mouse cursor to the position

where you want the text copied. Click the middle button on the mouse to insert the text (on a two-button mouse, press both mouse buttons simultaneously).

With some applications, if a text is already selected in the application where you want to insert the text, this method does not work because the text in the clipboard is overwritten by the other selected text. For such cases, the KDE application Klipper is very useful. Klipper "remembers" the last entries you have moved to the clipboard. By default, Klipper is started when KDE is loaded and appears as a clipboard icon in the panel. To view the clipboard contents, click the Klipper icon. The most recent entry is listed on top and is marked as active with a black check mark. If an extensive text was copied to Klipper, only the first line of the text is displayed.

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. For further information about Klipper, see the Klipper online help.

5.10 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 Internet connections and your passwords, creating data archives, and viewing PDF files.

5.10.1 Managing Internet Connections with KNetworkManager

You can establish Internet connections with NetworkManager or KInternet. For a description of KInternet, see Chapter *Managing Internet Connections with KInternet* (↑Applications). In YaST, select whether to use NetworkManager. For a list of criteria that help you to decide whether to use NetworkManager or other applications and for further information, refer to Section "Managing Network Connections with NetworkManager" (Chapter 18, *Basic Networking*, ↑Reference) and Section "Integration in Changing Operating Environments" (Chapter 30, *Mobile Computing with Linux*, ↑Reference).

When NetworkManager is enabled, you can monitor your network connections in KDE with the KNetworkManager applet. Click the KNetworkManager icon in the system tray to see a list of available network connections, such as wired, wireless, dial-up, or

VPN. NetworkManager automatically chooses the best network available, but it can only automatically connect to a known network. The connection currently used is marked in the list. To activate a different connection, just click another connection. For some connections, such as WLAN, you may be prompted for additional information, such as network name, password or passphrase, and encryption details. Network connections are managed by user and the passwords are stored in KWallet.

5.10.2 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 master password, open your wallet to view, search, delete, or create 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.

Starting KWallet

When KWallet starts for the first time (for example, when you access a Web site where you must enter a password to log in), a dialog appears with the welcome screen. Choose between *Basic setup* (recommended) and *Advanced setup*. If you choose *Basic setup*, in the next screen you can choose whether to store personal information. Some KDE applications, such as 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*.

You can alter the settings at any time by right-clicking the KWallet icon in the panel and selecting *Configure Wallet*. A dialog box opens where you can select several options. By default, all passwords are stored in one wallet, *kdewallet*, but you can also add new wallets. Once configured, KWallet appears in the panel.

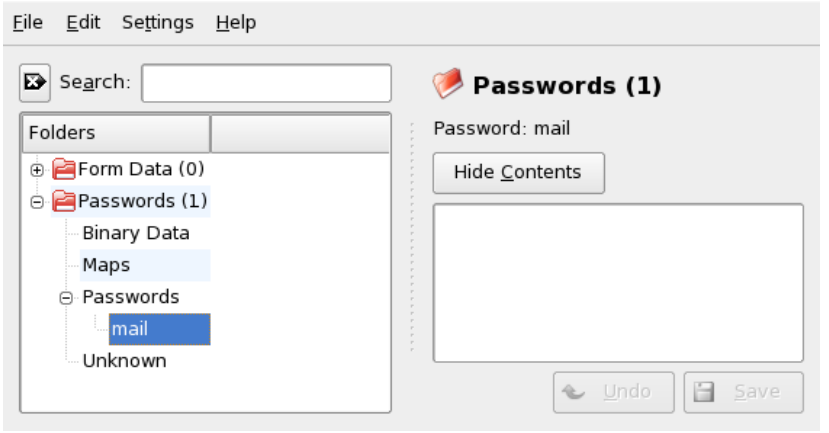
The KWallet Manager

To store data in your wallet or view its contents, click the KWallet icon in the panel. A dialog box opens, showing the wallets that are accessible on your system. Click the wallet to open. A window prompts for your password.

After a successful login, the KWallet Manager window opens. 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.

In the KWallet Manager, you can change your master password for KWallet at any time with *File → Change Password*.

Figure 5.7 *The KWallet Manager Window*



You can add or delete folders. Selecting a folder updates the folder entry list and the summary display. Selecting a folder entry updates the entry contents pane and allows

you to edit that entry. Entries can also be created or deleted using the context menu for the folder contents.

Copying Your Wallet to Another Computer

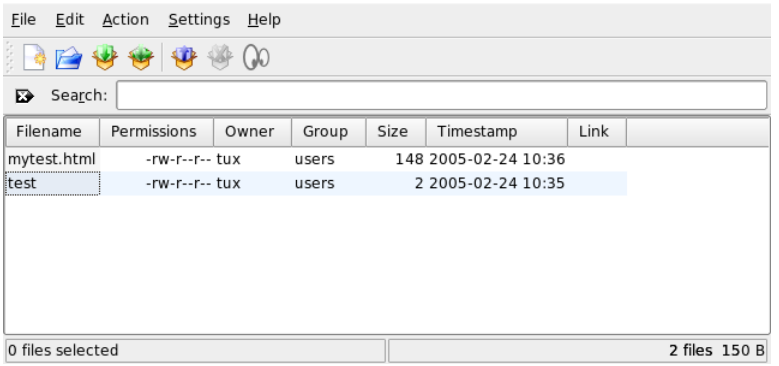
For the most part, KWallet resides silently in the panel and is automatically activated if needed. However, you can copy your wallet files to another computer (for example, your laptop). To simplify this task, wallets can be dragged from the manager window to a file browser window. This let you easily package a new wallet for transfer to another environment. For example, a new wallet could be created and copied onto a removable flash memory device. Important passwords could be transferred there, so you have them available in other locations.

5.10.3 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.

Figure 5.8 *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*.

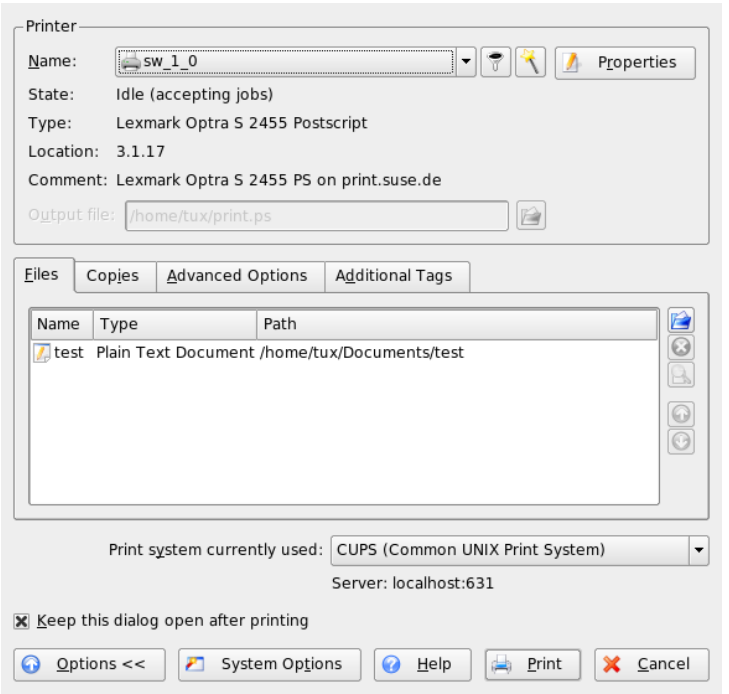
5.10.4 Managing Print Jobs in KDE

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, see Chapter *Printer Operation* (↑Reference). As soon as a connection has been established, you can start using the printer.

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 `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 5.9, “Starting a Print Job with KPrinter” (page 159).

Figure 5.9 *Starting a Print Job with KPrinter*



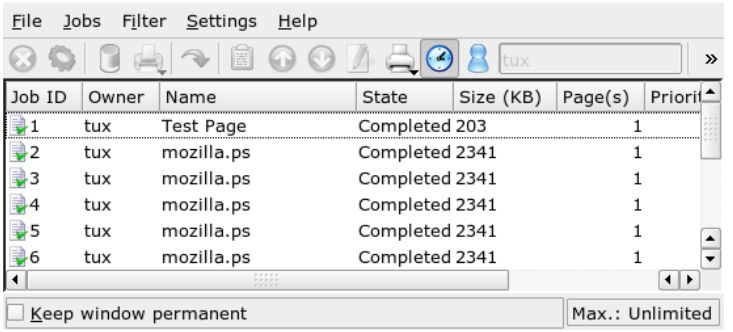
The first tab, *Files*, determines the file or files to print. Either drag them from the desktop and drop them into the list window or use the file dialog to locate them. *Copies* determines the page selection (all pages of the selected document, the currently selected one, or a range) and the number 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 rarely 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 `kjobviewer` from the command line. A window like that in Figure 5.10, "Managing Print Jobs with KJobViewer" (page 160) 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 5.10 *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* shows 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.

