
Fedora 9

Release Notes



Fedora Documentation Project

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1. Welcome to Fedora

The Fedora Project is a Red Hat sponsored and community supported open source project. Its goal is the rapid progress of free and open source software and content. The Fedora Project makes use of public forums, open processes, rapid innovation, meritocracy, and transparency in pursuit of the best operating system and platform that free and open source software can provide.



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>



Older Release Notes on the Web

If you are migrating from a release of Fedora older than the immediately previous one, you should refer to older Release Notes for additional information. You can find older Release Notes at <http://docs.fedoraproject.org/release-notes/>.

You can help the Fedora Project community continue to improve Fedora if you file bug reports and enhancement requests. Refer to <http://fedoraproject.org/wiki/BugsAndFeatureRequests> for more information about bugs. Thank you for your participation.

To find out more general information about Fedora, refer to the following Web pages:

- Fedora Overview

<http://fedoraproject.org/wiki/Overview>

- Fedora FAQ

<http://fedoraproject.org/wiki/FAQ>

- Help and Discussions

<http://fedoraproject.org/wiki/Communicate>

- Participate in the Fedora Project

<http://fedoraproject.org/wiki/Join>



Document Links

Many links may not work properly from within the installation environment, due to resource constraints. The release notes are also available post-installation as part of the desktop Web browser's default home page. If you are connected to the internet, use these links to find other helpful information about Fedora and the community that creates and supports it.

2. Release Highlights



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

2.1. Fedora Tour

You can find a tour filled with pictures and videos of this exciting new release at <http://fedoraproject.org/wiki/Tours/Fedora9>.

2.1.1. Release Summary

For a less technical user friendly summary of the important changes in this release, refer to:

<http://fedoraproject.org/wiki/Releases/9/ReleaseSummary>

2.2. New in Fedora

This release includes significant new versions of many key components and technologies. The following sections provide a brief overview of major changes from the last release of Fedora.

2.2.1. Spins

Fedora includes several different *spins*¹, which are variations of Fedora built from a specific set of software packages. Each spin has a combination of software to meet the requirements of a specific kind of end user. In addition to a very small **boot.iso** image for network installation, users have the following spin choices:

- A regular Fedora image for desktops, workstations, and server users. This spin provides a good upgrade path and similar environment for users of previous releases of Fedora.
- One of several Live images that can be run from a disc or USB flash device, and can be installed to hard disk as desired. Refer to the "*Live*"² section for more information about the Live images.

More custom spins are available at <http://spins.fedoraproject.org>. These Live images can be used on USB media via the *livecd-iso-to-disk* utility available in the *livecd-tools* package.

¹ <http://fedoraproject.org/wiki/CustomSpins>

2.2.2. Jigdo

Fedora releases are also available via Jigdo. This distribution method can improve the speed of obtaining the installation ISO images. Instead of waiting for torrent downloads to complete, Jigdo seeks the fastest mirrors it can find via the Fedora Project Mirror Manager infrastructure, and downloads the bits it needs from these mirrors. To optimize seeking these bits, you can tell Jigdo to scan a DVD or CD you already have, and cut down on redundant downloads. This feature becomes particularly useful if you:

1. Download all the test releases and then get the final release, in which case you have 90% of the data already with each subsequent download.
2. Download both the DVD and the CD set, in which case the DVD holds 95% of the data needed for the CD sets.
3. Download any combination of the above.

2.2.3. Upgrading using PreUpgrade

PreUpgrade is an application users run on an existing Fedora 7 or 8 installation, that resolves and downloads packages required to upgrade Fedora. While PreUpgrade downloads the necessary packages, users are free to continue using their systems.

To use PreUpgrade to upgrade Fedora 8 to Fedora 9:

1. Back up all important data before upgrading.
2. Run the **yum update** command as root to make sure all packages are updated to their latest versions.
3. Run the **yum install preupgrade** command as root to install PreUpgrade.
4. Run the **preupgrade** command as root to start the PreUpgrade application.
5. Select **Fedora 9 (Sulphur)** on the **Choose desired release** screen, and click the **Apply** button.
6. When all of the packages have downloaded, reboot your system to start the Fedora 9 installer.

For further information, refer to the PreUpgrade Wiki:

<http://fedoraproject.org/wiki/Features/PreUpgrade>

2.2.4. Features

- This release features [GNOME 2.22](#)³. GNOME now includes a webcam photo and video creation utility called **Cheese**, improved network filesystem support, a new international clock applet, Google Calendar support and custom email labels in Evolution, a new Remote Desktop Viewer, improved accessibility features, and **PolicyKit** integration.
- KDE 4.0.3 is available in the KDE Live image as well as the regular DVD.
- Xfce 4.4.2 is available as part of this release.

- [NetworkManager](#)⁴ 0.7 provides improved mobile broadband support, including GSM and CDMA devices, and now supports multiple devices and ad-hoc networking for sharing connections. It is now enabled by default on installations from DVD, CD, the network, and Live images.
- The Fedora installer, **Anaconda**, now supports partition resizing for ext2/3, NTFS filesystems, creating and installing to encrypted file systems, improved Rescue Mode with FirstAidKit, independent locations for the second stage installer and the software packages. A redesigned, larger **netboot.iso** image now features a second stage installer partly for this reason.
- Live USB images now support persistence, so your data and setting changes will be preserved even after rebooting.
- [PackageKit](#)⁵, a new set of graphical and console tools, with a framework for cross-distribution software management, has replaced **Pirut** in this release of Fedora. The **PackageKit** graphical updater is available instead of **Pup**. Behind **PackageKit**, the performance of **yum** has been significantly improved.
- FreeIPA makes managing auditing, identity and policy processes easier by providing web-based and command line provisioning, and administration tools to ease system administration. FreeIPA combines the power of the Fedora Directory Server with FreeRADIUS, MIT Kerberos, NTP and DNS to provide an easy, out of the box solution.
- [Ext4](#)⁶, the next version of the mature and stable ext3 filesystem is available as a option in this release. Ext4 features better performance, higher storage capacity and several other new features.
- This release of Fedora uses [Upstart](#)⁷, an event-based replacement for the `/sbin/init` daemon.
- Firefox 3 (beta 5) brings a number of major improvements including a native look and feel, desktop integration, the new Places replacement for bookmarks, and a re-worked address bar.
- The completely free and open source Java environment OpenJDK 6 is installed by default. [IcedTea](#)⁸ 7, derived from OpenJDK 1.7, is no longer the default. [IcedTea](#)⁹ includes a browser plug-in based on GCJ, and is available for both x86 and x86_64 architectures. GCJ is still the default on PPC architecture.
- [OpenOffice.org](#)¹⁰ 2.4, with many new features, is available as part of Fedora 9.
- Fedora now includes [Perl 5.10.0](#)¹¹, which features a smaller memory footprint and other improvements.
- Fedora now includes [TeXLive](#)¹² to replace the older, unmaintained TeX distribution.
- Fedora 9 features a 2.6.25 based kernel.
- Kernel crashes can be more automatically reported to <http://www.kerneloops.org/> and diagnosed in a friendly way via the *kerneloops* package installed by default. Crash signatures are commonly referred to as oopses in Linux.
- Work on the start-up and shutdown in X has yielded noticeable improvements.

2.3. Road Map

The proposed plans for the next release of Fedora are available at <http://fedoraproject.org/wiki/RoadMap>.

3. Feedback

Thank you for taking the time to provide your comments, suggestions, and bug reports to the Fedora community. By doing so, you help improve the state of Fedora, Linux, and free software worldwide.

3.1. Providing Feedback on Fedora Software

To provide feedback on Fedora software or other system elements, please refer to <http://fedoraproject.org/wiki/BugsAndFeatureRequests>. A list of commonly reported bugs and known issues for this release is available from <http://fedoraproject.org/wiki/Bugs/F9Common>.

3.2. Providing Feedback on Release Notes



Feedback for Release Notes Only

This section concerns feedback on the release notes themselves.

If you feel these release notes could be improved in any way, you can provide your feedback directly to the beat writers. Here are several ways to do so, in order of preference:

1. If you have a Fedora account, edit content directly at <http://fedoraproject.org/wiki/Docs/Beats>.
2. Fill out a bug request using this template: <http://tinyurl.com/nej3u> - **This link is ONLY for feedback on the release notes themselves.** Refer to the admonition above for details.
3. Email relnotes@fedoraproject.org¹³.

4. Installation Notes



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>



Fedora Installation Guide

To learn how to install Fedora, refer to <http://docs.fedoraproject.org/install-guide/>.



