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Fedora 15

Deployment Guide

Deployment, Configuration and Administration of Fedora 15



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Abstract

The *Deployment Guide* documents relevant information regarding the deployment, configuration, and administration of Fedora 15. It is oriented towards system administrators with a basic understanding of the system.

Preface

The *Deployment Guide* contains information on how to customize the Fedora 15 system to fit your needs. If you are looking for a comprehensive, task-oriented guide for configuring and customizing your system, this is the manual for you.

This manual discusses many intermediate topics such as the following:

- Installing and managing packages using the graphical **PackageKit** and command line **Yum** package managers
- Setting up a network – from establishing an Ethernet connection using **NetworkManager** to configuring channel bonding interfaces to increase server bandwidth
- Configuring **DHCP**, **BIND**, **Apache HTTP Server**, **Postfix**, **Sendmail** and other enterprise-class servers and software
- Gathering information about your system, including obtaining user-space crash data with the **Automatic Bug Reporting Tool**, and kernel-space crash data with `kdump`
- Easily working with kernel modules and upgrading the kernel

1. Target Audience

The *Deployment Guide* assumes you have a basic understanding of the Fedora operating system. If you need help with the installation of this system, refer to the *Fedora 15 Installation Guide*.

2. How to Read this Book

This manual is divided into the following main categories:

Part I, *Basic System Configuration* (page 35)

This part covers basic system administration tasks such as keyboard configuration, date and time configuration, and managing users and groups.

Chapter 1, *Language and Keyboard Configuration* (page 36) covers basic language and keyboard setup. Read this chapter if you need to configure the language of your desktop, change the keyboard layout, or add the keyboard layout indicator to the panel.

Chapter 2, *Date and Time Configuration* (page 39) covers the configuration of the system date and time. Read this chapter if you need to change the date and time setup, or configure the system to synchronize the clock with a remote Network Time Protocol (NTP) server.

Chapter 3, *Managing Users and Groups* (page 44) covers the management of users and groups in a graphical user interface and on the command line. Read this chapter if you need to manage users and groups on your system, or enable password aging.

Part II, *Package Management* (page 69)

This part describes how to manage software packages on Fedora using both **Yum** and the **PackageKit** suite of graphical package management tools.

Chapter 4, *Yum* (page 70) describes the **Yum** package manager. Read this chapter for information how to search, install, update, and uninstall packages on the command line.

Chapter 5, *PackageKit* (page 91) describes the **PackageKit** suite of graphical package management tools. Read this chapter for information how to search, install, update, and uninstall packages using a graphical user interface.

Part III, *Networking* (page 103)

This part describes how to configure the network on Fedora.

Chapter 6, *Network Interfaces* (page 104) explores various interface configuration files, interface control scripts, and network function files located in the `/etc/sysconfig/network-scripts/` directory. Read this chapter for information how to use these files to configure network interfaces.

Part IV, *Infrastructure Services* (page 119)

This part provides information how to configure services and daemons, configure authentication, and enable remote logins.

Chapter 7, *Services and Daemons* (page 120) explains the concept of runlevels, and describes how to set the default one. It also covers the configuration of the services to be run in each of these runlevels, and provides information on how to start, stop, and restart a service. Read this chapter to learn how to manage services on your system.

Chapter 8, *Configuring Authentication* (page 125) describes how to configure user information retrieval from Lightweight Directory Access Protocol (LDAP), Network Information Service (NIS), and Winbind user account databases, and provides an introduction to the System Security Services Daemon (SSSD). Read this chapter if you need to configure authentication on your system.

Chapter 9, *OpenSSH* (page 168) describes how to enable a remote login via the SSH protocol. It covers the configuration of the `sshd` service, as well as a basic usage of the `ssh`, `scp`, `sftp` client utilities. Read this chapter if you need a remote access to a machine.

Part V, *Servers* (page 185)

This part discusses various topics related to servers such as how to set up a Web server or share files and directories over the network.

Chapter 10, *DHCP Servers* (page 186) guides you through the installation of a Dynamic Host Configuration Protocol (DHCP) server and client. Read this chapter if you need to configure DHCP on your system.

Chapter 11, *DNS Servers* (page 198) introduces you to Domain Name System (DNS), explains how to install, configure, run, and administer the **BIND** DNS server. Read this chapter if you need to configure a DNS server on your system.

Chapter 12, *Web Servers* (page 225) focuses on the **Apache HTTP Server 2.2**, a robust, full-featured open source web server developed by the Apache Software Foundation. Read this chapter if you need to configure a web server on your system.

Chapter 13, *Mail Servers* (page 272) reviews modern email protocols in use today, and some of the programs designed to send and receive email, including **Postfix**, **Sendmail**, **Fetchmail**, and **Procmal**. Read this chapter if you need to configure a mail server on your system.

Chapter 14, *Directory Servers* (page 302) covers the installation and configuration of **OpenLDAP 2.4**, an open source implementation of the LDAPv2 and LDAPv3 protocols. Read this chapter if you need to configure a directory server on your system.

Chapter 15, *File Servers* (page 317) guides you through the installation and configuration of **Samba**, an open source implementation of the Server Message Block (SMB) protocol, and **vsftpd**, the primary FTP server shipped with Fedora. Read this chapter if you need to configure a file server on your system.

Part VI, *Monitoring and Automation* (page 358)

This part describes various tools that allow system administrators to monitor system performance, automate system tasks, and report bugs.

Chapter 16, *System Monitoring Tools* (page 359) discusses applications and commands that can be used to retrieve important information about the system. Read this chapter to learn how to gather essential system information.

Chapter 17, *Viewing and Managing Log Files* (page 366) describes the configuration of the `rsyslog` daemon, and explains how to locate, view, and monitor log files. Read this chapter to learn how to work with log files.

Chapter 18, *Automating System Tasks* (page 388) provides an overview of the `cron`, `at`, and `batch` utilities. Read this chapter to learn how to use these utilities to perform automated tasks.

Chapter 19, *Automatic Bug-Reporting Tool (ABRT)* (page 397) concentrates on **ABRT**, a system service and a set of tools to collect crash data and send a report to the relevant issue tracker. Read this chapter to learn how to use **ABRT** on your system.

Part VII, *Kernel, Module and Driver Configuration* (page 412)

This part covers various tools that assist administrators with kernel customization.

Chapter 20, *Manually Upgrading the Kernel* (page 413) provides important information how to manually update a kernel package using the `rpm` command instead of `yum`. Read this chapter if you cannot update a kernel package with the **Yum** package manager.

Chapter 21, *Working with Kernel Modules* (page 422) explains how to display, query, load, and unload kernel modules and their dependencies, and how to set module parameters. Additionally, it covers specific kernel module capabilities such as using multiple Ethernet cards and using channel bonding. Read this chapter if you need to work with kernel modules.

Chapter 22, *The kdump Crash Recovery Service* (page 439) explains how to configure, test, and use the `kdump` service in Fedora, and provides a brief overview of how to analyze the resulting core dump using the **crash** debugging utility. Read this chapter to learn how to enable `kdump` on your system.

Appendix A, *RPM* (page 456)

This appendix concentrates on the RPM Package Manager (RPM), an open packaging system used by Fedora, and the use of the `rpm` utility. Read this appendix if you need to use `rpm` instead of `yum`.

Appendix B, *The sysconfig Directory* (page 470)

This appendix outlines some of the files and directories located in the `/etc/sysconfig/` directory. Read this appendix if you want to learn more about these files and directories, their function, and their contents.

Appendix C, *The proc File System* (page 488)

This appendix explains the concept of a virtual file system, and describes some of the top-level files and directories within the `proc` file system (that is, the `/proc/` directory). Read this appendix if you want to learn more about this file system.

3. Document Conventions

This manual uses several conventions to highlight certain words and phrases and draw attention to specific pieces of information.

In PDF and paper editions, this manual uses typefaces drawn from the *Liberation Fonts*¹ set. The Liberation Fonts set is also used in HTML editions if the set is installed on your system. If not, alternative but equivalent typefaces are displayed. Note: Red Hat Enterprise Linux 5 and later includes the Liberation Fonts set by default.

3.1. Typographic Conventions

Four typographic conventions are used to call attention to specific words and phrases. These conventions, and the circumstances they apply to, are as follows.

`Mono-spaced Bold`

Used to highlight system input, including shell commands, file names and paths. Also used to highlight key caps and key-combinations. For example:

To see the contents of the file `my_next_bestselling_novel` in your current working directory, enter the `cat my_next_bestselling_novel` command at the shell prompt and press **Enter** to execute the command.

The above includes a file name, a shell command and a key cap, all presented in Mono-spaced Bold and all distinguishable thanks to context.

Key-combinations can be distinguished from key caps by the hyphen connecting each part of a key-combination. For example:

Press **Enter** to execute the command.

Press **Ctrl+Alt+F2** to switch to the first virtual terminal. Press **Ctrl+Alt+F1** to return to your X-Windows session.