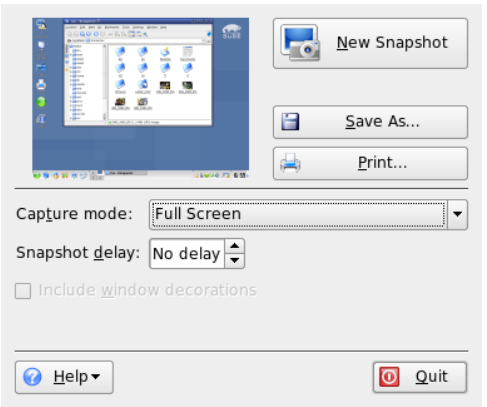
The icons in the toolbar correspond to the functions you can access by way of the menu. A help text explaining the function is displayed when you move the mouse pointer over one of the icons.

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 the next time you log in.

5.10.5 Taking Screen Shots

With KSnapshot, you can create snapshots of your screen or individual application windows. Start the program from the main menu or by pressing Alt + F2 and entering `ksnapshot`. The KSnapshot dialog consists of two parts. The upper area (Current Snapshot) contains a preview of the current screen and three buttons for creating and saving the screen shots. The lower area contains further options for the actual creation of the screen shot.

Figure 5.11 *KSnapshot*



To take a screen shot, use *Snapshot Delay* to determine the time (in seconds) to wait between clicking *New Snapshot* and the actual creation of the screen shot. If *Only Grab the Window Containing the Pointer* is selected, only the window containing the pointer is saved. To save the screen shot, click *Save Snapshot* and designate the directory and

filename for the image in the subsequent dialog. Click *Print Snapshot* to print the screen shot.

You can also use The GIMP to take screen shots. To open The GIMP, press Alt + F2 and enter `gimp`. When you run GIMP for the first time, it installs some files in your home directory and displays dialogs that give you the opportunity to adapt it to your environment. For information about using The GIMP, refer to Chapter *Manipulating Graphics with The GIMP* (↑Applications) or see its help. You may need to install the help with YaST (`kdeutils3-extra`).

5.10.6 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 `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.

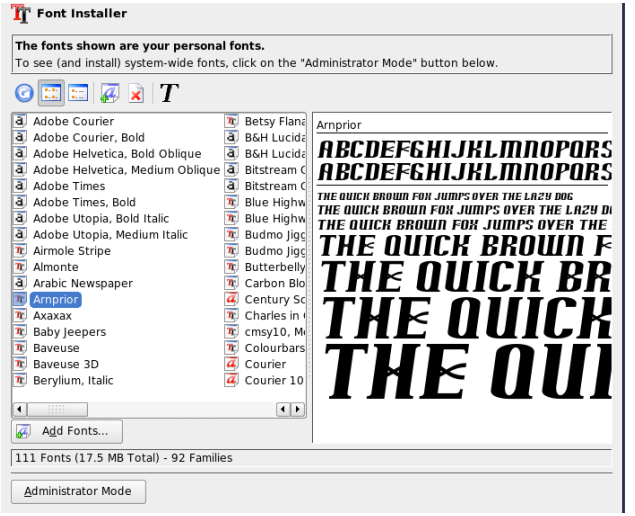
Another nice option is to select the area in which you are interested with the select tool from the toolbar. Draw a rectangle and choose from the pop-up menu whether you need the selected area as text or as a graphic. It is copied to the clipboard. You can even save the area to a file.

5.10.7 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 5.12, “Font Administration from the Control Center” (page 163).

Figure 5.12 *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.

5.11 Obtaining Software Updates

Click the ZENworks updater in your panel to install additional software and apply security updates. Select the software packages to install from the list then click *Update*. For background information and configuration options, see Section 2.12, “Update from the Command Line” (page 76).

5.12 For More Information

As well as the applications described here for getting started, KDE can run a lot of other applications. Find detailed information about many important applications in the *Applications* manual.

- To learn more about KDE and KDE applications, also refer to `http://www.kde.org/` and `http://www.kde-apps.org/`.
- To report bugs or add feature requests, go to `http://bugs.kde.org/`.

6 Customizing Your KDE Desktop

You can change the way your KDE desktop looks and behaves to suit your own personal tastes and needs. If you only want to change the appearance of individual desktop objects, you can usually access a configuration dialog by right-clicking the object. For customizing certain groups of desktops elements or changing the overall appearance of your KDE desktop, refer to Section 6.2, "Configuring Your Desktop with the Control Center" (page 166).

6.1 Changing Individual Desktop Icons

In the following, find some examples of how to change individual desktops elements.

Procedure 6.1 *Creating New Desktop Objects*

To add a new desktop object, proceed as follows:

1. Right-click an empty space on the desktop and select *Create New*.
2. From the submenu, choose the type of object to create on the desktop: a folder, file, or one of several types of links.
3. Enter the name of the new object when prompted to do so.
4. To change the properties of the new object, right-click the new icon and select *Properties*. A dialog appears, showing four tabs where you can change the properties of the object, such as the permissions.

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

Procedure 6.2 *Changing Panel Elements*

Add new elements to the quick launch area and the system tray in the panel as follows:

1 Right-click an empty patch of the panel.

2 To add a new application to the panel:

   a From the context menu, select *Add Application to Panel*.

   b Select the application to add from one of the categories of the submenu.

   c Move the button to the desired position by dragging and dropping it with the mouse.

   d To change the icon for the application, right-click the button and select *Configure Application Button*. By clicking the application icon in the dialog box that appears, open a new window in which to select a different icon.

3 To add a new applet to the panel:

   a From the context menu select *Add Applet to Panel*.

   b In the dialog box that appears, you can restrict the number of applets shown by selecting a special type of applet in *Show* or by typing a part of the applet name in *Search*.

   c Select the applet to add and click *Add to Panel*. The applet is inserted into the panel.

6.2 Configuring Your Desktop with the Control Center

With KDE, you can personalize your desktop to a very high degree. You can change a variety of settings, such as the desktop background, screen saver, fonts, keyboard and

mouse configuration, and sounds. Adjust these settings with the modules of the KDE Control Center. Start the Control Center from the main menu or press Alt + F2 and enter `kcontrol`.

The side bar provides different categories with a subset of settings each. Just click a category icon and explore the possibilities provided there. You can always return to the higher-level category by clicking *Back*. For an overview of all categories, switch to a tree view. Change the view by selecting *View* → *Mode* → *Tree View*.

Clicking an item displays the corresponding settings on the right. Change the settings as desired. No changes take effect until you click *Apply*. If you have changed an option then decide that you want to leave the settings as they were, click *Reset* to discard the changes. Reset all items on the page to the default values by clicking *Default*. Changing some settings may require root permissions. Log in as `root` if prompted to do so.

The following sections introduce the major categories and contain procedures for some common changes you may want to apply to your KDE desktop. Detailed information about the settings of each category is provided by the *Help* button on each page of settings or in the help center.

6.2.1 Appearance & Themes

This category lets you change the way your KDE desktop and applications look. You can access a number of settings.

Background holds options for the background of your desktop, such as colors, pictures, or slide shows. If you configured multiple virtual desktops, you can set different options for each. See Section 6.2.2, “Desktop” (page 168).

Colors lets you manage and edit color schemes for your desktop. There are a variety of color schemes installed by default but you can also create your own color scheme using a predefined scheme as starting point.

With *Fonts*, all fonts and font attributes used on the KDE desktop can be configured. You can also modify antialiasing settings. By default, antialiasing is activated for all fonts. Antialiasing is a software technique for diminishing jagged edges that should be smooth. Although it reduces the jagged appearance of the lines, it also makes them fuzzier. To deactivate or customize antialiasing, select the corresponding options.

In the *Icons* section, control the icon style for the entire KDE desktop. Icons are used on the desktop, panel, and toolbars of applications. You can choose icon themes, adjust icon sizes, assign effects to icons (for example, you can make them semitransparent or colorize them), and configure settings for each of the different places icons are used.