Installation issues not covered in these release notes

If you encounter a problem or have a question during installation that is not covered in these release notes, refer to <http://fedoraproject.org/wiki/FAQ> and <http://fedoraproject.org/wiki/Bugs/Common>.

Anaconda is the name of the Fedora installer. This section outlines issues related to **Anaconda** and installing Fedora 9.



Downloading Large Files

If you intend to download the Fedora DVD ISO image, keep in mind that not all file downloading tools can accommodate files larger than 2 GiB in size. Tools without this limitation include **wget** 1.9.1-16 and above, **curl**, and **ncftpget**. **BitTorrent** is another method for downloading large files. For information about obtaining and using the torrent file, refer to <http://torrent.fedoraproject.org/>.

Anaconda tests the integrity of installation media by default. This function works with the CD, DVD, hard drive ISO, and NFS ISO installation methods. The Fedora Project recommends that you test all installation media before starting the installation process and before reporting any installation-related bugs. Many of the bugs reported are actually due to improperly-burned CDs or DVDs.

The **mediacheck** function is highly sensitive, and may report some usable discs as faulty. This result is often caused by disc writing software that does not include padding when creating discs from ISO files. To use this test, at boot time hit any key to enter the menu. Then press the **Tab** key, add the option **mediacheck** to the parameter list, and press **Enter**.

After you complete the **mediacheck** function successfully, reboot to return the system to its normal state. On many systems, this results in a faster installation process from the disc. You may skip the **mediacheck** option when rebooting.



BitTorrent Automatically Verifies File Integrity

If you use **BitTorrent**, any files you download are automatically validated. If your file completes downloading, you do not need to check it. Once you burn your CD or DVD, however, you should still use **mediacheck** to test the integrity of the media.

To perform memory testing before you install Fedora, press any key to enter the boot menu, then select **Memory Test**. This option runs the **Memtest86** stand alone memory testing software in place of **Anaconda**. **Memtest86** memory testing continues until you press the **Esc** key.



Memtest86 Availability

You must boot from Installation Disc 1, the DVD, or a rescue CD in order to use this feature.

Fedora 9 supports graphical FTP and HTTP installations. However, the installer image must either fit in RAM or appear on local storage, such as Installation Disc 1. Therefore, only systems with more than 192MiB of RAM, or which boot from Installation Disc 1, can use the graphical installer. Systems with 192MiB RAM or less fall back to using the text-based installer automatically. If you prefer to use the text-based installer, type **linux text** at the boot : prompt.

4.1. Changes in Anaconda

- Built-in support for resizing ext2, ext3, and ntfs partitions.
- Support for installation to encrypted block devices, including the root filesystem.
- Consolidated network booting ISO image, replacing old **boot.iso**, **diskboot.img**, and **rescuecd.iso**.

- Second stage installer location now independent of software package location.
- Native installation to x86 and x86_64 machines using EFI and booting via grub.
- Hardware probing and detection now based on HAL and udev.
- Support for persistence in Live images on USB flash media.

4.2. Installation Related Issues

4.2.1. IDE Device Names

Use of **/dev/hdX** on i386 and x86_64 for IDE drives has changed to **/dev/sdX**. See notes about the importance of labeling devices for upgrades from releases before Fedora 7, and partition limitations.

4.2.2. IDE RAID

Not all IDE RAID controllers are supported. If your RAID controller is not yet supported by *dmraid*, you may combine drives into RAID arrays by configuring Linux software RAID. For supported controllers, configure the RAID functions in the computer BIOS.

4.2.3. Multiple NICs and PXE Installation

Some servers with multiple network interfaces may not assign eth0 to the first network interface as BIOS knows it, which can cause the installer to try using a different network interface than was used by PXE. To change this behavior, use the following in **pxelinux.cfg/*** config files:

```
IPAPPEND 2
APPEND ksdevice=bootif
```

The configuration options above causes the installer to use the same network interface as BIOS and PXE use. You can also use the following option:

```
ksdevice=link
```

This option causes the installer to use the first network device it finds that is linked to a network switch.

4.3. Upgrade Related Issues

Refer to <http://fedoraproject.org/wiki/DistributionUpgrades> for detailed recommended procedures for upgrading Fedora.

4.3.1. Emacs

If you are upgrading to Fedora 9 and use *emacs*, you must upgrade to the latest version of emacs for your prior release to ensure a clean upgrade. Fedora 8 users must have *emacs-22.1-10.fc8* or later, while Fedora 7 users must have *emacs-22.1-7.fc7*.

To see what version of *emacs* is installed, run the **rpm -q emacs** command.

4.3.2. SCSI driver partition limits

Whereas older IDE drivers supported up to 63 partitions per device, SCSI devices are limited to 15 partitions per device. **Anaconda** uses the `libata` driver in the same fashion as the rest of Fedora, so it is unable to detect more than 15 partitions on an IDE disk during the installation or upgrade process.

If you are upgrading a system with more than 15 partitions, you may need to migrate the disk to Logical Volume Management (LVM). This restriction may cause conflicts with other installed systems if they do not support LVM. Most modern Linux distributions support LVM, and drivers are available for other operating systems as well.

4.3.3. Disk partitions must be labeled

A change in the way that the Linux kernel handles storage devices means that device names like `/dev/hdX` or `/dev/sdX` may differ from the values used in earlier releases. **Anaconda** solves this problem by relying on partition labels or UUIDs for finding devices. If these are not present, then **Anaconda** presents a warning indicating that partitions need to be labelled and that the upgrade can not proceed. Systems that use Logical Volume Management (LVM) and the device mapper usually do not require relabeling.

4.3.3.1. To check disk partition labels

To view partition labels, boot the existing Fedora installation, and enter the following at a terminal prompt:

```
/sbin/blkid
```

Confirm that each volume line in the list has a **LABEL=** value, as shown below:

```
/dev/hdd1: LABEL="/boot" UUID="ec6a9d6c-6f05-487e-a8bd-a2594b854406" SEC_TYPE="ext2"
TYPE="ext3"
```

4.3.3.2. Update the file system mount entries

If any filesystem labels were added or modified, then the device entries in **/etc/fstab** must be adjusted to match:

```
su -c "cp /etc/fstab /etc/fstab.orig"
su -c "gedit /etc/fstab"
```

An example of a mount by label entry is:

```
LABEL=f7-slash / ext3 defaults 1 1
```

4.3.3.3. Update the grub.conf kernel root entry

If the label for the `/` (root) filesystem was modified, the kernel boot parameter in the grub configuration file must also be modified:

```
su -c "gedit /boot/grub/grub.conf"
```

A matching example kernel grub line is:

```
kernel /vmlinuz-2.6.20-1.2948.fc6 ro root=LABEL=f7-slash rhgb quiet
```

4.3.3.4. Test changes made to labels

If partition labels were adjusted, or the `/etc/fstab` file modified, then boot the existing Fedora installation to confirm that all partitions still mount normally and login is successful. When complete, reboot with the installation media to start the installer and begin the upgrade.

4.3.4. Upgrades versus fresh installations

In general, fresh installations are recommended over upgrades, particularly for systems that include software from third-party repositories. Third-party packages remaining from a previous installation may not work as expected on an upgraded Fedora system. If you decide to perform an upgrade anyway, the following information may be helpful:

- Before you upgrade, back up the system completely. In particular, preserve `/etc`, `/home`, and possibly `/opt` and `/usr/local` if customized packages are installed there. You may wish to use a multi-boot approach with a "clone" of the old installation on alternate partition(s) as a fallback. In that case, create alternate boot media, such as a GRUB boot floppy.



System Configuration Backups

Backups of configurations in `/etc` are also useful in reconstructing system settings after a fresh installation.

- After you complete the upgrade, run the following command:

```
rpm -qa --last > RPMS_by_Install_Time.txt
```

Inspect the end of the output for packages that pre-date the upgrade. Remove or upgrade those packages from third-party repositories, or otherwise deal with them as necessary. Some previously installed packages may no longer be available in any configured repository. To list all these packages, use the following command:

```
su -c "yum list extras"
```

4.4. Kickstart HTTP Issue

When using a Kickstart configuration file via HTTP, kickstart file retrieval may fail with an error that indicates the file could not be retrieved. Click the **OK** button several times without making modifications to override this error successfully. As a workaround, use one of the other supported methods to retrieve Kickstart configurations.

5. Architecture Specific Notes



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section provides notes that are specific to the supported hardware architectures of Fedora.