The first sentence highlights the particular key cap to press. The second highlights two sets of three key caps, each set pressed simultaneously.

If source code is discussed, class names, methods, functions, variable names and returned values mentioned within a paragraph will be presented as above, in `Mono-spaced Bold`. For example:

File-related classes include `filesystem` for file systems, `file` for files, and `dir` for directories. Each class has its own associated set of permissions.

Proportional Bold

This denotes words or phrases encountered on a system, including application names; dialogue box text; labelled buttons; check-box and radio button labels; menu titles and sub-menu titles. For example:

¹ <https://fedorahosted.org/liberation-fonts/>

Choose **System > Preferences > Mouse** from the main menu bar to launch **Mouse Preferences**. In the **Buttons** tab, click the **Left-handed mouse** check box and click **Close** to switch the primary mouse button from the left to the right (making the mouse suitable for use in the left hand).

To insert a special character into a **gedit** file, choose **Applications > Accessories > Character Map** from the main menu bar. Next, choose **Search > Find...** from the **Character Map** menu bar, type the name of the character in the **Search** field and click **Next**. The character you sought will be highlighted in the **Character Table**. Double-click this highlighted character to place it in the **Text to copy** field and then click the **Copy** button. Now switch back to your document and choose **Edit > Paste** from the **gedit** menu bar.

The above text includes application names; system-wide menu names and items; application-specific menu names; and buttons and text found within a GUI interface, all presented in Proportional Bold and all distinguishable by context.

Note the > shorthand used to indicate traversal through a menu and its sub-menus. This is to avoid the difficult-to-follow 'Select **Mouse** from the **Preferences** sub-menu in the **System** menu of the main menu bar' approach.

Mono-spaced Bold Italic or Proportional Bold Italic

Whether Mono-spaced Bold or Proportional Bold, the addition of Italics indicates replaceable or variable text. Italics denotes text you do not input literally or displayed text that changes depending on circumstance. For example:

To connect to a remote machine using `ssh`, type `ssh username@domain.name` at a shell prompt. If the remote machine is `example.com` and your username on that machine is `john`, type `ssh john@example.com`.

The `mount -o remount file-system` command remounts the named file system. For example, to remount the `/home` file system, the command is `mount -o remount /home`.

To see the version of a currently installed package, use the `rpm -q package` command. It will return a result as follows: `package-version-release`.

Note the words in bold italics above — `username`, `domain.name`, `file-system`, `package`, `version` and `release`. Each word is a placeholder, either for text you enter when issuing a command or for text displayed by the system.

Aside from standard usage for presenting the title of a work, italics denotes the first use of a new and important term. For example:

When the Apache HTTP Server accepts requests, it dispatches child processes or threads to handle them. This group of child processes or threads is known as a *server-pool*. Under

Apache HTTP Server 2.0, the responsibility for creating and maintaining these server-pools has been abstracted to a group of modules called *Multi-Processing Modules* (MPMs). Unlike other modules, only one module from the MPM group can be loaded by the Apache HTTP Server.

3.2. Pull-quote Conventions

Two, commonly multi-line, data types are set off visually from the surrounding text.

Output sent to a terminal is set in Mono-spaced Roman and presented thus:

```
books      Desktop  documentation  drafts  mss      photos  stuff  svn
books_tests Desktop1  downloads      images  notes    scripts svgs
```

Source-code listings are also set in Mono-spaced Roman but are presented and highlighted as follows:

```
package org.jboss.book.jca.ex1;

import javax.naming.InitialContext;

public class ExClient
{
    public static void main(String args[])
        throws Exception
    {
        InitialContext iniCtx = new InitialContext();
        Object          ref    = iniCtx.lookup("EchoBean");
        EchoHome        home   = (EchoHome) ref;
        Echo             echo   = home.create();

        System.out.println("Created Echo");

        System.out.println("Echo.echo('Hello') = " + echo.echo("Hello"));
    }
}
```

3.3. Notes and Warnings

Finally, we use three visual styles to draw attention to information that might otherwise be overlooked.



Note

A note is a tip or shortcut or alternative approach to the task at hand. Ignoring a note should have no negative consequences, but you might miss out on a trick that makes your life easier.



Important

Important boxes detail things that are easily missed: configuration changes that only apply to the current session, or services that need restarting before an update will apply. Ignoring Important boxes will not cause data loss but may cause irritation and frustration.



Warning

A Warning should not be ignored. Ignoring warnings will most likely cause data loss.

4. Feedback

If you find a typographical error in this manual, or if you have thought of a way to make this manual better, we would love to hear from you! Please submit a report in *Bugzilla*² against the product **Fedora Documentation**.

When submitting a bug report, be sure to provide the following information:

- Manual's identifier: `deployment-guide`
- Version number: 15

If you have a suggestion for improving the documentation, try to be as specific as possible when describing it. If you have found an error, please include the section number and some of the surrounding text so we can find it easily.

5. Acknowledgements

Certain portions of this text first appeared in the *Deployment Guide*, copyright © 2007 Red Hat, Inc., available at http://docs.redhat.com/docs/en-US/Red_Hat_Enterprise_Linux/5/html/Deployment_Guide/index.html

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² <http://bugzilla.redhat.com/>

Part I.

Basic System Configuration

This part covers basic system administration tasks such as keyboard configuration, date and time configuration, and managing users and groups.

Chapter 1.

Language and Keyboard Configuration

This chapter describes how to change the language of your desktop, configure the keyboard layout, and allow a user to switch between different keyboard layouts using the **Region and Language** configuration tool.

1.1. Changing the Language

To configure the language of your desktop, open the **System Settings** dialog window by selecting **Applications** → **System Tools** → **System Settings** from the **Activities** menu, click **Region and Language**, and select the **Language** tab. You will be presented with a list of available languages.

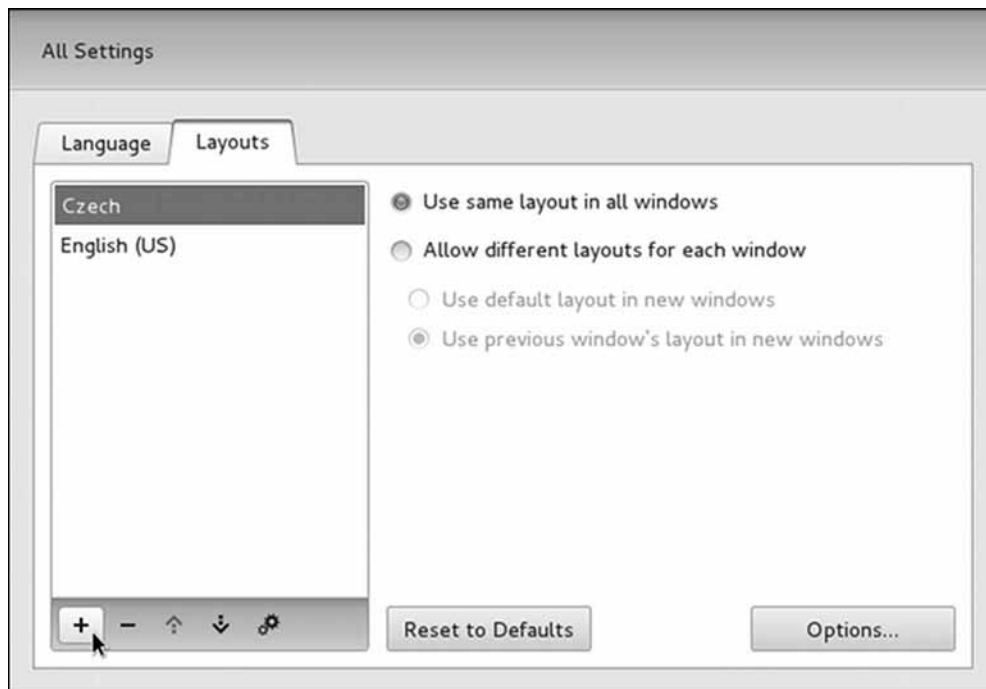


Figure 1.1. Changing the language

To choose a particular language, select it from the list and either close the window, or click the **All Settings** button in the upper-left corner of the window to return to the **System Settings** window. The changes will take effect the next time you log in to your system.

1.2. Changing the Keyboard Layout

Although the installation program allows a system administrator to configure a keyboard layout during the system installation, the default settings may not always suit your current needs. To add a new keyboard layout, open the **System Settings** window by selecting **Applications** → **System Tools** → **System Settings** from the **Activities** menu, click the **Region and Language** icon, and select the **Layouts** tab.