Launch Feedback allows you to modify what kind of cursor and taskbar feedback you want for starting applications. For example, instead of a bouncing cursor indicating that an application is loading, you can set a blinking cursor.

A screen saver automatically appears if you do not use your computer for a specific time. In the *Screensaver* section, change the screen saver or configure the time-out before it starts.

In the *Splash Screen* section, you can change the splash screen that displays on KDE start-up.

Style holds options for user interface elements (called widgets) in KDE, such as buttons, menus, and scroll bars. You can choose a certain style and see a preview of it.

With *Theme Manager*, choose, install, or modify configuration sets (themes) for your KDE desktop.

Window Decorations provides options for the title bar of the windows and the style of the borders around windows.

6.2.2 Desktop

The *Desktop* settings configure the appearance and behavior of your KDE desktop.

In *Behavior*, configure options such as showing or hiding desktop icons, showing tool tips, and icon layout. You can also specify if you want to see previews of particular file types on the desktop and which devices have icons.

In *Multiple Desktops*, increase or reduce the number of virtual desktops to use and enter a name for each desktop. By default, two virtual desktops are configured on your system. You can switch between the desktops with the desktop previewer in the panel or by using the mouse wheel.

Panels controls panel options such as size, position, length, and display. You can also change the appearance of the panel with transparency, background images, and icon

zooming. Because the main menu is also part of the panel, also configure various menu options here, including the applications shown in your main menu.

In the *Taskbar* section, configure options such as whether to show windows from all desktops on the taskbar, grouping of similar tasks, and what action on the taskbar your mouse buttons trigger.

Window Behavior customizes the default KDE window manager, kwin. Here, control what happens when windows are moved, clicked, or resized. You can bind actions to certain keys and mouse events.

Window-Specific Settings lets you customize settings that only apply to some windows. It only takes effect if you use KWin as your window manager.

6.2.3 Internet & Network

The *Internet & Network* category helps you to configure Internet and networking options.

Two sections deal with how to manage your Bluetooth devices and services: *Paired Bluetooth Devices* and *Bluetooth Services*. In the *Connection Preferences* section, KDE lets you change the time-out values for different connections.

Desktop Sharing is useful if you want to invite other people to your desktops. Only let trustworthy users take part in your session.

File Sharing allows you to configure Samba (Windows) and NFS (UNIX) file sharing. The settings can only be changed if you are an administrator. If you log in as root, you can add, change, or remove folders to share with others.

Use *Local Network Browsing* if you want to browse a local network. It is like "Network Neighborhood." Take into account that you may need some additional software, especially the LISa daemon (see package `kdenetwork3-lisa`).

In *Proxy*, you can customize proxy and SOCKS servers. Normally, if your administrator does not tell you to use this, it is probably not useful for you.

The settings in *Samba* should only be configured with YaST.

Web Browser offers settings for the default KDE browser, Konqueror. For example, you can customize fonts, manage cookies, and determine Web behavior, such Web

shortcuts. For more information about how to use Web shortcuts, refer to Section “Using Web Shortcuts” (Chapter 7, *The Web Browser Konqueror*, ↑Applications).

6.2.4 KDE Components

This category holds advanced KDE options, such as the default application to open when clicking a link.

The *Component Chooser* module handles basic tasks. You can change the default e-mail client, text editor, messenger, terminal, and Web browser. Whenever a KDE application needs to start an application of these types, it always calls the default component set here.

KDE uses *File Associations* to identify a file type and start an appropriate application. Here, you can also choose which icon represents each file type and whether to show files of a certain type in an embedded or a separate viewer.

The *File Manager* module configures the behavior of Konqueror as a file manager. Here, define which fonts and font sizes to use, the path to your home directory, if previews are allowed, and if quick copy and move actions are allowed.

In *KDE Performance* , you can optimize the performance of your KDE desktop.

An overview of all plug-ins of the KDE daemon is shown in *Service Manager*. This module shows two different types: services invoked on start-up and services called on demand. Normally do not change the settings of this module, because it is vital for KDE.

In *Session Manager*, define how KDE handles sessions on login and shutdown. By default, KDE remembers your previous session and restores the applications you were using the next time you login. You can define different options here, such as excluding individual applications from being restored.

Spell Checker lets you modify what spell checker to use, what types of errors to check for, and the default dictionary to use. The KDE spell checking system (KSpell) provides support for several spell checking utilities: the most commonly used are ASpell and ISpell.

6.2.5 Peripherals

This category holds settings for various devices that can be plugged in to your computer, such as a digital camera, display, keyboard, and mouse.

Digital Camera lets you configure support for your digital camera. You can add your camera model and define the type of port by which it is connected to your computer.

With *Display*, modify your display options, such as screen size and power control if supported by your display.

Joystick helps to check whether your joystick is working correctly. You can adjust the calibration.

The *Keyboard* section allows you to modify basic keyboard settings such as keyboard repeat delay.

Of course, you can also adjust a lot of *Mouse* settings, such as actions to be triggered by single or double clicking, cursor themes, and double click intervals.

With *OBEX Devices*, configure OBEX connections for your devices, such as PDAs.

Remote Controls allows you to configure bindings between your remote controls and KDE applications.

6.2.6 Power Control

This category is only useful for laptops. *Laptop Battery* monitors your batteries. Power management software must be installed.

6.2.7 Regional & Accessibility

This category holds regional settings as well as options for handicapped persons.

In *Accessibility*, configure functions that can help individuals with difficulties in hearing or motor function. These include certain sound and keyboard options.

The *Country/Region & Language* section lets you configure options that are specific for your location, such as language, currency, and number and date format.

In *Input Actions*, configure mouse gestures and keyboard shortcuts for starting applications and running commands.

In the *Keyboard Layout* section, find multiple layouts for different languages. If *Enable Keyboard Layouts* is selected, you can add and activate several keyboard layouts, such as English and German, and switch between them. Fine-tune them in the *Xkb Options* tab.

In the *Keyboard Shortcuts* section, you can define global KDE shortcuts. For an overview of the currently active shortcuts, refer to the list of *Global Shortcuts*. You can also choose a different, predefined shortcut scheme, such as a Windows or Mac scheme.

6.2.8 Security & Privacy

This category holds settings for personal security certificates, KWallet, password treatment, and privacy settings.

To make KDE more secure, *Crypto* allows you to configure SSL (secure socket layer). This is used in most KDE applications as well as others. There is also a possibility to manage your personal certificates.

KDE Wallet allows you to configure the KDE Wallet system, KWallet. It saves sensitive information, such as passwords and form data, for several applications in a strongly encrypted file, protected with a master password that you define. For information about using KWallet, see Section 5.10.2, “Managing Passwords with KWallet Manager” (page 155).

To change your personal settings, go to *Password & User Account*. Here, set a new name, organization, e-mail address, SMTP server, or password.

The *Privacy* module manages personal Web browsing data. For example, use it to clear the cache, delete the history of visited Web sites, or remove unwanted cookies.

6.2.9 Sound & Multimedia

Use this category to perform all settings for the playback of audio CDs and for the sound system.

In *Audio CDs*, configure encoding and device settings.

With *Sound System*, configure aRts, KDE's sound server. This allows you to hear your system sound while simultaneously listening to a music CD.

With *System Bell*, switch from system notifications (default) to a system bell and specify the volume, pitch, and duration of the bell.

The *System Notifications* section defines how the system should inform you in the event of a problem, when a task is performed, or if an event requiring your immediate attention occurs. In the upper part of the dialog, select the application for which to configure the system notifications. As soon as you select a program, all events the application can send to the user are listed in the lower window. Determine the notification type for each notification in the *Actions* dialog.

The default view of the system notification dialog only offers *Play a sound* for audible notification. Click *More Options* to access other action modes. You can log the notification to a file, execute a program, or show the message in a pop-up window. In the lower part of the dialog under *Quick Controls*, globally activate or deactivate the actions for all programs.

6.2.10 System Administration

This category offers options for central system tasks. Most of the sections require root permission to make changes.

With the *Font Installer*, you can install personal or systemwide fonts. To change system fonts, click *Administrator Mode*.

Login Manager configures the KDE login manager, KDM. You can change the appearance, fonts used, background shown, shutdown behavior, what users are displayed at login, and some convenience issues for the login screen.

The *Path* section defines the paths to some important directories for your data: `desktop`, `autostart`, and `documents`.

Getting Started with the GNOME Desktop

7

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 introduces several smart and useful applications that can help you feel at home in your new desktop environment. For information about configuring your desktop, see Chapter 8, *Customizing Your GNOME Desktop* (page 201).