5.1. RPM multiarch support on 64-bit platforms (x86_64, ppc64)

RPM supports parallel installation of multiple architectures of the same package. A default package listing such as **rpm -qa** might appear to include duplicate packages, since the architecture is not displayed. Instead, use the **repoquery** command, part of the *yum-utils* package, which displays architecture by default. To install *yum-utils*, run the following command:

```
su -c "yum install yum-utils"
```

To list all packages with their architecture using **rpm**, run the following command:

```
rpm -qa --queryformat "%{name}-%{version}-%{release}.%{arch}\n"
```

You can add this to **/etc/rpm/macros** (for a system wide setting) or **~/.rpmmacros** (for a per-user setting). It changes the default query to list the architecture:

```
%_query_all_fmt      %{name}-%{version}-%{release}.%{arch}
```

5.2. PPC Specifics for Fedora

This section covers specific information about Fedora and the PPC hardware platform.

5.2.1. Hardware Requirements for PPC

5.2.1.1. Processor and memory

- Minimum CPU: PowerPC G3 / POWER3.
- Fedora 9 supports only the "New World" generation of Apple Power Macintosh, shipped from circa 1999 onward. Although "Old World" machines should work, they require a special bootloader which is not included in the Fedora distribution.
- Fedora 9 supports IBM RS/6000, pSeries, iSeries, and Cell Broadband Engine machines.
- Fedora 9 also supports the Sony PlayStation 3 and Genesi Pegasos II and Efika.
- Fedora 9 includes new hardware support for the P.A. Semiconductor 'Electra' machines.
- Recommended for text-mode: 233 MHz G3 or better, 128MiB RAM.
- Recommended for graphical: 400 MHz G3 or better, 256MiB RAM.

5.2.1.2. Hard disk space

The complete packages can occupy over 9 GB of disk space. Final size is entirely determined by the installing spin and the packages selected during installation. Additional disk space is required during

installation to support the installation environment. This additional disk space corresponds to the size of `/Fedora/base/stage2.img` (on Installation Disc 1) plus the size of the files in `/var/lib/rpm` on the installed system.

In practical terms, additional space requirements may range from as little as 90 MiB for a minimal installation to as much as an additional 175 MiB for a larger installation.

Additional space is also required for any user data, and at least 5% free space should be maintained for proper system operation.

5.2.2. 4 KiB Pages on 64-bit machines

After a brief experiment with 64KiB pages in Fedora Core 6, the PowerPC64 kernel has now been switched back to 4KiB pages. The installer should reformat any swap partitions automatically during an upgrade.

5.2.3. The Apple keyboard

The **Option** key on Apple systems is equivalent to the **Alt** key on the PC. Where documentation and the installer refer to the **Alt** key, use the **Option** key. For some key combinations you may need to use the **Option** key in conjunction with the **Fn** key, such as **Option+Fn+F3** to switch to virtual terminal tty3.

5.2.4. PPC installation notes

Fedora Installation Disc 1 is bootable on supported hardware. In addition, a bootable CD image appears in the `images/` directory of this disc. These images behave differently according to your system hardware:

- On most machines, the bootloader automatically boots the appropriate 32-bit or 64-bit installer from the install disc.
- **64-bit IBM pSeries (POWER4/POWER5), current iSeries models**
After using OpenFirmware to boot the CD, the bootloader, **yaboot**, automatically boots the 64-bit installer.
- **IBM "Legacy" iSeries (POWER4)**
So-called "Legacy" iSeries models, which do not use OpenFirmware, require use of the boot image located in the `images/iSeries` directory of the installation tree.
- **32-bit CHRP (IBM RS/6000 and others)**
After using OpenFirmware to boot the CD, select the **linux32** boot image at the boot : prompt to start the 32-bit installer. Otherwise, the 64-bit installer starts and fails.
- **Genesi Pegasos II / Efika 5200B**
The Fedora kernel supports both Pegasos and Efika without the need to use the "Device Tree Supplement" from powerdeveloper.org. However, the lack of full support for ISO9660 in the firmware means that booting via yaboot from the CD is not possible. Boot the 'netboot' image instead, either from the CD or over the network. Because of the size of the image, you must set the firmware's **load-base** variable to load files at a high address such as 32MiB instead of the default 4MiB:

```
setenv load-base 0x2000000
```

At the OpenFirmware prompt, enter the following command to boot the Efika update, if necessary, or the netboot image from the CD:

```
boot cd: /images/netboot/ppc32.img
```

Or from the network:

```
boot eth ppc32.img
```

You must also manually configure OpenFirmware to make the installed Fedora system bootable. To do this, set the **boot-device** and **boot-file** environment variables appropriately, to load yaboot from the **/boot** partition. For example, a default installation might require the following:

```
setenv boot-device hd:0
setenv boot-file /yaboot/yaboot
setenv auto-boot? true
```

- **PA Semi Electra**

The Electra firmware does not yet support yaboot; to install on Electra, you can boot the **ppc64.img** netboot image. After the installation, you will need to manually configure the firmware to load the installed kernel and initrd from the **/boot** partition. Refer to the firmware documentation for further details.

- **Sony PlayStation 3**

For installation on PlayStation 3, first update to firmware 1.60 or later. The "Other OS" boot loader must be installed into the flash, following the instructions at <http://www.playstation.com/ps3-openplatform/manual.html>. A suitable boot loader image can be found on Sony's "ADDON" CD, available from <ftp://ftp.kernel.org/pub/linux/kernel/people/geoff/cell/>.

Once the boot loader is installed, the PlayStation 3 should be able to boot from the Fedora install media. Please note that network installation works best with NFS, since that takes less memory than FTP or HTTP methods. Using the **text** option also reduces the amount of memory taken by the installer.

For more information on Fedora and the PlayStation3 or Fedora on PowerPC in general, join the [Fedora-PPC mailing list](#)¹⁴ or the #fedora-ppc channel on [FreeNode](#)¹⁵.

- **Network booting**

Combined images containing the installer kernel and ramdisk are located in the **images/netboot/** directory of the installation tree. They are intended for network booting with TFTP, but can be used in many ways.

The **yaboot** loader supports TFTP booting for IBM pSeries and Apple Macintosh. The Fedora Project encourages the use of **yaboot** over the **netboot** images.

5.2.5. PPC Specific Packages

The *ppc64-utils* package has been split out into individual packages reflecting upstream packaging (*ps3pf-utils*, *powerpc-utils*, *powerpc-utils-papr*). Although the **mkzimage** command is no longer supplied, you can use the **wrapper** script from the *kernel-bootwrapper* package:

```
wrapper -i initrd- $\{\text{KERN\_VERSION}\}$ .img -o zImage- $\{\text{KERN\_VERSION}\}$ .img vmlinuz- $\{\text{KERN\_VERSION}\}$ 
```

5.3. x86 Specifics for Fedora

This section covers specific information about Fedora and the x86 hardware platform.

5.3.1. Hardware requirements for x86

In order to use specific features of Fedora 9 during or after installation, you may need to know details of other hardware components such as video and network cards.

5.3.1.1. Processor and memory

The following CPU specifications are stated in terms of Intel processors. Other processors, such as those from AMD, Cyrix, and VIA that are compatible with and equivalent to the following Intel processors, may also be used with Fedora.

Fedora 9 requires an Intel Pentium or better processor, and is optimized for Pentium 4 and later processors.

- Recommended for text-mode: 200 MHz Pentium-class or better.
- Recommended for graphical: 400 MHz Pentium II or better.
- Minimum RAM for text-mode: 128MiB.
- Minimum RAM for graphical: 192MiB.
- Recommended RAM for graphical: 256MiB.

5.3.1.2. Hard disk space

The complete packages can occupy over 9 GB of disk space. Final size is entirely determined by the installing spin and the packages selected during installation. Additional disk space is required during installation to support the installation environment. This additional disk space corresponds to the size of **/Fedora/base/stage2.img** (on Installation Disc 1) plus the size of the files in **/var/lib/rpm** on the installed system.

In practical terms, additional space requirements may range from as little as 90 MiB for a minimal installation to as much as an additional 175 MiB for a larger installation.

Additional space is also required for any user data, and at least 5% free space should be maintained for proper system operation.

5.4. x86_64 Specifics for Fedora

This section covers specific information about Fedora and the x86_64 hardware platform.

5.4.1. Hardware requirements for x86_64

In order to use specific features of Fedora 9 during or after installation, you may need to know details of other hardware components such as video and network cards.

5.4.1.1. Memory requirements for x86_64

- Minimum RAM for text-mode: 256MiB.
- Minimum RAM for graphical: 384MiB.
- Recommended RAM for graphical: 512MiB.

5.4.1.2. Hard disk space requirements for x86_64

The complete packages can occupy over 9 GB of disk space. Final size is entirely determined by the installing spin and the packages selected during installation. Additional disk space is required during installation to support the installation environment. This additional disk space corresponds to the size of `/Fedora/base/stage2.img` (on Installation Disc 1) plus the size of the files in `/var/lib/rpm` on the installed system.