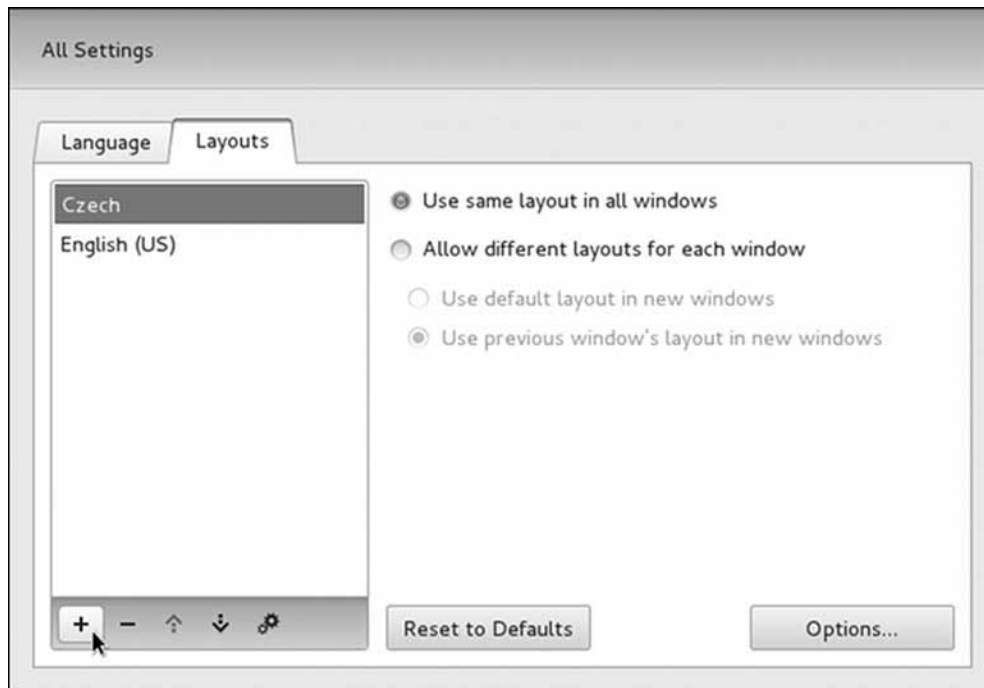


Figure 1.2. Changing the keyboard layout

The left part of the window provides a list of currently enabled layouts, while the right part allows you to choose whether to use the same keyboard layout for all windows, or if you prefer to use a different layout for each window.

To add a keyboard layout, click the + (that is, the plus sign) button below the list. A dialog box will appear, allowing you to select the desired layout. The input field in the bottom part of the dialog box allows you to reduce the number of displayed items by typing part of the layout name (such as “slov” for Slovak layouts) in it. Once you are done, click the **Add** button to confirm your choice.

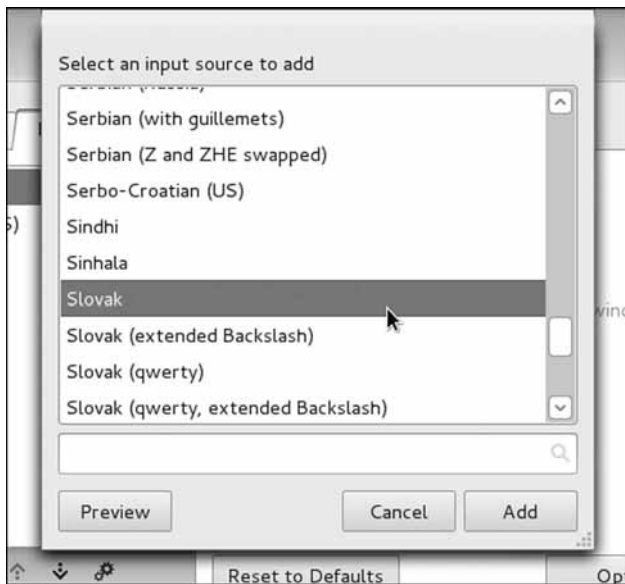


Figure 1.3. Adding a keyboard layout

To remove a keyboard layout, click the – (that is, the minus sign) button below the list.

When more than one layout is enabled, a keyboard indicator appears on the panel in order to allow you to switch between the layouts, and the first layout in the list is considered the default. To move a particular layout up or down in the list, select it from the list and click the ↑ (the upwards arrow) or ↓ (the downwards arrow) buttons respectively.



Figure 1.4. The keyboard layout indicator

The changes take effect immediately.

Chapter 2.

Date and Time Configuration

This chapter covers setting the system date and time in Fedora, both manually and using the Network Time Protocol (NTP), as well as setting the adequate time zone. Two methods are covered: setting the date and time using the **Date and Time** configuration tool, and doing so on the command line.

2.1. Date and Time Configuration Tool

The **Date and Time** configuration tool allows a user to change the system date and time, to configure the time zone used by the system, and to set up the Network Time Protocol daemon to synchronize the system clock with a time server.

To start the tool, select **Applications** → **System Tools** → **System Settings** from the **Activities** menu and click the **Date and Time** icon, or click the time in the panel and select **Date and Time Settings** from the drop-down menu.

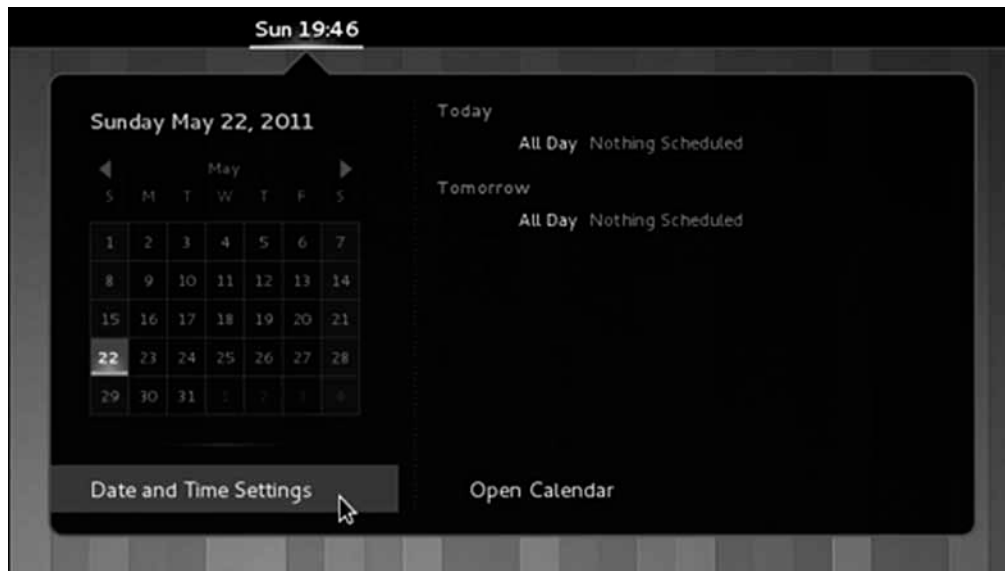


Figure 2.1. Running the Date and Time configuration tool

By default, the tool only allows you to review the current settings. This is because only `root` is allowed to set the system date and time. To unlock the configuration tool for changes, click the **Unlock** button in the bottom-left corner of the window, and provide the root password when prompted.



Figure 2.2. The Date and Time configuration tool

As you can see in *Figure 2.2. The Date and Time configuration tool* above, the main window of the **Date and Time** configuration tool is divided into two parts: while the left side of the window is dedicated to the time zone settings, the right part allows you to configure the date and time itself.

To change the time zone, click on the map, or select the region and city from the **Region** and **City** drop-down lists.

To change the current time of your system, either configure the system to synchronize it over the network by clicking the **Network Time** switch, or set it manually by clicking the up and down arrows above and below the numbers. Use the **24-Hour Time** switch to enable or disable the 24-hour time format.

To change the current date of your system, select a month from the drop-down list below the time, and use the up and down arrows to choose the day and year.

The changes take effect immediately.