7.1 Logging In and Selecting a Desktop

If more than one user account is configured on your computer, all users must authenticate. When you start your system, you are prompted to enter your username and password. This is the username and password you created when you installed your system. If you did not install your system, check with your system administrator for your username and password.

NOTE: Auto Login

If your computer is not run in a networking environment and you are the only person using it, you can automatically boot into the desktop environment. In this case, you do not see a login screen. This feature, called *auto login*, can be enabled or disabled during installation or at any time using the YaST user management module.

The program managing the login process depends on the desktop environment installed on your system. For GNOME, it is GDM. The login screen has the following items:

Login Prompt
: Enter your username and password to log in.

Language menu
: Specify the language to use in your session.

Session menu
: Specify the desktop to run. If other desktops are installed, they appear in the list. Make changes only if you want to use a session type other than your default (usually GNOME). Future sessions are automatically of the same type unless you change the session type manually.

Reboot
: Restarts the computer.

Shut Down
: Shuts down the computer.

7.1.1 Controlling a Session

After your username and password are authenticated, the Session Manager starts. The Session Manager lets you save certain settings for each session. It also lets you save the state of your most recent session and return to that session the next time you log in.

The Session Manager can save and restore the following settings:

- Appearance and behavior settings, such as fonts, colors, and mouse settings
- Applications that you were running, such as a file manager or OpenOffice.org

TIP: Saving and Restoring Applications

You cannot save and restore applications that Session Manager does not manage. For example, if you start the vi editor from the command line in a terminal window, Session Manager cannot restore your editing session.

7.1.2 Switching Desktops

If you installed both the GNOME and the KDE desktops, use the following instructions to switch desktops.

1. If you are logged in to GNOME, click *Desktop* → *Logout* → *OK*. If you are logged in to KDE, select *Logout* → *End Current Session*. On the login screen, click *Session*.
2. Select the desired desktop then click *OK*.
3. Enter your username.
4. Enter your password.
5. Click *Make Default* to make the desktop you chose in Step 2 (page 177) your new default desktop or click *Just For This Session* to leave your previous desktop as the default the next time you log in.

See Chapter 5, *Getting Started with the KDE Desktop* (page 137) for information about using the KDE desktop.

7.1.3 Locking Your Screen

To lock the screen, do either of the following:

- Select *Desktop* → *Lock Screen*.
- If the *Lock* button is present on a panel, click it. To add the *Lock* button to a panel, right-click the panel then click *Add to Panel* → *Lock Screen* → *Add*.

When you lock your screen, the screen saver starts or the screen goes black. To unlock the screen, move your mouse to display the locked screen dialog. Enter your password then click *Unlock* or press Enter .

7.2 Logging Out

When you are finished using the computer, you can log out and leave the system running, restart the system, or shut down the computer. If your system provides power management, you can choose to suspend the computer, making the next system start much faster than a complete boot.

To log out, click *Desktop → Log Out* then select one of the available options.

To save your current settings so that you can restore the session later, select *Save current setup*.

If the *Log Out* button is present on a panel, you can click it to access the same logout options. To add the *Log Out* button to a panel, right-click the panel then click *Add to Panel → Log Out → Add*.

7.3 Desktop Components

The main components of the GNOME desktop are icons that link to files, folders, or programs and a panel at the bottom of the screen (similar to the task bar in Windows).

Figure 7.1 *An Example GNOME Desktop*

Double-click an icon to start its associated program. Right-click an icon to access additional menus and options. You can also right-click any empty space on the desktop to access additional menus for configuring or managing the desktop itself.

7.3.1 Default Desktop Icons

The GNOME desktop features desktop icons providing basic navigation and functionalities for your system.

You can right-click an icon to display a menu offering file operations such as copying, cutting, or renaming. Selecting *Properties* displays a configuration dialog. Change the title of an icon and the icon itself 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, add an Important emblem to the file icon. Use the *Permissions* tab to view and modify the access, read, and write permissions for this file for the user, group, or others. The *Notes* tab manages comments. The menu for the trash can additionally features the *Empty Trash* option, 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 desired object with Nautilus (see Section 7.4.1, "Navigating in Nautilus" (page 185)). Right-click the object then click *Make Link*. Drag the link from the Nautilus window and drop it onto the desktop.

7.3.2 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. 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.

7.3.3 The Panel

On your first login, the GNOME desktop starts with a panel located at the bottom of the screen. This panel holds the three panel menus (*Applications*, *Places*, and *Desktop)*, a system tray holding applets, such as Beagle Search, Display Settings, and Network Settings, and a notification area with the system clock.

The panel also contains the window icons of all started applications. If you click the name of a window on the panel, 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.

If you right-click an empty spot in the panel, a menu opens, offering the options listed in the following table:

Table 7.1 *Panel Menu Options*

Option	Description
Add to Panel	Opens a list of applications and applets that can be added to the panel.
Delete This Panel	Removes the panel from the desktop. All the panel settings are lost.
Lock/Unlock Panel Position	Locks the panel in its current position (so that it cannot be moved to another location on the desktop) or unlocks the panel (so it can be moved). To move the panel to another location, middle-click and hold on any vacant space on the panel then drag the panel to the new location.
Properties	Modifies the properties for this panel.
New Panel	Creates a new panel and adds it to the desktop.
Help	Opens the help center.
About Panels	Opens information about the panel application.

The Applications Menu

The *Applications* menu provides a structured list 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 from the *Run Application* prompt (Alt + F2) if you know the command.

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 7.4.2, “File Management” (page 186).

The Desktop Menu

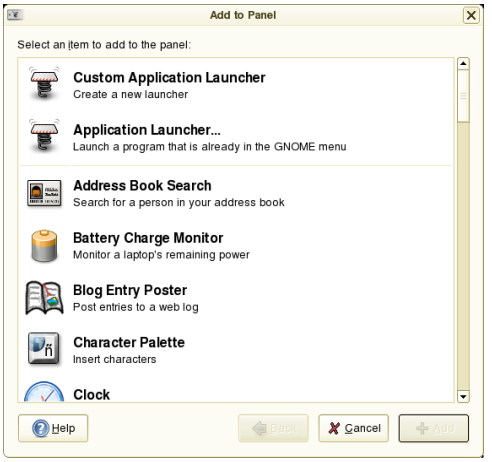
The *Desktop* menu contains controls for managing your desktop. Here, find the *GNOME Control Center* (customizes your desktop), *Lock Screen* (starts the screen saver), *Log Out* (ends your session), and an easy-to-use program for taking screen shots of your desktop. The screen shot function can also be accessed by pressing the Print Screen key (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.

To add an applet to a panel, 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 7.2 *Adding a New Icon to the Panel*



To modify the properties of an applet, right-click the applet to display its menu then click *Properties*. To move an applet, drag it to a new location on the panel.

7.3.4 Managing the Trash Bin

The trash bin is a directory for files, folders, and desktop objects marked for deletion. You can drag items from the file manager or the desktop to the trash bin icon by keeping the left mouse button pressed then releasing the button to drop them there. Alternatively, right-click an icon, file, or folder and select *Move to Trash*.

If you need to retrieve a file from the trash bin, you can display the contents and move the file out of Trash. When you empty Trash, you delete the contents permanently.

Displaying Trash

You can display the contents of Trash in any of the following ways:

From a File Browser Window
: Click *Go* → *Trash*. The contents of Trash are displayed in the window.

From a File Object Window
: Click *Places* → *Trash*. The contents of Trash are displayed in the window.

From the Desktop
Double-click the Trash icon on the desktop.

Emptying Trash

Empty the trash bin using either of the following methods:

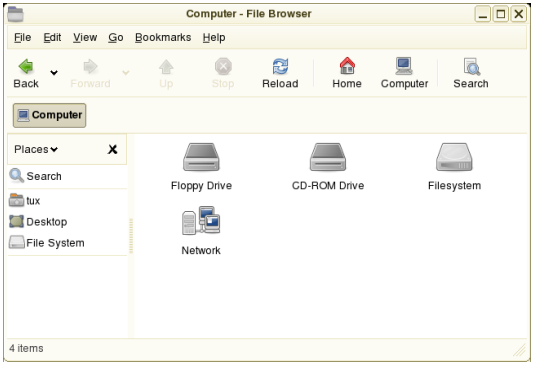
From a File Browser Window
Click *File → Empty Trash*.

From the Desktop
Right-click the Trash icon then select *Empty Trash*.