In practical terms, additional space requirements may range from as little as 90 MiB for a minimal installation to as much as an additional 175 MiB for a larger installation.

Additional space is also required for any user data, and at least 5% free space should be maintained for proper system operation.

6. Fedora Live Images



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

The Fedora release includes several live ISO images in addition to the traditional installation images. These ISO images are bootable, and you can burn them to media and use them to try out Fedora. They also include a feature that allows you to install the Live image content to your hard drive for persistence and higher performance.

6.1. Available Images

For a complete list of current spins available, and instructions for using them, refer to:

<http://fedoraproject.org/wiki/CustomSpins>

6.2. Usage Information

To boot from the Live image, insert it into your computer and restart. To log in and use the desktop environment, enter the username `fedora`. Hit **Enter** at the password prompt, since there is no password on this account. The Live images do not automatically login so users can select a preferred language. After logging in, if you wish to install the contents of the live image to your hard drive, click on the **Install to Hard Drive** icon on the desktop.

6.3. Text Mode Installation

You can do a text mode installation of the Live images using the **liveinst** command in the console.

6.4. Direct Installation

You can add **liveinst** or **textinst** as a boot loader option to perform a direct installation without booting up the live CD/DVD.

6.4.1. USB Booting

Another way to use these Live images is to put them on a USB stick. To do this, install the *livecd-tools* package from the development repository. Then, run the **livecd-iso-to-disk** script:

```
/usr/bin/livecd-iso-to-disk /path/to/live.iso /dev/sdb1
```

Replace */dev/sdb1* with the partition where you want to put the image.

This is *not* a destructive process; any data you currently have on your USB stick is *preserved*.

6.4.2. Live USB Persistence

Support for persistent changes with a Live image exists for Fedora 9. The primary use case is booting from a Live image on a USB flash drive and storing changes to that same device. To do this, download the Live image and then run the following command:

```
livecd-iso-to-disk --overlay-size-mb 512 /path/to/live.iso /dev/sdb1
```

Replace */dev/sdb1* with the partition where you want to put the image.

Replace *512* with the desired size in megabytes of the persistent data, or overlay. The **livecd-iso-to-disk** shell script is stored in the **LiveOS** directory at the top level of the CD image. The USB media must have sufficient free space for the Live image, plus the overlay, plus any other data to be stored on the media.

6.4.3. Tool Changes

Work has continued to better integrate the Live images with the rest of the system, and improve the tools used for building them. The **livecd-creator** utility now provides an API for building alternative front-ends, as well as tools for other types of images.

6.4.4. Differences From a Regular Fedora Install

The following items are different from a normal Fedora install with the live images.

- Live images provide a subset of packages available in the regular DVD image. Both connect to the same repository that has all the packages.
- SSH is disabled by default. SSH is disabled because the default username in the Live images does not have any password. However, installation to hard disk prompts for creating a new username and password.
- Live image installations do not allow any package selection or upgrade capability since they copy the entire file system from media or USB disks, to the hard disk. After the installation is complete, and your system has been rebooted, you can add and remove packages as desired with the **Add/Remove Packages** tool, **yum**, or the other software management tools.
- Live images do not work on i586 architecture.

7. Package Notes



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

The following sections contain information regarding software packages that have undergone significant changes for Fedora 9. For easier access, they are generally organized using the same groups that are shown in the installation system.

7.1. Sound Card Utility

The **system-config-soundcard** utility has been removed, due to [numerous](#)¹⁶ legacy design and implementation issues. Modern technologies, including udev and the HAL, have made certain sound cards work out of the box. Any sound card not working out of the box should be reported as a [bug](#)¹⁷. Preferences can still be fine-tuned within the desktop environment, using, among others, the PulseAudio tools.

7.2. Perl

Fedora 9 now includes Perl 5.10.0, the first "major" release update in perl5 in some time. The Perl interpreter itself is faster with a smaller memory footprint, and has several UTF-8 and threading improvements. The Perl installation is now relocatable, a blessing for systems administrators and operating system packagers. Perl 5.10.0 also adds a new smart match operator, a switch statement, named captures, state variables, and better error messages.

For more information, refer to:

<http://perldoc.perl.org/perldelta.html>

7.3. Yum Changes

The **installonlyn** plugin functionality has been folded into the core **yum** package. The **installonlypkgs** and **installonly_limit** options are used by default to limit the system to retain only two kernel packages. You can adjust the package set or the number of packages, or disable the option entirely to match your preferences. More details are available in the man page for **yum.conf**.

The **yum** command now retries when it detects a lock. This function is useful if a daemon is checking for updates, or if you are running **yum** and one of its graphical frontends simultaneously.

The **yum** command now understands a cost parameter in its configuration file, which is the relative cost of accessing a software repository. It is useful for weighing one software repository's packages as greater or less than any other. The cost parameter defaults to 1000, with lower costs given priority.

In Fedora 9 Rawhide, the **/etc/yum.repos.d/fedora-development.repo** file has been changed to **/etc/yum.repos.d/fedora-rawhide.repo**. References to **development** in

¹⁶ <https://www.redhat.com/archives/fedora-devel-list/2008-March/msg02148.html>

¹⁷ https://bugzilla.redhat.com/enter_bug.cgi?product=Fedora

fedora-rawhide.repo have been changed to **rawhide**. Due to the way that RPM deals with configuration files, the existing **/etc/yum.repos.d/fedora-development.repo** file is saved as **/etc/yum.repos.d/fedora-development.repo.rpmsave** if it was previous modified. Users of the development repository may need to update scripts custom configuration files to use the new name.

7.4. pam_mount

The **pam_mount** facility now uses a configuration file written in XML. The **/etc/security/pam_mount.conf** file will be converted to **/etc/security/pam_mount.conf.xml** during update with **/usr/bin/convert_pam_mount_conf.pl**, which removes all comments. Any per-user configuration files must be converted manually, with the conversion script if desired. A sample **pam_mount.conf.xml** file with detailed comments about the available options appears at **/usr/share/doc/pam_mount-*/pam_mount.conf.xml**.

7.5. TeXLive

TeXLive¹⁸ is a replacement for the old, unmaintained TeX package. It offers new style packages and fixes many security problems with the old distribution.

7.6. LTSP

The Linux Terminal Server Project (LTSP) has been included directly into Fedora 9. Work is ongoing. For the latest news and documentation, refer to:

<http://k12linux.fedorahosted.org/>

7.7. Utility Packages

The *nautilus-open-terminal* package now uses a GConf key to control its behavior when launched by right-clicking the Desktop. To enable its previous behavior, which opens the resulting terminal in the user's home directory, use this command:

```
gconftool-2 -s /apps/nautilus-open-terminal/desktop_opens_home_dir --type=bool true
```

The *i810switch* package has been removed. This functionality is now available through the **xrandr** command in the *xorg-x11-server-utils* package.

The *evolution-exchange* package replaces *evolution-connector* , and provides a capability under the old name.

The *system-config-firewall* and *system-config-selinux* packages replace *system-config-security-level* . The *system-config-selinux* package is part of the *policycoreutils-gui* package.

7.8. pilot-link and HAL/PolicyKit Interaction

The *pilot-link* package now blacklists the **visor** module by default. Users are encouraged to try the direct USB access present in recent versions of *pilot-link*. This is enabled by passing the **--port**

¹⁸ <http://www.tug.org/texlive/>

usb: option to the various *pilot-link* tools, instead of the serial devices used in the past (typically `/dev/pilot` or `/dev/ttyUSB0`, `/dev/ttyUSB1`, and so forth). For example:

```
pilot-xfer --port usb: --list
```

The *hal-info* and *hal* packages have been updated to correctly set permissions for the necessary USB devices using PolicyKit. If you have any existing manual configurations, revert the changes to avoid possible conflicts.

For further information, refer to the **README.fedora** included in the *pilot-link* package.

7.9. Legal Information

The following legal information concerns some software in Fedora.