2.2. Command Line Configuration

In case your system does not have the **Date/Time Properties** tool installed, or the *X Window Server* is not running, you can change the system date and time on the command line. Note that in order to perform actions described in this section, you have to be logged in as `root`. To do so, type the following at a shell prompt:

```
su -
```

2.2.1. Configuring the Date and Time

The `date` command allows the superuser to set the system date and time manually:

1. To change the current date, type the command in the following form at a shell prompt, replacing the `YYYY` with a four-digit year, `MM` with a two-digit month, and `DD` with a two-digit day of the month:

```
date +%D -s YYYY-MM-DD
```

For example, to set the date to 2 June 2010, type:

```
~]# date +%D -s 2010-06-02
```

2. To change the current date, use the following command, where `HH` stands for an hour, `MM` is a minute, and `SS` is a second, all typed in a two-digit form:

```
date +%T -s HH:MM:SS
```

If your system clock is set to use UTC (Coordinated Universal Time), add the following option:

```
date +%T -s HH:MM:SS -u
```

For instance, to set the system clock to 11:26 PM using the UTC, type:

```
~]# date +%T -s 23:26:00 -u
```

You can check your current settings by typing `date` without any additional argument, for example:

```
~]# date  
Wed Jun  2 11:58:48 CEST 2010
```

2.2.2. Configuring the Network Time Protocol

As opposed to the manual setup described above, you can also synchronize the system clock with a remote server over the Network Time Protocol (NTP). For the one-time synchronization only, use the **ntpdate** command:

1. Check whether the selected NTP server is accessible by using the `ntpdate` command in the following form:

```
ntpdate -q server_address
```

For example, to connect to `0.fedora.pool.ntp.org`, type:

```
~]# ntpdate -q 0.fedora.pool.ntp.org
server 204.15.208.61, stratum 2, offset -39.275438, delay 0.16083
server 69.65.40.29, stratum 2, offset -39.269122, delay 0.17191
server 148.167.132.201, stratum 2, offset -39.270239, delay 0.20482
23 May 01:05:54 ntpdate[10619]: step time server 204.15.208.61 offset -
39.275438 sec
```

2. When you find a satisfactory server, run the **ntpdate** command followed with one or more server addresses:

```
ntpdate server_address...
```

For instance:

```
~]# ntpdate 0.fedora.pool.ntp.org 1.fedora.pool.ntp.org
23 May 01:07:13 ntpdate[10669]: step time server 204.15.208.61 offset -
39.275436 sec
```

Unless an error message is displayed, the system time should now be set. You can check the current by setting typing `date` without any additional arguments as shown in Section 2.2.1, *Configuring the Date and Time* (page 41).

3. In most cases, these steps are sufficient. Only if you really need one or more system services to always use the correct time, enable running the **ntpdate** at boot time:

```
systemctl enable ntpdate.service
```

For more information about system services and their setup, refer to Chapter 7, *Services and Daemons* (page 120).



Note

If the synchronization with the time server at boot time keeps failing, that is, you find a relevant error message in the `/var/log/boot.log` system log, try to add the following line to `/etc/sysconfig/network`:

```
NETWORKWAIT=1
```

However, the more convenient way is to set the `ntpd` daemon to synchronize the time at boot time automatically:

1. Open the NTP configuration file `/etc/ntp.conf` in a text editor, creating a new one if it does not already exist.
2. Add or edit the list of public NTP servers. If you are using Fedora 15, the file should already contain the following lines, but feel free to change or expand these according to your needs:

```
server 0.fedora.pool.ntp.org iburst
server 1.fedora.pool.ntp.org iburst
server 2.fedora.pool.ntp.org iburst
```



Speeding up initial synchronization

To speed the initial synchronization up, it is recommended that the `iburst` directive is added at the end of each server line.

3. In the same file, set the proper permissions, giving the unrestricted access to localhost only:

```
restrict default kod nomodify notrap nopeer noquery
restrict -6 default kod nomodify notrap nopeer noquery
restrict 127.0.0.1
restrict -6 ::1
```

4. Save the changes, exit the editor, and restart the NTP daemon:

```
systemctl restart ntpd.service
```

5. Additionally, make sure that `ntpd` daemon is started at boot time:

```
systemctl enable ntpd.service
```

2.3. Additional Resources

For more information about the date and time configuration, refer to the following resources.

2.3.1. Additional Resources

- `date(1)` – The manual page for the **date** utility.
- `ntpd(8)` – The manual page for the **ntpd** utility.
- `ntpd(8)` – The manual page for the `ntpd` service.

Chapter 3.

Managing Users and Groups

The control of *users* and *groups* is a core element of Fedora system administration. Users can be either people (meaning accounts tied to physical users) or accounts which exist for specific applications to use. Groups are logical expressions of organization, tying users together for a common purpose. Users within a group can read, write, or execute files owned by that group.

Each user is associated with a unique numerical identification number called a *userid* (*UID*); likewise, each group is associated with a *groupid* (*GID*).

A user who creates a file is also the owner and group owner of that file. The file is assigned separate read, write, and execute permissions for the owner, the group, and everyone else. The file owner can be changed only by the `root` user, and access permissions can be changed by both the `root` user and file owner.

Fedora also supports *access control lists* (*ACLs*) for files and directories which allow permissions for specific users outside of the owner to be set. For more information about *ACLs*, refer to the *Access Control Lists* chapter of the *Fedora Storage Administration Guide*.

3.1. User Accounts Tool

The **User Accounts** configuration tool allows you to view, modify, add, and delete local users. To run the utility, either select **Applications** → **System Tools** → **System Settings** from the **Activities** menu and click the **User Accounts** icon, or click your name on the panel and choose **My Account** from the drop-down menu.

The main window of the **User Accounts** configuration tool is divided into two parts: The left side of the window contains a list of available user accounts. The right side provides details on a particular account.

By default, the tool only allows you to change certain settings regarding your account. This is because only `root` is allowed to configure users and groups. To unlock the configuration tool for all kinds of changes, click the **Unlock** button in the bottom-left corner of the window, and provide the root password when prompted.

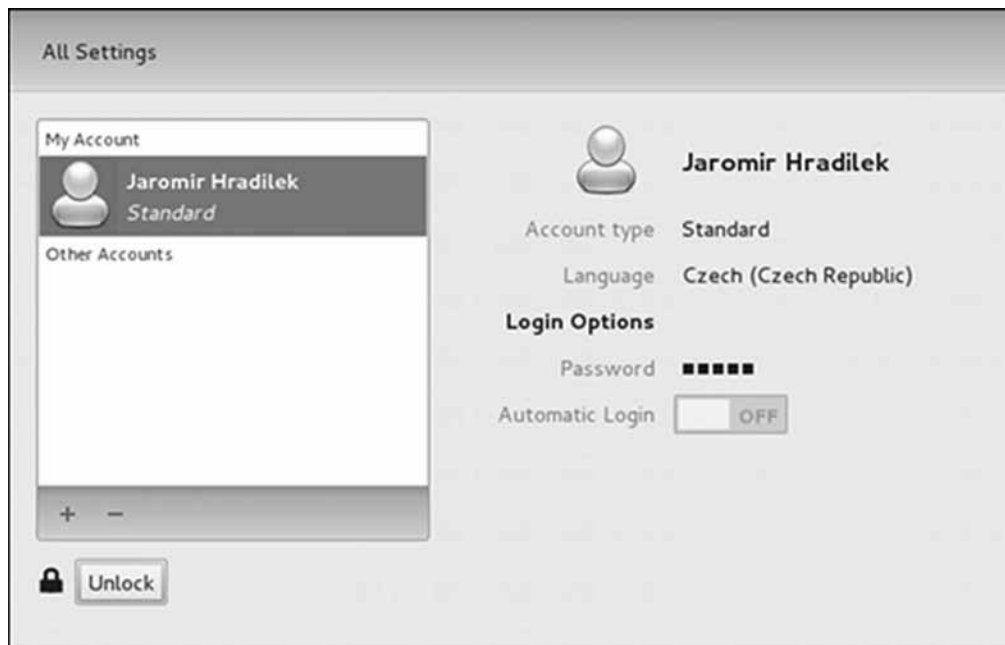


Figure 3.1. The User Accounts configuration tool

3.1.1. Configuring an Account

To change the image associated with an account, click the icon next to the account name and either select a picture from the drop-down list, or click **Browse for more pictures...** to use an image from your local drive.

To change the name associated with an account, click the name next to the icon to edit it.

To change the account type, use the **Account type** drop-down list. However, this change requires the configuration tool to be unlocked even if it is your account.

To change the default language for an account, click the button next to the **Language** label, and select the desired language from the list.

To change the password, click the button next to the **Password** label. A dialog box will appear, allowing you to set the new password. Note that the current password must be provided in order to confirm the change. Once done, click the **Change** button to save the change.



Figure 3.2. Changing the password



Password security advice

It is advisable to use a much longer password, as this makes it more difficult for an intruder to guess it and access the account without permission. It is also recommended that the password not be based on a dictionary term: use a combination of letters, numbers and special characters.

Finally, to set up automatic login for a particular account, enable the **Automatic Login** switch. The configuration tool must be unlocked to make this change.

3.1.2. Adding a New User

To add a new user, make sure the configuration tool is unlocked, and click the + button (that is, the plus sign) below the account list. A dialog box as shown in *Figure 3.3. Creating a new account* below will appear.