7.3.5 Accessing CD-ROM, DVD-ROM, and Floppy Disks

To access floppy disks, CDs, or DVDs, insert the medium into the appropriate drive then click *Places → Computer*. Double-click the appropriate icon in *Computer* to start the file manager and view the contents of the disk.

Figure 7.3 *Computer*



You can copy files to and from other directories by dragging and dropping.

WARNING

Do not simply remove disks from the drive after using them. Floppy disks, CDs, and DVDs must always be unmounted from the system first. Close all file manager sessions still accessing the medium then right-click the icon for the medium and select *Eject* from the menu. Then safely remove the disk when the tray opens automatically.

Format floppy disks by clicking *Applications* → *System* → *File System* → *Floppy Formatter*. Select the density of the floppy disk and the file system settings: Linux native (ext2), the file system for Linux, or DOS (FAT) to use the floppy with Windows systems.

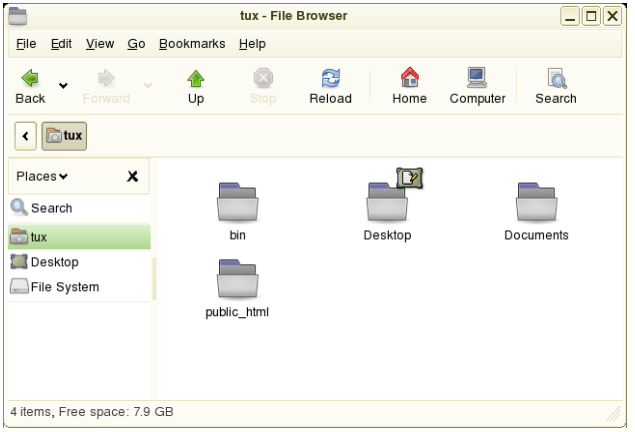
7.4 Managing Files and Folders with Nautilus

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 URIs. 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 using the menu entry or by clicking the Computer or Home icon on the desktop.

7.4.1 Navigating in Nautilus

The standard window of Nautilus is shown in Figure 7.4, “Nautilus Standard Window” (page 186). 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. When you double-click a folder icon, a new Nautilus window opens, displaying the folder's content.

Figure 7.4 *Nautilus Standard Window*



To navigate between folders, use the drop-down menu in the bottom left corner of the Nautilus window. Here, find all parent folders for the current directory up to the root file system. Select the folder you want and open it in a new Nautilus window on top of the old one. Open just the immediate parent of the current folder by clicking *File → Open Parent*. 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, you can use the *Back*, *Forward*, and *Up* buttons as you would in a Web browser. The functionalities and configuration options described in Section 7.4.2, “File Management” (page 186) also apply to the browser interface.

7.4.2 File Management

Perform several tasks in Nautilus by simply dragging and dropping. 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. Dragging text from an application to a folder window creates a new text document.

To move files between directories, open the source directory containing the file 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.

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 an FTP, SSH, HTTP, or Samba server, click *File → Connect to Server*. You are then prompted for the type of server and 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*.

7.4.3 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.

To edit a MIME type:

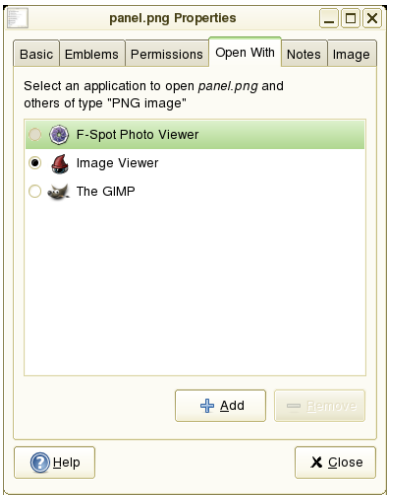
1. In a Nautilus window, right-click a file of the MIME type to change.
2. Click *Properties → Open With*.

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.

Figure 7.5 *Editing the MIME Type*



Even if a MIME type has not yet been registered, the procedure is the same. These modifications are applied globally, which means that any file of this type is subsequently opened by the defined application.

7.5 Managing Network Connections

Use the NetworkManager applet in the system tray of the panel for managing network connections. Click the icon to see all the available networks, such as wired and wireless networks, VPN connections, and dial-up connections. If multiple connections are listed, select the connections to use. Right-click the icon and uncheck *Enable Networking* or *Enable Wireless* if you want to stop these services completely. Disabling wireless is necessary in sensitive environments where you are not allowed to use wireless network devices.

Also use the NetworkManager applet for configuring wireless networks. gconf stores the settings in `~/.gconf` and the gnome-keyring-manager helps remember the passwords.

Find more information about networking in mobile environments in Chapter *Mobile Computing with Linux* (↑Reference) and general information about NetworkManager in Section "Managing Network Connections with NetworkManager" (Chapter 18, *Basic Networking*, ↑Reference).

7.6 Accessing Network Shares

Other network devices, like workstations and servers, can be set up to share some or all of their resources. Typically, files and folders are marked to let remote users access them. These are called network shares. If your system is configured to access network shares, you can use the file manager to access these shares.

To access network shares, click the *Computer* button in any file manager window. The window displays the network share types that you can access. Double-click a network resource type then click the network share to access. You might be required to authenticate to the resource by providing a username and password.

7.7 Opening or Creating Documents with OpenOffice.org

The office suite OpenOffice.org offers a complete set of office tools including a word processor, spreadsheet, presentation program, vector drawing program, and database component. Because OpenOffice.org is available for a number of operating systems, you can use the same data across different computing platforms. You can also open and edit files in Microsoft Office format and save them back to this format, if needed. To start OpenOffice.org, press Alt + F2 and enter `OOo`.

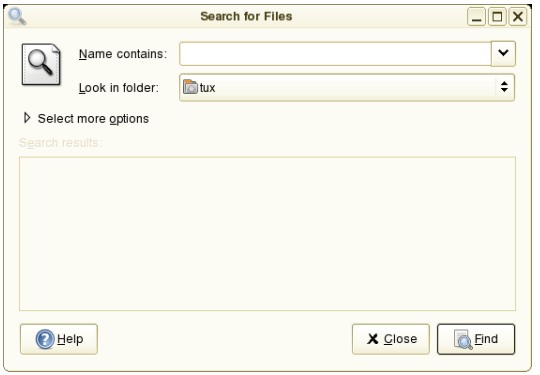
A number of sample documents and templates are included with OpenOffice.org. Access the templates by clicking *File → New → Templates and Documents*. In addition, you can use AutoPilot, a feature that guides you through the creation of letters and other common documents.

For a more in-depth introduction to OpenOffice.org, see Chapter *The OpenOffice.org Office Suite* (↑Applications) or view the help in any OpenOffice.org program.

7.8 Finding Files on Your Computer

Using *Search for File* from the *Places* menu, you can locate files on your computer using any number of search criteria. You can also open the *Search for Files* dialog by entering `gnome-search-tool` in a terminal window.

Figure 7.6 *Search for Files Dialog*



Search for Files uses the find, grep, and locate UNIX commands. All searches are case insensitive.

7.8.1 Performing a Basic Search

1. Click *Places* → *Search for Files*.

2. Type the search text in *Name Contains*. The search text can be a filename or partial filename, with or without wild cards, as shown in the following table:

Search Text	Example	Result
Full or partial filename	myfile.txt	Searches for all files that contain “myfile.txt” in the filename.

Search Text	Example	Result
Partial filename combined with wild cards (* [ ])	*.[ch]	Searches for all files that have a .c or .h extension.

3 In *Look in Folder*, type the path to the directory in which to begin the search.

4 Click *Find*.

Search for Files searches in the directory specified and any subdirectories of the directory and displays the results of the search in the *Search Results* list. If no files are found that match the search criteria, the application displays the message `No files found` in the list.

7.8.2 Adding Search Options

Use *Show More Options* to search by file content, dates, owner, or file size.

1 Click *Places* → *Search for Files*.

2 Type the search text in *Name Contains*.

3 In *Look in Folder*, type the path to the directory in which to begin the search.

4 Click *Show More Options* then click *Available Options*.

5 Select a search option to apply then click *Add*. The following options are available:

Option	Description
Contains the Text	Searches for a file by filename. Type a full filename or a partial filename with wild cards in the field provided. Use an asterisk (*) to indicate any number characters. Use a question mark (?) to indicate a single character. The search is case sensitive.