Portions Copyright (c) 2002-2007 Charlie Poole or Copyright (c) 2002-2004 James W. Newkirk, Michael C. Two, Alexei A. Vorontsov or Copyright (c) 2000-2002 Philip A. Craig

8. Linux Kernel



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section covers changes and important information regarding the 2.6.25 based kernel in Fedora 9. The 2.6.25 kernel includes:

- Tickless support for x86 64-bit systems (32-bit was added previously), which greatly improves power management.
- Some elements of the realtime kernel project.
- The kernel has a new version naming scheme to more closely match the upstream version naming scheme.
- The kernel spec file is now named **kernel1.spec** rather than **kernel-2.6.spec**.
- The kernel spec file has new macros that ease the kernel building process. Refer to <http://fedoraproject.org/wiki/Docs/CustomKernel> for further information.
- The kernel in Fedora 9 no longer loads modules by default for ISA sound cards. Load the module by hand using the command **modprobe module-name**, or put an entry in **/etc/modprobe.conf**. For example, for the Creative SoundBlaster AWE64, add the following entry:

```
install snd-sbawe
```

- The Fedora kernel offers **paravirt_ops** support in **domU**, as part of the kernel team's efforts to reduce the work required to produce current Xen kernels.

- **Xen** fully virtualized guests can directly boot a kernel and initrd image and pass kernel boot args. For more details refer to <http://fedoraproject.org/wiki/Features/XenFullvirtKernelBoot>.

8.1. Version

Fedora may include additional patches to the kernel for improvements, bug fixes, or additional features. For this reason, the Fedora kernel may not be line-for-line equivalent to the so-called *vanilla kernel* from the kernel.org web site:

<http://www.kernel.org/>

To obtain a list of these patches, download the source RPM package and run the following command against it:

```
rpm -qpl kernel-<version>.src.rpm
```

8.2. Changelog

To retrieve a log of changes to the package, run the following command:

```
rpm -q --changelog kernel-<version>
```

If you need a user friendly version of the changelog, refer to <http://wiki.kernelnewbies.org/LinuxChanges>. A short and full diff of the kernel is available from <http://kernel.org/git>. The Fedora version kernel is based on the Linus tree.

Customizations made for the Fedora version are available from <http://cvs.fedoraproject.org>.

8.3. Kernel Flavors

Fedora 9 includes the following kernel builds:

- Native kernel, for use in most systems. Configured sources are available in the *kernel-devel* package.
- The kernel-PAE, for use in 32-bit x86 systems with more than 4GB of RAM, or with CPUs that have an NX (No eXecute) feature. This kernel support both uniprocessor and multi-processor systems. Configured sources are available in the *kernel-PAE-devel* package.
- Virtualization kernel for use with the Xen emulator package. Configured sources are available in the *kernel-xen-devel* package.

You may install kernel headers for all kernel flavors at the same time. The files are installed in the **/usr/src/kernels/version[-PAE]-xen[-kdump]-arch/** tree. Use the following command:

```
su -c "yum install kernel{,-PAE,-xen,-kdump}-devel"
```

Select one or more of these flavors, separated by commas and no spaces, as appropriate. Enter the root password when prompted.



x86 Kernel Includes Kdump

Both the x86_64 and the i686 kernels are now relocatable, so they no longer require a separate kernel for kdump capability. PPC64 still requires a separate *kdump* kernel.



Default Kernel Provides SMP

There is no separate SMP kernel available for Fedora on i386, x86_64, and ppc64. Multiprocessor support is provided by the native kernel.



PowerPC Kernel Support

There is no support for Xen or kdump for the PowerPC architecture in Fedora. 32-bit PowerPC does still have a separate SMP kernel.

8.4. Preparing for Kernel Development

Fedora 9 does not include the *kernel-source* package provided by older versions since only the *kernel-devel* package is required now to build external modules. Configured sources are available, as described in [Section 8.3, “Kernel Flavors”](#).



Custom Kernel Building

For information on kernel development and working with custom kernels, refer to <http://fedoraproject.org/wiki/Docs/CustomKernel>.

8.5. Reporting Bugs

Refer to <http://kernel.org/pub/linux/docs/lkml/reporting-bugs.html> for information on reporting bugs in the Linux kernel. You may also use <http://bugzilla.redhat.com> for reporting bugs that are specific to Fedora.

9. Fedora Desktop



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section details changes that affect Fedora graphical desktop users.

9.1. GNOME

This release features [GNOME](#)¹⁹ 2.22.

¹⁹ <http://www.gnome.org/start/2.22/>

The GNOME splash screen has been disabled upstream intentionally. To enable it, use **gconf-editor** or the following command:

```
gconftool-2 --set /apps/gnome-session/options/show_splash_screen --type bool true
```

The lock screen dialog theme is not connected to the selected screensaver in this release. To enable it, use **gconf-editor** or the following command:

```
gconftool-2 --set --type string /apps/gnome-screensaver/lock_dialog_theme "system"
```

Blinking cursors are enabled by default in this release, and are centrally managed via a gconf setting. To turn it off, run the following command:

```
gconftool-2 --type bool --set /desktop/gnome/interface/cursor_blink false
```

9.1.1. Gvfs

GNOME 2.22 features the new Gvfs, a userspace virtual file-system with back-ends for sftp, ftp, dav, smb, obexftp, and others. The Gvfs system is the replacement/successor of `gnome-vfs`.

Gvfs consists of two parts:

- GIO, which is a new shared library that is part of GLib and provides the API for gvfs
- Gvfs itself, a package that contains back-ends for the various file system types and protocols

The Gvfs system runs a single master daemon, `gvfsd`, that keeps track of the current gvfs mounts. Most mounts are run in a separate daemon process. Clients talk to the mounts with a combination of DBus calls (on the session bus and using peer-to-peer DBus) and a custom protocol for file contents.

A few file-system types previously supported by `gnome-vfs` may not be yet supported by `gvfs`. Work continues to provide completed solutions for all these types.

9.1.2. GNOME Display Manager

The GNOME Display Manager (`gdm`) has been updated to the latest upstream code, which is a complete rewrite driven by Fedora developers.

[PolicyKit](#)²⁰ can be used to control shutdown and reboot. The configuration tool **gdmsetup** is currently missing, and is set to be replaced. For configuration changes, refer to the following:

<http://live.gnome.org/GDM/2.22/Configuration>

New features available on the login screen include:

- power management and monitoring on the login screen, so the laptop hibernates or shuts down when the battery gets low
- smarter user list

²⁰ [/wiki/PolicyKit](#)

- common default background between the login window and the desktop session, with no intermediate flicker

For more information on this feature:

<http://fedoraproject.org/wiki/Features/NewGdm>

Other notes:

- `~/.Xclients` and `~/.xsession` are no longer read automatically at login time. If you use either of these files, install the `xorg-x11-xinit-session` package.
- Due to a bug introduced at the end of the development cycle ([bug 445631](#)²¹), users will be unable to select their language the first time the login screen appears. Users should log in once, and then logout again to get language selection. Unfortunately, this bug also effects the LiveCD.
- The shipped version of GDM does not support old style theme formats, and is considerably plainer than the version shipped in Fedora 8. A priority for Fedora 10 will be greeter aesthetics.

9.2. KDE

This release features [KDE](#)²² 4.0.3. As the `kdepim` and `kdevelop` packages are not part of KDE 4.0 and `kdewebdev` is only partially available (no **Quanta**) in KDE 4.0, the KDE 3.5.9 versions of those packages are shipped.

[KDE 4.0](#)²³ features upgrades to core components such as the port to Qt 4. It also introduces a number of brand new frameworks such as the **Phonon**, a multimedia API; **Solid**, a hardware integration framework; **Plasma**, a re-written desktop and panel with many new concepts; integrated desktop search; compositing as a feature of **KWin**; and a brand new visual style called Oxygen. [KDE 4.0.3](#)²⁴ is a bugfix release from the KDE 4.0 release series.

Fedora 9 does **not** include the legacy KDE 3 Desktop. It does include a compatibility KDE 3 Development Platform, which can be used to build and run KDE 3 applications within KDE 4 or any other desktop environment. Refer to the **Backwards Compatibility** section for more details about what is included.

Since `networkmanager` does not work with the version of **NetworkManager** available in this release, the KDE Live images use `nm-applet` from *NetworkManager-gnome* as a replacement. The `gnome-keyring-daemon` facility saves passwords for these encryption technologies. (The dummy *knetworkmanager* package from Fedora 8 that only called `nm-applet` is no longer used.)

As the native **KWin** window manager now optionally supports compositing and desktop effects, the KDE Live images no longer include **Compiz/Beryl**. The **KWin** compositing/effects mode is disabled by default, but can be enabled in **systemsettings**. **Compiz** (with KDE 4 integration) is available from the repository by installing the *compiz-kde* package.

9.2.1. Workspace Changes

- **Plasma** replaces the old **Kicker** and **KDesktop**. **Plasma** manages both the panel and the desktop, and it is now possible to place the same **Plasma** applets (**plasmoids**) on both the panel and the desktop if the applet supports the size restrictions imposed by the panel.