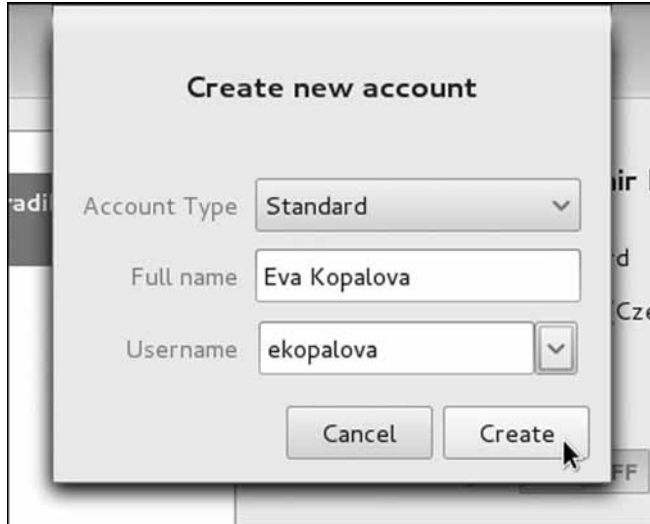


Figure 3.3. Creating a new account

Take the followign steps to create an account:

1. Select an account type from the **Account type** drop-down list. Available account types are *Administrator* and *Standard* (the default option).
2. Fill in the **Full name** input field to set the name associated with the account. This name will be used by the login manager, and will be displayed on the panel.
3. Either select a suggested username from the **Username** drop-down list, or fill in the corresponding input field.
4. Click the **Create** button to confirm the settings.

Fedora uses a *user private group* (UPG) scheme. The UPG scheme does not add or change anything in the standard UNIX way of handling groups; it offers a new convention. Whenever you create a new user, a unique group with the same name as the user is created.

When a new account is created, default configuration files are copied from the `/etc/skel/` directory into the new home directory.

3.1.3. Removing a User

To remove a user, make sure the configuration tool is unlocked, select the desired account from the account list, and click the – button (that is, the minus sign) below the account list. A dialog box as shown in *Figure 3.4. Removing an account* below will appear.



Figure 3.4. Removing an account

To delete files and directories that belong to the user (that is, the home directory, mail spool, and temporary files), click the **Delete Files** button. To keep these files intact and only delete the user account, click **Keep Files**. To abort the deletion, click **Cancel**.

3.2. User Manager Tool

The **User Manager** allows you to view, modify, add, and delete local users and groups.

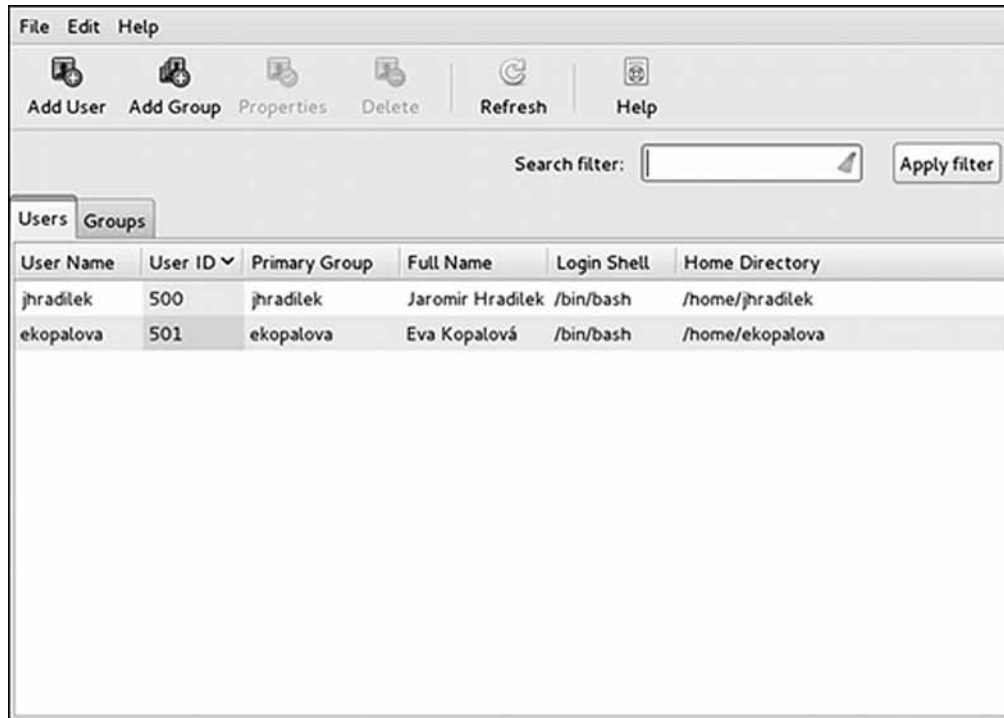


Figure 3.5. The GNOME User Manager

You can start the **User Manager** by clicking **Applications** → **Other** → **Users and Groups** from the **Activities** menu. Alternatively, you can enter `system-config-users` at the shell prompt to open the **User Manager**. Viewing and modifying user and group information requires superuser privileges. If you are not the superuser when you open the **User Manager**, it will prompt you for the superuser password.

To view a list of local users on the system, click the **Users** tab. To view a list of local groups on the system, click the **Groups** tab.

To find a specific user or group, type the first few letters of the name in the **Search filter** field. Press **Enter** or click the **Apply filter** button. The filtered list is displayed.

To sort the users, click on the column **User Name** and for groups click on **Group Name**. The users or groups are sorted according to the value of that column.

Fedora reserves user IDs below 500 for system users. By default, the **User Manager** does not display system users. To view all users, including the system users, go to **Edit** → **Preferences** and uncheck **Hide system users and groups** from the dialog box.

3.2.1. Adding a New User

To add a new user, click the **Add User** button. A window as shown in *Figure 3.6. Creating a new user* below appears. Type the username and full name for the new user in the appropriate fields. Type the user's password in the **Password** and **Confirm Password** fields. The password must be at least six characters.



Password security advice

It is advisable to use a much longer password, as this makes it more difficult for an intruder to guess it and access the account without permission. It is also recommended that the password not be based on a dictionary term: use a combination of letters, numbers and special characters.

Select a login shell from the pulldown list. If you are not sure which shell to select, accept the default value of `/bin/bash`. The default home directory is `/home/username/`. You can change the home directory that is created for the user, or you can choose not to create the home directory by unselecting **Create home directory**.

If you select to create the home directory, default configuration files are copied from the `/etc/skel/` directory into the new home directory.

Fedora uses a *user private group* (UPG) scheme. The UPG scheme does not add or change anything in the standard UNIX way of handling groups; it offers a new convention. Whenever you create a new user, by default, a unique group with the same name as the user is created. If you do not want to create this group, unselect **Create a private group for the user**.

To specify a user ID for the user, select **Specify user ID manually**. If the option is not selected, the next available user ID above 500 is assigned to the new user. Because Fedora reserves user IDs below 500 for system users, it is not advisable to manually assign user IDs 1-499.

Click **OK** to create the user.

User Name:

Full Name:

Password:

Confirm Password:

Login Shell:

Create home directory

Home Directory:

Create a private group for the user

Specify user ID manually:

Specify group ID manually:

Figure 3.6. Creating a new user

To configure more advanced user properties, such as password expiration, modify the user's properties after adding the user.

Modifying User Properties

To view the properties of an existing user, click on the **Users** tab, select the user from the user list, and click **Properties** from the menu (or choose **File** → **Properties** from the pulldown menu). A window similar to *Figure 3.7. User Properties* below appears.



The screenshot shows a dialog box titled "User Properties" with four tabs: "User Data", "Account Info", "Password Info", and "Groups". The "User Data" tab is selected and active. It contains the following fields:

- User Name: ekopalova
- Full Name: Eva Kopalová
- Password: *****
- Confirm Password: *****
- Home Directory: /home/ekopalova
- Login Shell: /bin/bash (with a dropdown arrow)

At the bottom of the dialog box are two buttons: "Cancel" and "OK".

Figure 3.7. User Properties

The **User Properties** window is divided into multiple tabbed pages:

- **User Data** – Shows the basic user information configured when you added the user. Use this tab to change the user's full name, password, home directory, or login shell.
- **Account Info** – Select **Enable account expiration** if you want the account to expire on a certain date. Enter the date in the provided fields. Select **Local password is locked** to lock the user account and prevent the user from logging into the system.
- **Password Info** – Displays the date that the user's password last changed. To force the user to change passwords after a certain number of days, select **Enable password expiration** and enter a desired value in the **Days before change required:** field. The number of days before the user's password expires, the number of days before the user is warned to change passwords, and days before the account becomes inactive can also be changed.
- **Groups** – Allows you to view and configure the Primary Group of the user, as well as other groups that you want the user to be a member of.

3.2.2. Adding a New Group

To add a new user group, select **Add Group** from the toolbar. A window similar to *Figure 3.8. New Group* below appears. Type the name of the new group. To specify a group ID for the new group, select **Specify group ID manually** and select the GID. Note that Fedora also reserves group IDs lower than 500 for system groups.

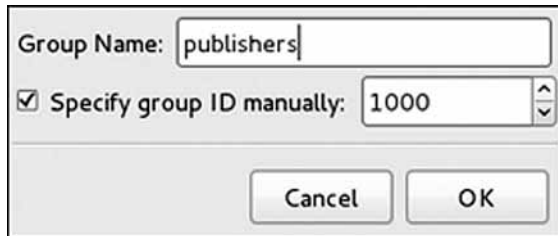


Figure 3.8. New Group

Click **OK** to create the group. The new group appears in the group list.