Option	Description
Date Modified Less Than	Searches for files that were modified within the period specified (in days).
Date Modified More Than	Searches for files that were modified before the period specified (in days).
Size At Least	Searches for files that are equal to or larger than the size specified (in kilobytes).
Size At Most	Searches for files that are smaller than or equal to the size specified (in kilobytes).
File is Empty	Searches for empty files.
Owned By User	Searches for files that are owned by the user specified.
Owned By Group	Searches for files that are owned by the group specified.
Owner is Unrecognized	Searches for files that are owned by a user or group that is unknown to the system.
Name Does Not Contain	Searches for filenames that do not contain the string that you enter. Enter a full filename or a partial filename with wildcards in the field provided. Use an asterisk (*) to indicate any number of characters. Use a question mark (?) to indicate a single character. The search is case sensitive.
Name Matches Regular Expression	Searches for files that contain the specified regular expression in their directory path or filename. Regular expressions are special text strings used to describe a search pattern. For more information, see `http://www.regular-expressions.info`.

Option	Description
Show Hidden and Backup Files	Includes hidden and backup files in the search.
Follow Symbolic Links	Follows symbolic links when searching for files.
Include Other Filesystems	Searches in directories that are not in the same file system as the start directory.

6 Specify the required search information for the search option.

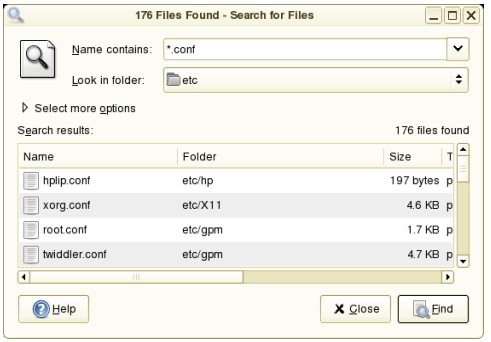
7 Repeat Step 5 (page 191) and Step 6 (page 193) for each search option to apply. To remove a search option from the current search, click the *Remove* button next to the option.

8 Click *Find*.

7.8.3 Using the Search Results List

You can use the search results list to open or delete a file found during a search or save the search results to a file.

Figure 7.7 *Search Results List*



To open a file displayed in the list, right-click the file then click *Open* or double-click the file. To open the folder that contains a file displayed in the Search Results list, right-click the file then click *Open Folder*. To delete a file displayed in the Search Results list, right-click the file then click *Move to Trash*.

To save the results of the last search that Search for Files performed, right-click anywhere in the search results list then click *Save Results As*. Type a name for the file to which to save the results then click *Save*.

7.8.4 Disabling Quick Searches

By default, *Search for Files* tries to speed up some searches by using the `locate` command. `locate` provides a secure way to index and quickly search for files. Because `locate` relies on a file index, the results might not be up to date. To disable quick searches, run the following command in a terminal window:

```
gconftool-2 --type=bool --set /apps/gnome-search-tool/disable/quick/search 1
```

For more information about `locate`, see Section "The Command locate" (Chapter 10, *Special Features of SUSE Linux*, ↑Reference).

7.9 Exploring the Internet

GNOME includes Firefox, a Mozilla™-based Web browser. Start it by clicking *Programs → Firefox Web Browser* or clicking its quick start icon in the top panel.

You can type an address into the location bar at the top or click links in a page to move to different pages, just like in any other Web browser. For information about Firefox, refer to Chapter *The Web Browser Firefox* (↑Applications).

7.10 E-Mail and Calendering

Novell Evolution seamlessly combines e-mail, a calendar, an address book, and a task list in one easy-to-use application. With its extensive support for communications and data interchange standards, Evolution can work with existing corporate networks and applications, including Microsoft Exchange. To start Evolution, click *Applications → Office → Evolution*.

The first time you start it, Evolution prompts you with a few questions as it sets up a mail account and helps you import mail from your old mail client. Then it shows you how many new messages you have and lists upcoming appointments and tasks, the current weather, and news from news feeds. The calendar, address book, and mail tools are available in the shortcut bar on the left.

For more information, see Chapter *Evolution: An E-Mail and Calendar Program* (↑Applications) and the Evolution 2.4 User Guide at http://www.novell.com/documentation/evolution24/index.html.

7.11 Moving Text between Applications

To copy text between applications, select the text then move the mouse cursor to the position where you want the text copied. Click the middle button on the mouse or the scroll wheel to copy the text.

When copying information between programs, you must keep the source program open and paste the text before closing it. When a program closes, any content from that application on the clipboard is lost.

7.12 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.

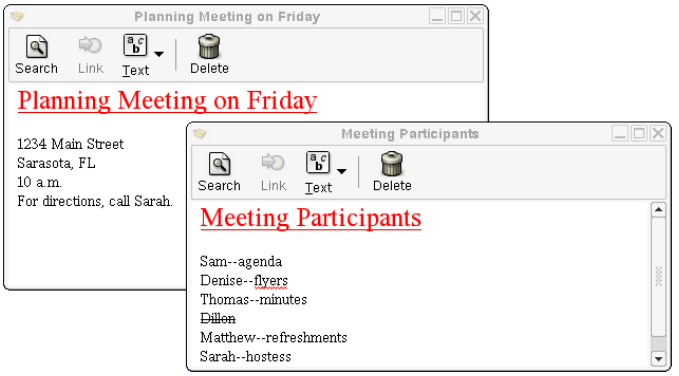
7.12.1 Taking Notes with Tomboy

Tomboy is a desktop note-taking application that helps you organize ideas and information. To add Tomboy to a panel, right-click the panel then click *Add to Panel*. Scroll down the list of items, select *Tomboy Notes*, then click *Add*. The Tomboy icon appears on your panel.

Left-click the panel icon to open the Tomboy menu 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. A *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, automatically-linking Web and e-mail addresses, undo and redo, and font styling and sizing.

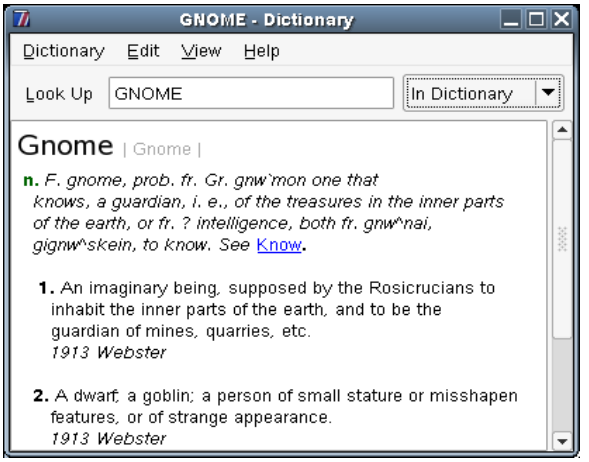
Figure 7.8 *Examples of Tomboy Notes*



7.12.2 Dictionary

GNOME Dictionary 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 7.9 *GNOME Dictionary*



Enter a word in *Look Up*. 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 online manual.

7.12.3 Messaging Using Gaim

Gaim is a powerful instant messenger client. It 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.

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.

7.12.4 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 discovering 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.

7.12.5 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`), 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 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 in which to create the archive. Then select an archive type. 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*.

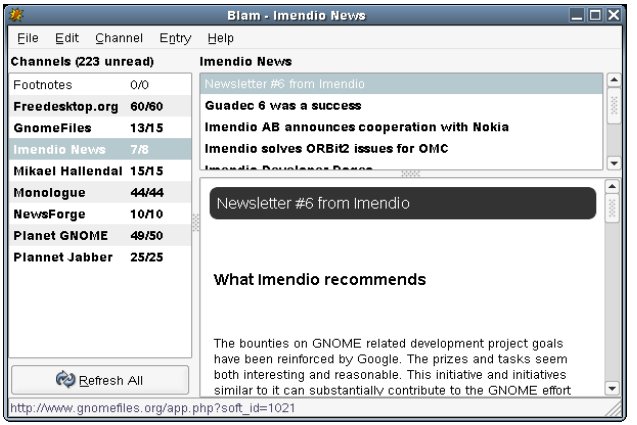
After completing the selection and configuration, exit the dialog. The archive you created is available for further processing at the specified location. To decompress an archive, load it to File Roller, click *Edit → Extract* then specify the target directory.

7.12.6 Reading News Feeds with Blam

Blam 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. 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 can print news entries 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 7.10 *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.

7.13 Obtaining Software Updates

Use the ZENworks updater to install additional software and apply security updates. Select the software packages to install from the list then click *Update*. For background information and configuration options, see Section 2.12, “Update from the Command Line” (page 76).