²² <http://kde.org/announcements/announce-4.0.3.php>

²³ <http://www.kde.org/announcements/4.0/>

²⁴ <http://kde.org/announcements/announce-4.0.3.php>

- The old KDE Control Center (**KControl**) has been replaced by **System Settings** (**systemsettings**).
- The **KDM** login manager uses a new theme format. Therefore, **KDM** themes written for KDE 3 do not work with the **KDM** in KDE 4. **KDM** now includes support for theme configuration, thus the external **kdmtheme** tool is no longer needed.

All the above applications can be found in the *kdebase-workspace* package.

9.2.2. Package and Application Changes

- The packages *qt* , *kdelibs* , and *kdebase* now represent the KDE 4 version, obsoleting the *qt4* , *kdelibs4* , and *kdebase4* packages in previous releases of Fedora.
- The Qt/KDE 3 versions have been renamed *qt3* , *kdelibs3* , and *kdebase3* . Fedora 9 only includes parts of *kdebase3* . Refer to the **Backwards Compatibility** section for details.
- Upstream KDE has split the *kdebase* module into three modules: *kdebase-runtime* , *kdebase* (sometimes called *kdebase-apps* to distinguish it from the old monolithic *kdebase*), and *kdebase-workspace* . This split is reflected in the Fedora packages.
- Fedora 9 adds a *kdegames3* package containing the games not yet ported to KDE 4.
- **Dolphin**, which is part of *kdebase* , replaces *d3lphin* .
- The *kdebase-workspace* package now includes support for **KDM** theme configuration, and therefore obsoletes *kdmtheme* .
- **Okular** replaces **KPDF**, **KGhostView**, and **KFax** in *kdegraphics* .
- The package *kaider* replaces **KBabel**, which used to be part of *kdesdk* .
- The *okteta* package replaces **KHexEdit**, which used to be part of *kdeutils* .
- The packages *kalgebra* and *marble* are now part of *kdeedu* .
- The *ksudoku* package is now part of *kdegames* .
- The package *gwenview* is now part of *kdegraphics* .
- The *kiconedit* and *kcoloredit* packages, which used to be part of *kdegraphics* , are now separate packages.
- The package *kmid* , which used to be part of *kdemultimedia* , is now a separate package.
- The Fedora KDE team has decided to drop the *-extras* sub-packages, which contained deprecated or unstable applications, because those applications have been either fixed or dropped in KDE 4.
- The package *kdeadmin-kpackage* has been split out of *kdeadmin* because **KPackage** now depends on *smart* .
- KDE 4 dropped the *kdeaddons* module. Therefore, there is no *kdeaddons* package in Fedora 9. The **Atlantik Designer**, for use with *kdegames3* , is still available as *kdeaddons-atlantikdesigner*. The *ksig* application and the *konq-plugins* Konqueror plugins are now their own packages, and *extragear-plasma* replaces the Kicker addons.

9.3. PackageKit

PackageKit is the new, default distribution-neutral package management framework and frontend. Refer to <http://fedoraproject.org/wiki/PackageKit> for further details.

9.4. Bluetooth

The Bluetooth feature in Fedora 9 (<http://fedoraproject.org/wiki/Features/BluetoothFedora9>) has several enhancements specific to this release. The future generations of this feature are covered with greater detail at:

<http://fedoraproject.org/wiki/Releases/FeatureBluetooth>

File sending to a Bluetooth device is now handled with the **bluetooth-sendto** program from the *bluez-gnome* package, which replaces **gnome-obex-sen**. Send a file in **Nautilus** from the **Send to...** function in the right-click context menu.

Pulling files from a Bluetooth device is now included in *gnome-user-share*, which has ObexFTP and *ObexPush*²⁵ support built-in. Share files via **SystemPreferencesInternet and NetworkPersonal File SharingShare Public files over Bluetooth** (ObexFTP support), or pull files using *ObexPush*²⁶ with **PersonalFile SharingReceive files in Downloads folder over Bluetooth**.

Files on the remote Bluetooth device can be viewed directly in **Nautilus** through GVFS, which supports Bluetooth devices. Synchronizing a Bluetooth device with a personal information manager (PIM) device is done using **gnome-pilot**

Browsing of Bluetooth devices is done via the right-click context menu from the Bluetooth icon on the desktop panel.

9.5. XULRunner

Applications that require the **Gecko** engine have had to depend on the entirety of **Firefox**. **XULRunner** is the Mozilla effort to split the browser engine for applications that require only that functionality, and no user interface parts. This split provides more API/ABI stability and a cleaner build environment for applications using **Gecko**. Many of the applications in Fedora that previously used **Gecko** now are built against **XULRunner**.

For a current status, visit <http://fedoraproject.org/wiki/Features/XULRunner>. To help with development, visit <http://fedoraproject.org/wiki/Releases/FeatureXULRunnerAPIChanges>.

For full upstream documentation, refer to <http://developer.mozilla.org/en/docs/XULRunner>.

9.6. Web Browsers

This release of Fedora includes version 3.0 (beta 5) of the popular **Firefox** web browser. Refer to <http://firefox.com/> for more information about Firefox. The *nspluginwrapper* package is included by default even on 32-bit systems since it separates the plug-ins to run in their own address space, which increases security and reliability of the browser.

For information about **Firefox** in Fedora, refer to this feature page:

<http://fedoraproject.org/wiki/Features/Firefox3>

²⁵ /wiki/ObexPush

²⁶ /wiki/ObexPush

9.6.1. NSpluginwrapper

nspluginwrapper is now installed by default, which makes web browser plug-ins run in a separate memory address. This increases browser stability, as plug-in crashes will not affect the web browser itself. As well, this increases security, as Fedora 9 has optional SELinux policies to sandbox plug-ins, to decrease the impact of security issues.

9.6.2. Enabling Flash Plugin

Fedora includes *swfdec* and *gnash*, which are free and open source implementations of Flash. We encourage you to try either of them before seeking out Adobe's proprietary Flash Player plug-in software. The Adobe Flash Player plug-in uses a legacy sound framework that does not work correctly without additional support. Run the following command to enable this support:

```
su -c "yum install libflashsupport"
```

Users of Fedora x86_64 must install the *nspluginwrapper.i386* package to enable the 32-bit Adobe Flash Player plug-in in Firefox, and the *libflashsupport.i386* package to enable sound from the plug-in.

1. Create the 32bit mozilla plugin directory:

```
su -c "mkdir -p /usr/lib/mozilla/plugins"
```

2. Install the *nspluginwrapper.i386* , *nspluginwrapper.x86_64* , and *libflashsupport.i386* packages:

```
su -c "yum install nspluginwrapper.{i386,x86_64} libflashsupport.i386"
```

3. Install *flash-plugin* as shown above.

Run **mozilla-plugin-config** to register the flash plugin:

```
su -c "mozilla-plugin-config -i -g -v"
```

4. Close all **Firefox** windows, and then relaunch **Firefox**.

Type **about:plugins** in the URL bar to ensure the plugin is loaded.

9.7. Mail Clients

The *mail-notification* package has been split. The **Evolution** plug-in is now in a separate package, *mail-notification-evolution-plugin*. When the *mail-notification* package is updated, this plug-in is added automatically.

Fedora 9 includes **Mozilla Thunderbird** version 2.0, which has numerous performance improvements, folder viewing enhancements, and enhanced mail notification support. For further details, refer to the Mozilla Thunderbird 2.0 release notes:

<http://www.mozilla.com/en-US/thunderbird/2.0.0.0/releasenotes/>

9.8. Disabling PC Speaker

PC speaker is enabled by default in Fedora. If you do not prefer this, there are two ways to circumvent the sounds:

- Reduce its volume to a acceptable level or completely mute the PC speaker in **alsamixer** with the setting for **PC Speak**.
- Disable the PC speaker system wide by running the following commands in a console.

```
su -  
modprobe -r pcspkr  
echo "install pcspkr :\" >> /etc/modprobe.conf
```

9.9. International Clock Applet

The new clock applet in the GNOME panel has expanded to support additional international timezones in the display, as well as weather information for each configured timezone displayed. This work, which involved merging **intlclock** with the GNOME clock applet, provides all the functionality of **system-config-date** and the weather applet. Additional features include: users can choose arbitrary locations instead of principal timezones; UI enhancements for new and old functions; and full weather information shown in a tool tip.

Read more about this feature:

<http://fedoraproject.org/wiki/Releases/FeatureClockApplet>

9.10. Dictionaries Consolidated

There is a new default spell checking back-end, **hunspell**, for both the GNOME and KDE desktops, as well as applications such as **OpenOffice.org**, **Firefox**, and other **XULRunner**-based applications. This common back-end includes a set of shared, multi-lingual dictionaries for use with **hunspell**. This feature uses a single set of common dictionaries regardless of the application, which gives consistent suggestions for misspelled words and uses less disk space by eliminating duplicate dictionaries.