3.2.3. Modifying Group Properties

To view the properties of an existing group, select the group from the group list and click **Properties** from the menu (or choose **File** → **Properties** from the pulldown menu). A window similar to *Figure 3.9. Group Properties* below appears.

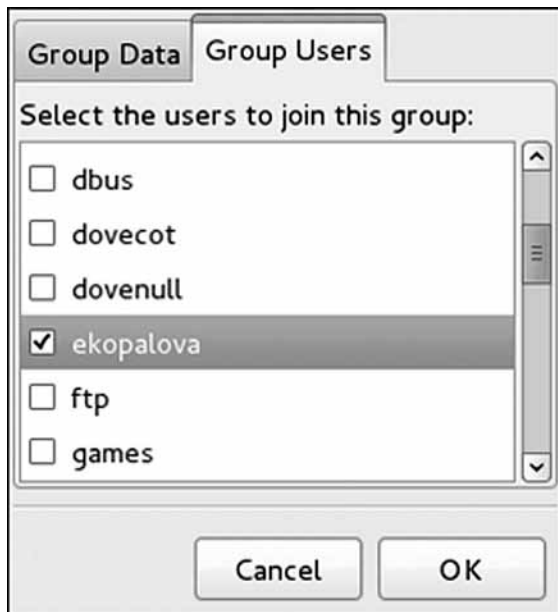


Figure 3.9. Group Properties

The **Group Users** tab displays which users are members of the group. Use this tab to add or remove users from the group. Click **OK** to save your changes.

3.3. User and Group Management Tools

Managing users and groups can be tiresome; this is why Fedora provides tools and conventions to make this task easier to manage.

The easiest way to manage users and groups is through the graphical application, **User Manager** (`system-config-users`). For more information on **User Manager**, refer to Section 3.2, *User Manager Tool* (page 49).

The following command line tools can also be used to manage users and groups:

- `useradd`, `usermod`, and `userdel` – Industry-standard methods of adding, deleting and modifying user accounts
- `groupadd`, `groupmod`, and `groupdel` – Industry-standard methods of adding, deleting, and modifying user groups
- `gpasswd` – Industry-standard method of administering the `/etc/group` file
- `pwck`, `grpck` – Tools used for the verification of the password, group, and associated shadow files
- `pwconv`, `pwunconv` – Tools used for the conversion of passwords to shadow passwords and back to standard passwords

3.3.1. Command Line Configuration

If you prefer command line tools or do not have the X Window System installed, use following to configure users and groups.

Adding a User

To add a user to the system:

1. Issue the `useradd` command to create a locked user account:

```
useradd username
```
2. Unlock the account by issuing the `passwd` command to assign a password and set password aging guidelines:

```
passwd username
```

Command line options for `useradd` are detailed in *Table 3.1. useradd Command Line Options* below.

Option	Description
<code>-c 'comment'</code>	<code>comment</code> can be replaced with any string. This option is generally used to specify the full name of a user.
<code>-d home_directory</code>	Home directory to be used instead of default <code>/home/username/</code> .
<code>-e date</code>	Date for the account to be disabled in the format YYYY-MM-DD.
<code>-f days</code>	Number of days after the password expires until the account is disabled. If 0 is specified, the account is disabled immediately after the password expires. If -1 is specified, the account is not be disabled after the password expires.
<code>-g group_name</code>	Group name or group number for the user's default group. The group must exist prior to being specified here.
<code>-G group_list</code>	List of additional (other than default) group names or group numbers, separated by commas, of which the user is a member. The groups must exist prior to being specified here.
<code>-m</code>	Create the home directory if it does not exist.
<code>-M</code>	Do not create the home directory.
<code>-N</code>	Do not create a user private group for the user.
<code>-p password</code>	The password encrypted with <code>crypt</code> .
<code>-r</code>	Create a system account with a UID less than 500 and without a home directory.
<code>-s</code>	User's login shell, which defaults to <code>/bin/bash</code> .
<code>-u uid</code>	User ID for the user, which must be unique and greater than 499.

Table 3.1. `useradd` Command Line Options

Adding a Group

To add a group to the system, use the command `groupadd`:

```
groupadd group_name
```

Command line options for `groupadd` are detailed in Table 3.2. *groupadd Command Line Options* below.

Option	Description
<code>-f, --force</code>	When used with <code>-g gid</code> and <code>gid</code> already exists, <code>groupadd</code> will choose another unique <code>gid</code> for the group.
<code>-g gid</code>	Group ID for the group, which must be unique and greater than 499.
<code>-K, --key key=value</code>	Override <code>/etc/login.defs</code> defaults.

Option	Description
<code>-o, --non-unique</code>	Allow to create groups with duplicate.
<code>-p,</code> <code>--password <i>password</i></code>	Use this encrypted password for the new group.
<code>-r</code>	Create a system group with a GID less than 500.

Table 3.2. groupadd Command Line Options

Password Aging

For security reasons, it is advisable to require users to change their passwords periodically. This can be done when adding or editing a user on the **Password Info** tab of the **User Manager**.

To configure password expiration for a user from a shell prompt, use the `chage` command with an option from *Table 3.3. chage Command Line Options* below, followed by the username.



Shadow passwords must be enabled to use chage

Shadow passwords must be enabled to use the `chage` command. For more information, see Section 3.7, *Shadow Passwords* (page 66).

Option	Description
<code>-d <i>days</i></code>	Specifies the number of days since January 1, 1970 the password was changed.
<code>-E <i>date</i></code>	Specifies the date on which the account is locked, in the format YYYY-MM-DD. Instead of the date, the number of days since January 1, 1970 can also be used.
<code>-I <i>days</i></code>	Specifies the number of inactive days after the password expiration before locking the account. If the value is 0, the account is not locked after the password expires.
<code>-l</code>	Lists current account aging settings.
<code>-m <i>days</i></code>	Specify the minimum number of days after which the user must change passwords. If the value is 0, the password does not expire.
<code>-M <i>days</i></code>	Specify the maximum number of days for which the password is valid. When the number of days specified by this option plus the number of days specified with the <code>-d</code> option is less than the current day, the user must change passwords before using the account.
<code>-W <i>days</i></code>	Specifies the number of days before the password expiration date to warn the user.

Table 3.3. chage Command Line Options



chage interactivity

If the `chage` command is followed directly by a username (with no options), it displays the current password aging values and allows them to be changed interactively.

You can configure a password to expire the first time a user logs in. This forces users to change passwords immediately.

1. *Set up an initial password* – There are two common approaches to this step: the administrator can assign a default password, or he can use a null password.

To assign a default password, type the following at a shell prompt:

```
passwd username
```

To assign a null password instead, use the following command:

```
passwd -d username
```



Avoid using null passwords whenever possible

Using a null password, while convenient, is a highly insecure practice, as any third party can log in first and access the system using the insecure username. Always make sure that the user is ready to log in before unlocking an account with a null password.

2. *Force immediate password expiration* – Type the following command:

```
chage -d 0 username
```

This command sets the value for the date the password was last changed to the epoch (January 1, 1970). This value forces immediate password expiration no matter what password aging policy, if any, is in place.

Upon the initial log in, the user is now prompted for a new password.

3.3.2. Explaining the Process

The following steps illustrate what happens if the command `useradd juan` is issued on a system that has shadow passwords enabled:

1. A new line for `juan` is created in `/etc/passwd`:

```
juan:x:501:501::/home/juan:/bin/bash
```

The line has the following characteristics:

- It begins with the username `juan`.
- There is an `x` for the password field indicating that the system is using shadow passwords.

- A UID greater than 499 is created. Under Fedora, UIDs and GIDs below 500 are reserved for system use. These should not be assigned to users.
 - A GID greater than 499 is created.
 - The optional GECOS information is left blank.
 - The home directory for `juan` is set to `/home/juan/`.
 - The default shell is set to `/bin/bash`.
2. A new line for `juan` is created in `/etc/shadow`:

```
juan:!!:14798:0:99999:7:::
```

The line has the following characteristics:

- It begins with the username `juan`.
- Two exclamation marks (!!) appear in the password field of the `/etc/shadow` file, which locks the account.



Note

If an encrypted password is passed using the `-p` flag, it is placed in the `/etc/shadow` file on the new line for the user.

- The password is set to never expire.
3. A new line for a group named `juan` is created in `/etc/group`:

```
juan:x:501:
```

A group with the same name as a user is called a *user private group*. For more information on user private groups, refer to Section 3.2.1, *Adding a New User* (page 50).

The line created in `/etc/group` has the following characteristics:

- It begins with the group name `juan`.
 - An `x` appears in the password field indicating that the system is using shadow group passwords.
 - The GID matches the one listed for user `juan` in `/etc/passwd`.
4. A new line for a group named `juan` is created in `/etc/gshadow`:

```
juan:!!:
```

The line has the following characteristics:

- It begins with the group name `juan`.
- An exclamation mark (!) appears in the password field of the `/etc/gshadow` file, which locks the group.
- All other fields are blank.