8 Customizing Your GNOME Desktop

Use *Desktop Preferences* to customize your GNOME desktop. Some of the settings you might want to change include the desktop background, screen saver, keyboard and mouse, sounds, and file associations. Start by clicking *Desktop → GNOME Control Center* then select the desktop settings to modify. In the individual modules, access help for the options by clicking *Help*. The system immediately adopts every change made in a configuration module.

Figure 8.1 *GNOME Desktop Preferences*

8.1 Hardware Settings

The hardware settings configure your keyboard, mouse, printers, removable drives, and media and set your screen resolution.

8.1.1 Modifying Keyboard Preferences

Use *Keyboard Preferences* to modify the autorepeat preferences for your keyboard and to configure typing break settings. Click the *Accessibility* button to start the keyboard accessibility preference tool.

8.1.2 Configuring the Mouse

Use *Mouse Preference* to configure your mouse for right-hand use or for left-hand use. You can also specify the speed and sensitivity of mouse movement.

8.1.3 Installing and Configuring Printers

You could use this module to install and configure printers. On a SUSE Linux system, these settings are best made with YaST as described in Section 2.4.4, “Printer” (page 44).

8.1.4 Configuring Removable Drives and Media

Use this module to set preferences for removable drives and media. These settings control automatic actions for devices and various media.

8.1.5 Specifying Screen Resolution Settings

You could use this module to specify the resolution settings for your screen, including resolution and refresh rate. On a SUSE Linux system, these settings are best made with YaST as described in Section “X11 Setup with SaX2” (Chapter 14, *The X Window System*, ↑Reference).

8.2 Look and Feel Settings

Look and Feel lets you change your desktop background, choose fonts, screensavers, and themes, and customize window behavior.

8.2.1 Changing the Desktop Background

The desktop background is the image or color that is applied to your desktop. You can customize the desktop background in the following ways:

- Select an image for the desktop background. The image is superimposed on the desktop background color. The desktop background color is visible if you select a transparent image or if the image does not cover the entire desktop.
- Select a color for the desktop background. You can select a solid color or create a gradient effect with two colors (where one color blends gradually into another color).

You can also change the appearance of your desktop background from within the Nautilus file manager. To use an image file as a background picture, drag it from the file manager and drop it into *Desktop Wallpaper*.

If you do not want any background picture, click *No Wallpaper* and select a desktop color instead.

8.2.2 Selecting Fonts

Use *Font Preferences* to select the fonts to use in your applications, windows, terminals, and desktop. The upper part of the dialog shows the fonts selected for the application, desktop, window title, and terminal. Click one of the buttons to open a selection dialog where you can set the font family, style, and size.

8.2.3 Configuring the Screen Saver

Use *Screensaver Preferences* to select or change your screen saver. A screen saver is a small program that takes over the display screen if there are no keystrokes or mouse movements for a specified duration of time.

You can select a *Random* screen saver (random selection of screen savers from a custom-defined list) or a *Blank screen* instead of a screen saver or *Disable* the screen saver function. Another option is to select a specific screen saver from the list of installed screen savers. The currently selected screen saver is displayed in the preview window on the right.

Use *Activate after* to determine when the screen should be made completely blank (if you choose the *Blank screen* option) or when the screen saver starts after there are no keystrokes or mouse movements. All time references are in minutes.

Select *Lock screen when active* to lock the screen when a screen saver is running. To unlock the screen, move the mouse or press a key on the keyboard then enter your password.

8.2.4 Choosing a Theme

A theme is a group of coordinated settings that specify the visual appearance of a part of the desktop. Use *Theme Preferences* to select from a list of preinstalled themes or customize the settings to your own preferences. The list of available themes includes several themes for users with accessibility requirements.

A theme contains settings that affect different the following parts of the desktop:

Controls
: The visual appearance of windows, panels, and applets. Also the visual appearance of the GNOME-compliant interface items that appear on windows, panels, and applets, such as menus, icons, and buttons. Some of the controls setting options that are available are designed for special accessibility needs.

Window Frame
: The appearance of the frames around windows only.

Icon
: The appearance of the icons on panels and the desktop background.

The color settings for the desktop and applications are controlled using themes. You can choose from a variety of preinstalled themes. Selecting a style from the list overview applies it automatically. *Theme Details* opens another dialog where you can customize the style of single desktop elements, like window content, window borders, and icons. Making changes and leaving the dialog by clicking *Close* switches the theme to custom. Click *Save Theme* to save your modified theme under a custom name. The Internet and other sources provide many additional themes for GNOME as .tar.gz files. Install these with *Install Theme*. You can also drag new themes into the *Theme Preferences* window and drop them there.

8.2.5 Customizing Window Behavior

Use *Window Preferences* to customize window behavior for the desktop. You can determine how a window reacts to contact with the mouse pointer or to double-clicks on its title bar and define which key to hold to move an application window.

When several application windows populate the desktop, the active one by default is the last one clicked. Change this behavior by activating *Select windows when the mouse moves over them*. If desired, activate *Raise selected window after an interval* and adjust the latency time with the slider. This raises a window a short time after the window receives focus.

Application windows can be shaded (rolled up) by double-clicking the title bar, leaving only the title bar visible. This saves space on the desktop and is the default behavior. It is also possible to set windows to maximize when the title bar is double-clicked.

Select a modifier key to press for moving a window (Ctrl , Alt , or the Windows logo key).

8.3 Personal Settings

Personal Settings lets you configure accessibility and assistive technology options, change your password, and customize keyboard shortcuts.

8.3.1 Configuring Accessibility Settings

The settings of this module facilitate the use of the keyboard for users with motion impairments. The module consists of the three tabs: *Basic*, *Filters*, and *Mouse Keys*. Before modifying settings, activate *Enable keyboard accessibility features*.

8.3.2 Configuring Assistive Technology Support

The GNOME desktop includes assistive technologies for users with special needs. These technologies include a screen reader, magnifier, and on-screen keyboard. To enable the technologies, first select *Enable assistive technologies* then select the technologies you want.

The `gok` package must be installed to get on-screen keyboard support. The `gnopernicus` and `gnome-mag` packages must be installed to get screen reading and magnifying capabilities.

8.3.3 Changing Your Password

Use this module to change your password. Specify your current password, specify your new password twice, then click *OK*. Using capitals, numbers, and symbols increases the security of a password.

8.3.4 Customizing Keyboard Shortcuts

A keyboard shortcut is a key or combination of keys that provides an alternative to standard ways of performing an action. Use *Keyboard Shortcuts* to display the default keyboard shortcuts. You can customize the shortcuts to your preferences.

To change the shortcut keys for an action, click the shortcut for the action then press the keys to associate with the action. To disable the shortcut keys for an action, click the shortcut for the action then press <kbd><—</kbd> .

8.4 System Settings

System Settings configures network proxies, search and indexing, sessions, and sound settings.

8.4.1 Configuring Network Proxies

The Network Proxy Preferences tool lets you configure how your system connects to the Internet. You can configure the desktop to connect to a proxy server and specify the details of the server. A proxy server is a server that intercepts requests to another server and fulfills the request itself, if it can. You can specify the Domain Name Service (DNS) name or the IP address of the proxy server. A DNS name is a unique alphabetic identifier for a computer on a network. An IP address is a unique numeric identifier for a computer on a network.

8.4.2 Setting Search and Indexing Preferences

Use this module to set preferences for the Beagle search tool. On *Search*, click *Start search & indexing services automatically* to start the Beagle daemon when you log in. You can also choose the key strokes that display the Beagle search window by specifying any combination of Ctrl, Alt, and a function key, and you can determine the maximum number of results to display when a search is performed.

On *Indexing*, choose to index your home directory (selected by default), not to index your home directory, and to add additional directories to index. Make sure you have rights to the directories you add. You can also specify resources that you do not want indexed. These resources can include directories, patterns, mail folders, or types of objects.

For more information about Beagle, see Chapter *Using Beagle* (↑Applications).

8.4.3 Managing Sessions

You can set session preferences and specify which applications to start when you begin a session. You can configure sessions to save the state of applications then restore the state when you start another session.

You can also use this preference tool to manage multiple sessions. For example, you might have a mobile session that starts applications you use most frequently when traveling, a demo session that starts applications used to present a demonstration or slide show to a customer, and a work session that uses a different set of applications when you are working in the office.

8.4.4 Setting Sound Preferences

Sound Preference controls when the sound server starts. You can also specify which sounds to play when particular events occur.