Details on this effort are here:

<http://fedoraproject.org/wiki/Releases/FeatureDictionary>

9.11. Compiz

Fedora 9 ships with Compiz 0.7.2, which improves multi-display support, adds KDE4 support, adds a configurable middle and right-click button, and mouse wheel actions for GTK Window Decorator. Compiz 0.7.2 adds many improvements and bug fixes.

For further details, refer to the Compiz 0.7.2 release announcement:

<http://lists.compiz-fusion.org/pipermail/community/2008-March/000168.html>

9.12. vmmouse Driver

Due to a bug in the shipping **xorg-x11-drv-vmouse** driver, the mouse position may not be correctly positioned on a virtual machine guest's display. As a workaround until an update, add **Option**

NoAutoAddDevices to the **ServerFlags** section of **/etc/X11/xorg.conf** in the guest machine. Create the section if necessary:

```
Section "ServerFlags"
    Option      "NoAutoAddDevices"
EndSection
```

10. File Systems



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

Fedora 9 provides basic support for encrypted swap partitions and non-root file systems. To use it, add entries to **/etc/crypttab** and reference the created devices in **/etc/fstab**.

New in Fedora 9, the installer **Anaconda** has support for creating encrypted file systems during installation. For more information on that, refer to the [Fedora Installation Guide](#)²⁷.

Installing to encrypted volumes, including the root file system, is now supported. There is no configuration tool for adding or removing keys from volumes at a later time, or otherwise doing modification of the encryption. Refer to this feature page for more information:

<http://fedoraproject.org/wiki/Releases/FeatureEncryptedFilesystems>

For full instructions on using encrypted file systems, refer to the [Fedora Encryption and Privacy Guide](#)²⁸.

10.1. Ext4 Preview

The new ext4 file system is available in Fedora 9 as a nearly feature complete preview. While an ext3 file system can be mounted as ext4, an ext3 to ext4 conversion tool is planned that converts existing ext3 on-disk format to ext4.

Fedora 9 may be installed onto an ext4 file system by adding the **ext4** option to the installer boot parameters and selecting custom partitioning.



e2fsprogs userspace tools

The **e2fsprogs** userspace tools shipping with Fedora 9 are not yet fully ext4-capable. In particular, **fsck** ability is limited.

For more information about this feature:

<http://fedoraproject.org/wiki/FedoraExt4>

²⁷ <http://docs.fedoraproject.org/install-guide>

²⁸ <http://docs.fedoraproject.org/encryption-privacy-guide>

<http://fedoraproject.org/wiki/Features/Ext4>

11. Web Servers



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

11.1. PostgreSQL DBD Driver

Users of the **mod_dbd** module should note that the **apr-util** DBD driver for PostgreSQL is now distributed as a separate dynamically-loaded module. The driver module is now included in the *apr-util-pgsql* package. A MySQL driver is now also available, in the *apr-util-mysql* package.

11.2. TurboGears Applications

SQLAlchemy has been updated to 0.4.x. TurboGears Applications developed using SQLAlchemy for their database layer will need to update their startup scripts. Instead of:

```
import pkg_resources
pkg_resources.require('TurboGears')
```

the start script needs to have:

```
__requires__ = 'TurboGears[future]'
import pkg_resources
```

11.3. Drupal

Drupal has been updated from the 5.x series to 6.2. For details, refer to:

<http://drupal.org/drupal-6.2>

Remember to log in to your site as the admin user, and disable any third-party modules before upgrading this package. After upgrading the package:

1. Copy **/etc/drupal/default/settings.php.rpm** to **/etc/drupal/default/settings.php**, and repeat for any additional sites' settings.php files.
2. Browse to <http://host/drupal/update.php> to run the upgrade script.

11.4. Squid

Squid has been updated from version 2.6 to 3.0.STABLE2. The configuration files are not entirely backwards compatible. For further details, refer to the Squid release notes:

<http://www.squid-cache.org/Versions/v3/3.0/squid-3.0.STABLE2-RELEASENOTES.html>

As well, due to a bug, the transparent proxy does not work. This should be resolved after the first update.

12. Mail Servers



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section concerns electronic mail servers or mail transfer agents (MTAs).

12.1. Sendmail

By default, the **Sendmail** mail transport agent (MTA) does not accept network connections from any host other than the local computer. To configure **Sendmail** as a server for other clients:

1. Edit `/etc/mail/sendmail.mc` and either change the **DAEMON_OPTIONS** line to also listen on network devices, or comment out this option entirely using the **dn1** comment delimiter.
2. Install the `sendmail-cf` package:

```
yum install sendmail-cf
```

3. Regenerate `/etc/mail/sendmail.cf`:

```
make -C /etc/mail
```

13. Development



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section covers various development tools and features.

13.1. Tools

13.1.1. GCC Compiler Collection

This release of Fedora has been built with GCC 4.3.0, which is included with the distribution.

For more information on GCC 4.3, refer to:

<http://gcc.gnu.org/gcc-4.3/>

13.1.1.1. Code Generation

Starting with *gcc-4.1.2-25* and *glibc-2.6.90-14*, the **-D_FORTIFY_SOURCE=2** option protects not only C code, but also C++. There have been several security issues already which would not have been exploitable if this checking was in place earlier. Refer to this announcement:

<https://www.redhat.com/archives/fedora-devel-announce/2007-September/msg00015.html> for more details.

13.1.2. Eclipse

This release of Fedora includes Fedora Eclipse, based on the Eclipse SDK version 3.3.2. The 3.3.x series of releases has a "*New and Noteworthy*"²⁹ page, and *release notes*³⁰ specific to 3.3.2 are also available.

The Eclipse SDK is known variously as "the Eclipse Platform," "the Eclipse IDE," and "Eclipse." The Eclipse SDK is the foundation for the combined release of twenty-one Eclipse projects under the Callisto combined release umbrella:

<http://www.eclipse.org/europa>

Some of the Europa projects are included in Fedora:

- CDT for C/C++ development:

<http://www.eclipse.org/cdt>

- GEF, the Graphical Editing Framework:

<http://www.eclipse.org/gef>

- Mylyn, a task-focused UI for Eclipse, along with task connectors for Bugzilla and Trac:

<http://www.eclipse.org/mylyn>

Other Eclipse projects available in Fedora include:

- Subclipse, for integrating Subversion version control:

<http://subclipse.tigris.org/>

- PyDev, for developing in Python:

<http://pydev.sf.net>

- PHPeclipse, for developing in PHP:

<http://www.phpeclipse.de/>

- E.P.I.C, for developing perl:

<http://e-p-i-c.sourceforge.net/>

- Photran, for developing in Fortran:

²⁹ <http://archive.eclipse.org/eclipse/downloads/drops/R-3.3-200706251500/whatsnew/eclipse-news.html>

³⁰ http://www.eclipse.org/eclipse/development/readme_eclipse_3.3.2.html

<http://www.eclipse.org/photran/>

Assistance in getting more projects packaged and tested with GCJ is always welcome. Contact the interested parties through [fedora-devel-java-list](#) and/or [#fedora-java](#) on freenode:

<http://www.redhat.com/mailman/listinfo/fedora-devel-java-list/>

Fedora also includes plugins and features that are particularly useful to FLOSS hackers, ChangeLog editing with *eclipse-changelog*, and Bugzilla interaction with *eclipse-mylyn-bugzilla*. Our CDT package, *eclipse-cdt*, includes a snapshot release of work to integrate with the GNU Autotools. There is also *eclipse-rpm-editor* for editing RPM specfiles.

The latest information regarding these projects can be found at the Fedora Eclipse Project page:

<http://sourceware.org/eclipse/>

13.1.2.1. Non-packaged Plugins and Features

Fedora Eclipse allows non-root users to make use of the Update Manager functionality for installing non-packaged plugins and features. Such plugins are installed in the user's home directory under the **.eclipse** directory.

13.1.2.2. Upgrading from Fedora 8

Users upgrading from Fedora 8 should be aware that cached content in their home directory may not be flushed properly (see Eclipse bug [#215034](#)³¹). To work around this issue, run Eclipse from a terminal with the **-clean** option. Note: this only needs to be done once.