5. A directory for user `juan` is created in the `/home/` directory:

```
~]# ls -l /home
total 4
drwx-----. 4 juan juan 4096 Mar  3 18:23 juan
```

This directory is owned by user `juan` and group `juan`. It has *read, write, and execute* privileges *only* for the user `juan`. All other permissions are denied.

6. The files within the `/etc/skel/` directory (which contain default user settings) are copied into the new `/home/juan/` directory:

```
~]# ls -la /home/juan
total 28
drwx-----. 4 juan juan 4096 Mar  3 18:23 .
drwxr-xr-x. 5 root root 4096 Mar  3 18:23 ..
-rw-r--r--. 1 juan juan  18 Jun 22  2010 .bash_logout
-rw-r--r--. 1 juan juan  176 Jun 22  2010 .bash_profile
-rw-r--r--. 1 juan juan  124 Jun 22  2010 .bashrc
drwxr-xr-x. 2 juan juan 4096 Jul 14  2010 .gnome2
drwxr-xr-x. 4 juan juan 4096 Nov 23 15:09 .mozilla
```

At this point, a locked account called `juan` exists on the system. To activate it, the administrator must next assign a password to the account using the `passwd` command and, optionally, set password aging guidelines.

3.4. Standard Users

Table 3.4. *Standard Users* below lists the standard users configured in the `/etc/passwd` file by an **Everything** installation. The group ID (GID) in this table is the *primary group* for the user. See Section 3.5, *Standard Groups* (page 63) for a listing of standard groups.

User	UID	GID	Home Directory	Shell	Packages
root	0	0	/root	/bin/bash	setup
bin	1	1	/bin	/sbin/nologin	setup
daemon	2	2	/sbin	/sbin/nologin	setup
sys	–	3	–	–	setup
adm	3	4	/var/adm	/bin/bash	setup
tty	–	5	–	–	setup
disk	–	6	–	–	setup
lp	4	7	/var/spool/lpd	/sbin/nologin	setup
mem	–	8	–	–	setup
kmem	–	9	–	–	setup
wheel	–	10	–	–	setup
cdrom	–	11	–	–	udev, MAKEDEV

User	UID	GID	Home Directory	Shell	Packages
sync	5	(0)	/sbin	/bin/sync	setup
shutdown	6	(0)	/sbin	/sbin/shutdown	setup
halt	7	(0)	/sbin	/sbin/halt	setup
mail	8	12	/var/spool/mail	/sbin/nologin	setup
news	9	13	/var/spool/news	/sbin/nologin	setup
uucp	10	14	/var/spool/uucp	/sbin/nologin	setup
operator	11	(0)	/root	/sbin/nologin	setup
games	12	(100)	/usr/games	/sbin/nologin	setup
gopher	13	30	/usr/lib/gopher-data	/sbin/nologin	setup
ftp	14	50	/var/ftp	/sbin/nologin	setup
man	–	15	–	–	setup
oprofile	16	16	/home/oprofile	/sbin/nologin	oprofile
pkiuser	17	17	/usr/share/pki	/sbin/nologin	pki-ca, rhpki-ca
dialout	–	18	–	–	udev, MAKEDEV
floppy	–	19	–	–	dev, MAKEDEV
games	–	20	–	–	setup
slocate	–	21	–	–	slocate
utmp	–	22	–	–	initscripts, libutempter
squid	23	23	/var/spool/squid	/dev/null	squid
pvm	24	24	/usr/share/pvm3	/bin/bash	pvm
named	25	25	/var/named	/bin/false	bind
postgres	26	26	/var/lib/postgresql	/bin/bash	postgresql-server
mysql	27	27	/var/lib/mysql	/bin/bash	mysql
nscd	28	28	/	/bin/false	nscd
rpcuser	29	29	/var/lib/nfs	/bin/false	nfs-utils
console	–	31	–	–	dev
rpc	32	32	/	/bin/false	portmap
amanda	33	(6)	/var/lib/amanda	/bin/false	amanda
tape	–	33	–	–	udev, MAKEDEV
netdump	34	34	/var/crash	/bin/bash	netdump-client, netdump-server
utempter	–	35	–	–	libutempter

User	UID	GID	Home Directory	Shell	Packages
vdsm	36	–	/	/bin/bash	kvm, vdsm
kvm	–	36	–	–	kvm, vdsm, libvirt
rpm	37	37	/var/lib/rpm	/bin/bash	rpm
ntp	38	38	/etc/ntp	/sbin/nologin	ntp
video	–	39	–	–	setup
dip	–	40	–	–	setup
mailman	41	41	/var/mailman	/bin/false	mailman
gdm	42	42	/var/gdm	/bin/bash	gdm
xfs	43	43	/etc/X11/fs	/bin/false	XFree86-xfs
pppusers	–	44	–	–	linuxconf
popusers	–	45	–	–	linuxconf
slipusers	–	46	–	–	linuxconf
mailnull	47	47	/var/spool/mqueue	/dev/null	sendmail
apache	48	48	/var/www	/bin/false	apache
wnn	49	49	/home/wnn	/bin/bash	FreeWnn
smmisp	51	51	/var/spool/mqueue	/dev/null	sendmail
puppet	52	52	/var/lib/puppet	/sbin/nologin	puppet
tomcat	53	53	/var/lib/tomcat	/sbin/nologin	tomcat
lock	–	54	–	–	lockdev
ldap	55	55	/var/lib/ldap	/bin/false	openldap-servers
frontpage	56	56	/var/www	/bin/false	mod_frontpage
nut	57	57	/var/lib/ups	/bin/false	nut
beagleindex	58	58	/var/cache/beagle	/bin/false	beagle
tss	59	59	–	/sbin/nologin	trousers
piranha	60	60	/etc/sysconfig/ha	/dev/null	piranha
prelude- manager	61	61	–	/sbin/nologin	prelude-manager
snortd	62	62	–	/sbin/nologin	snortd
audio	–	63	–	–	setup
condor	64	64	/var/lib/condor	/sbin/nologin	condord
nslcd	65	(55)	/	/sbin/nologin	nslcd
wine	–	66	–	–	wine
pegasus	66	65	/var/lib/Pegasus	/sbin/nologin	tog-pegasus

User	UID	GID	Home Directory	Shell	Packages
webalizer	67	67	/var/www/html/usage	/sbin/nologin	webalizer
haldaemon	68	68	/	/sbin/nologin	hal
vcsa	69	69	–	/sbin/nologin	dev, MAKEDEV
avahi	70	70	/var/run/avahi-daemon	/sbin/nologin	avahi
realtime	–	71	–	–	–
tcpdump	72	72	/	/sbin/nologin	tcpdump
privoxy	73	73	/etc/privoxy	/bin/bash	privoxy
sshd	74	74	/var/empty/sshd	/sbin/nologin	openssh-server
radvd	75	75	/	/bin/false	radvd
cyrus	76	(12)	/var/imap	/bin/bash	cyrus-imapd
saslauth	–	76	–	–	cyrus-imapd
arpwatch	77	77	/var/lib/arpwatch	/sbin/nologin	arpwatch
fax	78	78	/var/spool/fax	/sbin/nologin	mgetty
nocpulse	79	79	/etc/sysconfig/nocpulse	/bin/bash	nocpulse
desktop	80	80	–	/sbin/nologin	desktop-file-utils
dbus	81	81	/	/sbin/nologin	dbus
jonas	82	82	/var/lib/jonas	/sbin/nologin	jonas
clamav	83	83	/tmp	/sbin/nologin	clamav
screen	–	84	–	–	screen
quaggavt	–	85	–	–	quagga
sabayon	86	86	–	/sbin/nologin	sabayon
polkituser	87	87	/	/sbin/nologin	PolicyKit
wbpriv	–	88	–	–	samba-common
postfix	89	89	/var/spool/postfix	/bin/true	postfix
postdrop	–	90	–	–	postfix
majordomo	91	91	/usr/lib/majordomo	/bin/bash	majordomo
quagga	92	92	/	/sbin/nologin	quagga
exim	93	93	/var/spool/exim	/sbin/nologin	exim
distcache	94	94	/	/sbin/nologin	distcache
radiusd	95	95	/	/bin/false	freeradius
hsqldb	96	96	/var/lib/hsqldb	/sbin/nologin	hsqldb
dovecot	97	97	/usr/libexec/dovecot	/sbin/nologin	dovecot
ident	98	98	/	/sbin/nologin	ident

User	UID	GID	Home Directory	Shell	Packages
nobody	99	99	/	/sbin/nologin	setup
users	–	100	–	–	setup
qemu	107	107	/	/sbin/nologin	libvirt
ovirt	108	108	/	/sbin/nologin	libvirt
saned	111	111	/	/sbin/nologin	sane-backends
vhostmd	112	112	/usr/share/vhostmd	/sbin/nologin	vhostmd
usbmuxd	113	113	/	/sbin/nologin	usbmuxd
bacula	133	133	/var/spool/bacula	/sbin/nologin	bacula
ricci	140	140	/var/lib/ricci	/sbin/nologin	ricci
luci	141	141	/var/lib/luci	/sbin/nologin	luci
stap-server	155	155	/var/lib/stap-server	/sbin/nologin	systemtap
avahi-autoipd	170	170	/var/lib/avahi-autoipd	/sbin/nologin	avahi
pulse	171	171	/var/run/pulse	/sbin/nologin	pulseaudio
rtkit	172	172	/proc	/sbin/nologin	rtkit
nfsnobody	65534 ¹	65534	/var/lib/nfs	/sbin/nologin	nfs-utils

Table 3.4. Standard Users

3.5. Standard Groups

Table 3.5. *Standard Groups* below lists the standard groups configured by an **Everything** installation. Groups are stored in the `/etc/group` file.