8.5 Modifying the Appearance of Menus and Toolbars

Use the options in the *Menu and Toolbar Preferences* dialog to modify the appearance of menus, menu bars, and toolbars for GNOME-compliant applications. To access *Menu and Toolbar Preferences*, click *Applications → Utilities → Desktop → Menus & Toolbars.*

Select *Show icons in menus* to display an icon beside each item in a menu. Some menu items do not have an icon. *Editable menu accelerators* lets you assign different keyboard shortcuts to menu items. Select this option, highlight a menu item in any application, then press the keys you want to assign. The shortcut then appears on the menu. Click <— to remove a shortcut.

Detachable toolbars lets you move toolbars from application windows to any location on the screen. If you select this option, handles appear on the left side of toolbars in your applications. Click and hold this area then drag the toolbar to its new location.

Toolbar button labels lets you choose to display toolbar icons as *Text only*, *Icons only*, *Text beside icons*, or *Text below icons*. The default setting is *Text below icons*.

8.6 Setting Preferred Applications

To improve the interoperability of your GNOME desktop, you can configure the default Web browser, mail reader, and terminal applications that are launched whenever another GNOME application needs these functionalities. To do this, click *Applications → Utilities → Desktop → Preferred Applications*.

On *Web Browser*, *Mail Reader*, or *Terminal*, select the name of the application to use as the default. For example, if you set your default browser to *Firefox* on *Web Browser*, Firefox is started when you click a link in an e-mail. You can also click *Custom* to customize the application's command. All settings made in *Preferred Applications* apply only to GNOME applications.

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. 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.
`/var/log/messages`	Ongoing messages from the kernel and system log daemon when running.

Log File	Description
`/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 2.5.3, “Boot and Rescue Disks” (page 51) 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 machine 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.

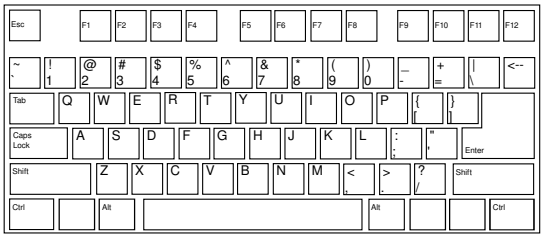
Procedure 9.2 *Changing the Boot Sequence in a SCSI BIOS (Adaptec Host Adapter)*

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 documentation located in `/usr/src/linux/Documentation/kernel-parameters.txt`.

TIP: Obtaining Kernel Documentation

Install the `kernel-source` package to check out the kernel documentation.

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=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`.

`acpi=noirq`
: Do not use ACPI for IRQ routing.

`acpi=ht`
: Run only enough ACPI to enable hyper-threading.

`acpi=strict`
: Be less tolerant of platforms that are not strictly ACPI specification compliant.

`pci=noacpi`
: Disable 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 reboot 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 twice 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 twice 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 browser 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 219). 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. Select a language.
5. Accept the license agreement.
6. In the *Installation Mode* screen, select *Other* and set the installation mode to *Repair Installed System*.

7 Once in the YaST System Repair module, select *Expert Tools* then select *Install New Boot Loader*.

8 Restore the original settings and reinstall the boot loader.

9 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, but Does Not Boot into a 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 Fail

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 232).

- 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 232).

- 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. Depending on whether you use local user management and authentication or network authentication, login failures occur for different reasons.

Local user management can fail for the following reasons:

- The user might have entered the wrong password.
- The user's home directory containing the desktop configuration files is corrupted or write protected.
- There might be problems with the X Window System authenticating this particular user, especially if the user's home directory has been used with another Linux distribution prior to installing the current one.

To locate the reason for a local login failure, proceed as follows:

1. Check whether the user remembered his password correctly before you start debugging the whole authentication mechanism. If the user might not remember his password correctly, use the YaST User Management module to change the user's password.
2. Log in as `root` and check `/var/log/messages` for error messages of the login process and of PAM.
3. Try to log in from a console (using Ctrl + Alt + F1).

   If this is successful, the blame cannot be put on PAM, 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 230) and Section 9.4.4, “ Login Successful but KDE Desktop Fails” (page 230).
4. 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.

5 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.

6 If the desktop could not start because of corrupt configuration files, proceed with Section 9.4.3, “ Login Successful but GNOME Desktop Fails ” (page 230) or Section 9.4.4, “ Login Successful but KDE Desktop Fails” (page 230).

The following are some common reasons why network authentication for a particular user might fail on a specific machine:

- The user might have entered the wrong password.
- 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.

To locate the cause of the login failures with network authentication, proceed as follows:

1 Check whether the user remembered his password correctly before you start debugging the whole authentication mechanism.

2 Determine the directory server the machine relies on for authentication and make sure that it is up and running and properly communicating with the other machines.

3 Determine that the user's username and password work on other machines to make sure that his authentication data exists and is properly distributed.

4 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 error messages.

5 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 230) and Section 9.4.4, " Login Successful but KDE Desktop Fails" (page 230).

6 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.

7 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.

8 If the desktop could not start because of corrupt configuration files, proceed with Section 9.4.3, " Login Successful but GNOME Desktop Fails " (page 230) or Section 9.4.4, " Login Successful but KDE Desktop Fails" (page 230).

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 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:

IMPORTANT

The debugging procedure described below only applies to a simple network server/client setup that does not involve any internal routing. We

assume both server and client to be members of the same subnet without the need for additional routing.

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 234). If ping still fails, either your network card is not configured correctly or your network hardware is faulty. Refer to Step 4.c (page 235) 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 from before 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 *Create Backup* 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 Options* 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 All*, *Deselect All*, and *Select Files* 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.

SUSE Linux offers two different methods to cope with this kind of situation. You can either use the YaST System Repair functionality or boot the rescue system. The following sections cover both flavors of system repair.

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 239).

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 241).

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 242).

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:

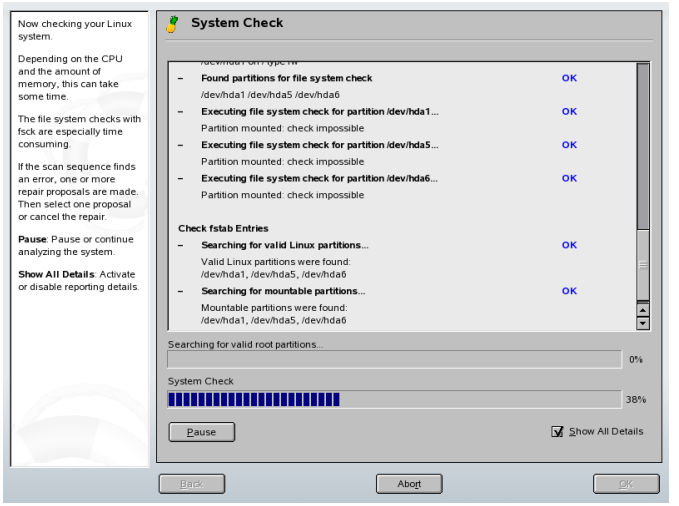
1 Boot the system with the original installation medium used for the initial installation (as outlined in Chapter 1, *Installation with YaST* (page 3)).

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 240). 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 9, *The Boot Loader*, ↑Reference).

Run Partitioning Tool
: This starts the expert partitioning tool in YaST. Find details in Section 2.5.6, “Partitioner” (page 53).

Repair 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.

Recover 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 Floppy
: This option saves important system files to a floppy disk. If one of these files become damaged, it can be restored from disk.

Verify 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 installa-

tion support for registered products and the incident-based support by phone or Web. Nearly all common customer problems can be eliminated quickly and competently.

9.7.1 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 online update 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

Reach our support staff under the following links and phone numbers. Any prices listed are call costs, not costs for support.

- http://support.novell.com/eService
- Germany: Phone: 0900 111 2 777 (12 Cent/min) (Monday through Friday from 13:00 to 17:00 CET)
- Austria: Phone: 0820 500 781 (14.5 cent/min) (Monday through Friday from 13:00 to 17:00 CET)
- Switzerland: Phone: 0848 860 847 (costs depend on provider) (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@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/support/products/suselinux/contacts.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.

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 opening a service request on http://support.novell.com/eService. You will receive a reply soon after that provides a practical solution.

9.7.2 Advanced Support

Qualified support is available at transparent rates. If your question is not covered by the scope of the free service or if you do not have a valid support claim, you can take advantage of our 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 10.1. 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.

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