Group	GID	Members
root	0	root
bin	1	root, bin, daemon
daemon	2	root, bin, daemon
sys	3	root, bin, adm
adm	4	root, adm, daemon
tty	5	–
disk	6	root
lp	7	daemon, lp
mem	8	–

¹ nfsnobody is 4294967294 on 64-bit platforms

Group	GID	Members
kmem	9	–
wheel	10	root
mail	12	mail, postfix
uucp	14	uucp
man	15	–
games	20	–
gopher	30	–
video	39	–
dip	40	–
ftp	50	–
lock	54	–
audio	63	–
nobody	99	–
users	100	–
dbus	81	–
usbmuxd	113	–
utmp	22	–
utempter	35	–
avahi-autoipd	170	–
floppy	19	–
vcsa	69	–
rpc	32	–
rtpkit	499	–
abrt	498	–
nscd	28	–
desktop_admin_r	497	–
desktop_user_r	496	–
cdrom	11	–
tape	33	–
dialout	18	–
haldaemon	68	haldaemon
apache	48	–
ldap	55	–

Group	GID	Members
saslauth	495	–
postdrop	90	–
postfix	89	–
avahi	70	–
ntp	38	–
rpcuser	29	–
nfsnobody	65534	–
pulse	494	–
pulse-access	493	–
fuse	492	–
gdm	42	–
stapdev	491	–
stapusr	490	–
sshd	74	–
tcpdump	72	–
slocate	21	–
dovecot	97	–
dovnull	489	–
mailnull	47	–
smmsp	51	–

Table 3.5. Standard Groups

3.6. User Private Groups

Fedora uses a *user private group (UPG)* scheme, which makes UNIX groups easier to manage. A UPG is created whenever a new user is added to the system. It has the same name as the user for which it was created and that user is the only member of the UPG.

UPGs make it safe to set default permissions for a newly created file or directory, allowing both the user and *the group of that user* to make modifications to the file or directory.

The setting which determines what permissions are applied to a newly created file or directory is called a *umask* and is configured in the `/etc/bashrc` file. Traditionally on UNIX systems, the `umask` is set to `022`, which allows only the user who created the file or directory to make modifications. Under this scheme, all other users, *including members of the creator's group*, are not allowed to make any modifications. However, under the UPG scheme, this "group protection" is not necessary since every user has their own private group.

3.6.1. Group Directories

System administrators usually like to create a group for each major project and assign people to the group when they need to access that project's files. With this traditional scheme, file managing is difficult; when someone creates a file, it is associated with the primary group to which they belong. When a single person works on multiple projects, it becomes difficult to associate the right files with the right group. However, with the UPG scheme, groups are automatically assigned to files created within a directory with the *setgid* bit set. The *setgid* bit makes managing group projects that share a common directory very simple because any files a user creates within the directory are owned by the group which owns the directory.

For example, a group of people need to work on files in the `/opt/myproject/` directory. Some people are trusted to modify the contents of this directory, but not everyone.

1. As root, create the `/opt/myproject/` directory by typing the following at a shell prompt:

```
mkdir /opt/myproject
```
2. Add the `myproject` group to the system:

```
groupadd myproject
```
3. Associate the contents of the `/opt/myproject/` directory with the `myproject` group:

```
chown root:myproject /opt/myproject
```
4. Allow users to create files within the directory, and set the *setgid* bit:

```
chmod 2775 /opt/myproject
```

At this point, all members of the `myproject` group can create and edit files in the `/opt/myproject/` directory without the administrator having to change file permissions every time users write new files. To verify that the permissions have been set correctly, run the following command:

```
~]# ls -l /opt
total 4
drwxrwsr-x. 3 root myproject 4096 Mar  3 18:31 myproject
```

3.7. Shadow Passwords

In multiuser environments it is very important to use *shadow passwords* (provided by the `shadow-utils` package). Doing so enhances the security of system authentication files. For this reason, the installation program enables shadow passwords by default.

The following list shows the advantages shadow passwords have over the traditional way of storing passwords on UNIX-based systems:

- Improves system security by moving encrypted password hashes from the world-readable `/etc/passwd` file to `/etc/shadow`, which is readable only by the `root` user.
- Stores information about password aging.
- Allows the `/etc/login.defs` file to enforce security policies.

Most utilities provided by the `shadow-utils` package work properly whether or not shadow passwords are enabled. However, since password aging information is stored exclusively in the `/etc/shadow` file, any commands which create or modify password aging information do not work.

The following is a list of commands which do not work without first enabling shadow passwords:

- `chage`
- `gpasswd`
- `usermod -e` or `-f` options
- `useradd -e` or `-f` options

3.8. Additional Resources

For more information about users and groups, and tools to manage them, refer to the following resources.

3.8.1. Installed Documentation

- Related man pages — There are a number of man pages for the various applications and configuration files involved with managing users and groups. Some of the more important man pages have been listed here:

User and Group Administrative Applications

- `man chage` — A command to modify password aging policies and account expiration.
- `man gpasswd` — A command to administer the `/etc/group` file.
- `man groupadd` — A command to add groups.
- `man grpck` — A command to verify the `/etc/group` file.
- `man groupdel` — A command to remove groups.
- `man groupmod` — A command to modify group membership.
- `man pwck` — A command to verify the `/etc/passwd` and `/etc/shadow` files.
- `man pwconv` — A tool to convert standard passwords to shadow passwords.
- `man pwunconv` — A tool to convert shadow passwords to standard passwords.

- `man useradd` – A command to add users.
- `man userdel` – A command to remove users.
- `man usermod` – A command to modify users.

Configuration Files

- `man 5 group` – The file containing group information for the system.
- `man 5 passwd` – The file containing user information for the system.
- `man 5 shadow` – The file containing passwords and account expiration information for the system.

Revision History

Revision History	Date	Author
Revision 1-2 Corrected a command synopsis in Section 10.2.3, <i>Starting and Stopping the Server</i> (page 190). Added missing information to Section 7.2.1, <i>Checking the Service Status</i> (page 122).	Tue Jul 12 2011	Jaromír Hradílek
Revision 1-1 Added missing <code>via</code> keywords to Section 6.4, <i>Configuring Static Routes</i> (page 115). Described the <code>HOTPLUG</code> configuration option in Section 6.2.1, <i>Ethernet Interfaces</i> (page 105). Corrected a typing error in Section 6.2.1, <i>Ethernet Interfaces</i> (page 105).	Mon Jun 20 2011	Jaromír Hradílek
Revision 1-0 Fedora 15 release of the <i>Deployment Guide</i> .	Tue May 24 2011	Jaromír Hradílek

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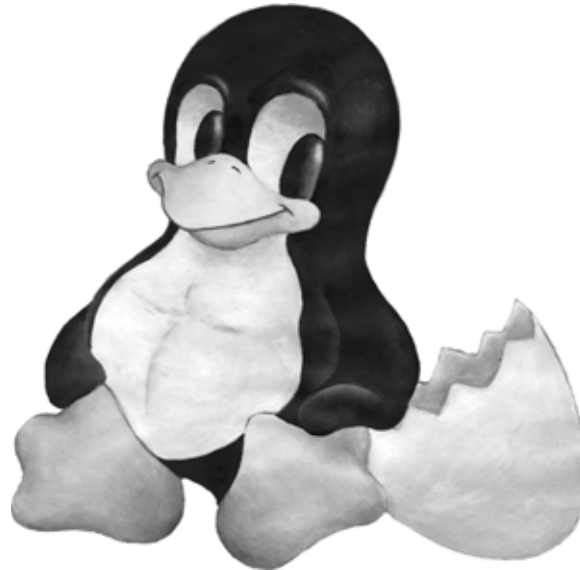
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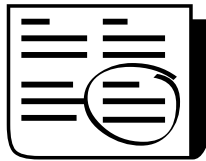
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