13.1.2.3. 64-bit Java Runtime Environments and JNI

Do not try to run Fedora's x86_64 Eclipse packages on Sun's 32-bit JRE. They will fail. Either switch to a 64-bit proprietary JRE, or, if available, install the 32-bit version of the packages. To install a 32-bit version, run the following command (SWT is given as an example):

```
yum install libswt3-gtk2.i386
```

Likewise, the 32-bit JNI libraries shipped by default on ppc64 systems do not run with a 64-bit JRE. To install the 64-bit version, use the following command:

```
yum install package_name.ppc64
```

14. Security



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

³¹ https://bugs.eclipse.org/bugs/show_bug.cgi?id=215034

<http://docs.fedoraproject.org/release-notes/>

This section highlights various security items from Fedora.

14.1. Security Enhancements

Fedora continues to improve its many proactive [security features](#)³².

14.2. Support for SHA-256 and SHA-512 passwords

The *glibc* package in Fedora 8 had [support](#)³³ for passwords using SHA-256 and SHA-512 hashing. Previously, only DES and MD5 were available. These tools have been extended in Fedora 9. Password hashing using the SHA-256 and SHA-512 hash functions is now supported.

To switch to SHA-256 or SHA-512 on an installed system, use **authconfig --passalgo=sha256 --update** or **authconfig --passalgo=sha512 --update**. Alternatively, use the **authconfig-gtk** GUI tool to configure the hashing method. Existing user accounts will not be affected until their passwords are changed.

SHA-512 is used by default on newly installed systems. Other algorithms can be configured only for kickstart installations, by using the **--passalgo** or **--enablemd5** options for the kickstart **auth** command. If your installation does not use kickstart, use **authconfig** as described above, and then change the root user password, and passwords for other users created after installation.

New options now appear in *libuser*, *pam*, and *shadow-utils* to support these password hashing algorithms. Running **authconfig** configures all these options automatically, so it is not necessary to modify them manually.

- New values for the **crypt_style** option, and the new options **hash_rounds_min**, and **hash_rounds_max**, are now supported in the **[defaults]** section of **/etc/libuser.conf**. Refer to the **libuser.conf(5)** man page for details.
- New options, **sha256**, **sha512**, and **rounds**, are now supported by the **pam_unix** PAM module. Refer to the **pam_unix(8)** man page for details.
- New options, **ENCRYPT_METHOD**, **SHA_CRYPT_MIN_ROUNDS**, and **SHA_CRYPT_MAX_ROUNDS**, are now supported in **/etc/login.defs**. Refer to the **login.defs(5)** man page for details. Corresponding options were added to **chpasswd(8)** and **newusers(8)**.

14.3. FORTIFY_SOURCE extended to cover more functions

FORTIFY_SOURCE³⁴ protection now covers `asprintf`, `dprintf`, `vasprintf`, `vdprintf`, `obstack_printf` and `obstack_vprintf`. This improvement is particularly useful for applications that use the *glib2* library, as several of its functions use `vasprintf`.

14.4. SELinux Enhancements

Different roles are now available, to allow finer-grained access control:

³² <http://fedoraproject.org/wiki/Security/Features>

³³ <http://people.redhat.com/drepper/sha-crypt.html>

³⁴ http://fedoraproject.org/wiki/Security/Features#FORTIFY_SOURCE

- `guest_t` does not allow running `setuid` binaries, making network connections, or using a GUI.
- `xguest_t` disallows network access except for HTTP via a Web browser, and no `setuid` binaries.
- `user_t` is ideal for office users: prevents becoming root via `setuid` applications.
- `staff_t` is same as `user_t`, except that root access via **`sudo`** is allowed.
- `unconfined_t` provides full access, the same as when not using SELinux.

As well, browser plug-ins wrapped with *nspluginwrapper*, which is the default, now run confined.

14.5. Default Firewall Behavior

In Fedora 9, the default firewall behavior has changed. There are no default ports open, except for SSH (22), which is opened by **Anaconda**.

14.6. General Information

A general introduction to the many proactive security features in Fedora, current status, and policies is available at <http://fedoraproject.org/wiki/Security>.

14.7. SELinux

The SELinux project pages have troubleshooting tips, explanations, and pointers to documentation and references. Some useful links include the following:

- New SELinux project pages: <http://fedoraproject.org/wiki/SELinux>
- Troubleshooting tips: <http://fedoraproject.org/wiki/SELinux/Troubleshooting>
- Frequently Asked Questions: <http://docs.fedoraproject.org/selinux-faq/>
- Listing of SELinux commands: <http://fedoraproject.org/wiki/SELinux/Commands>
- Details of confined domains: <http://fedoraproject.org/wiki/SELinux/Domains>

14.8. Free IPA

Free IPA is a centrally managed identity, policy, and audit installation.

The IPA server installer assumes a relatively clean system, installing and configuring several services:

- a Fedora Directory Server instance
- KDC
- Apache
- `ntpd`
- TurboGears

Some effort is made to be able to roll back the changes made but they are not guaranteed. Similarly the **`ipa-client-install`** tool overwrites PAM (**`/etc/pam.conf`**) and Kerberos (**`/etc/krb5.conf`**) configurations.

IPA does not support other instances of Fedora Directory Server on the same machine at install time, even listening on different ports. In order to install IPA, other instances must be removed. IPA itself can handle this removal.

There is currently no mechanism for migrating existing users into an IPA server.

The server self-configures to be a client of itself. If the Directory Server or KDC fail to start on bootup, boot into single-user mode in order to resolve the issue.

For more information, refer to this feature page:

<http://fedoraproject.org/wiki/Features/freeIPA>

15. Java



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

15.1. OpenJDK

Fedora 9 includes OpenJDK 6, a Free Software implementation of the Java Platform, Standard Edition. OpenJDK 6 is not yet Java compatible; work is underway to certify it.

Fedora will track Sun's stable OpenJDK 6 branch.

15.2. OpenJDK Replaces IcedTea

The OpenJDK 6 packages, **java-1.6.0-openjdk***, replace their *IcedTea*³⁵ counterparts, **java-1.7.0-icedtea***. The Fedora 8 IcedTea packages track the unstable OpenJDK 7 branch, whereas the **java-1.6.0-openjdk*** packages track the stable OpenJDK 6 branch. The decision to have OpenJDK 6 replace IcedTea was made for several reasons:

- Sun has replaced most of the encumbrances for which IcedTea was providing replacements. For the rest of the encumbrances, replacements have been merged from the IcedTea project.
- IcedTea's mandate is to merge as much as possible with OpenJDK, so the differences between IcedTea and OpenJDK should diminish over time.
- OpenJDK 6 is a stable branch, whereas OpenJDK 7 is unstable, and is not expected to ship a stable release until 2009.
- Sun has licensed the OpenJDK trademark for use in Fedora.
- Shipping both OpenJDK 6 and IcedTea would have been confusing, and would have added size to the distribution.

IcedTea continues to provide autotools support (*autoconf* , *automake* , *libtool* , and so on), a portable interpreter for PowerPC and 64-bit PowerPC architectures, plugin support, Web Start support, and

³⁵ <https://fedoraproject.org/wiki/IcedTea>

patches to integrate OpenJDK into Fedora. The IcedTea sources are included in the **java-1.6.0-openjdk** SRPM.

If IcedTea is already installed, the package changeover does not happen automatically. The packages related to IcedTea based on OpenJDK 7 must first be erased, then the new OpenJDK 6 packages installed.

```
su -c "yum erase java-1.7.0-icedtea{,-plugin}"
su -c "yum install java-1.6.0-openjdk{,-plugin}"
```

15.3. Handling Java Applets

Upstream OpenJDK does not provide a plugin. The Fedora OpenJDK packages include an adaptation of **gcjwebplugin**, that runs untrusted applets safely in a Web browser. The plugin is packaged as **java-1.6.0-openjdk-plugin**.

- The **gcjwebplugin** adaptation has no support for the [bytecode-to-JavaScript bridge \(LiveConnect\)](#)³⁶. Applets that rely on this bridge will not work. Experimental LiveConnect support exists in the IcedTea repository, but is not ready for deployment in Fedora.
- The **gcjwebplugin** adaptation does not support [signed applets](#)³⁷. Signed applets will run in untrusted mode. Experimental support for signed applets is present in the IcedTea repository, but it is not ready for deployment in Fedora.
- The **gcjwebplugin** security policy may be too restrictive. To enable restricted applets, run the **firefox -g** command in a terminal window to see what is being restricted, and then grant the restricted permission in the **/usr/lib/jvm/java-1.6.0-openjdk-1.6.0.0/jre/lib/security/java.policy** file.

15.4. Handling Web Start Applications

Upstream OpenJDK does not provide Web Start support. Experimental Web Start support via [NetX](#)³⁸ is present in the IcedTea repository, but is not ready for deployment in Fedora.

15.5. Fedora and JPackage

Fedora includes many packages derived from the [JPackage Project](#)³⁹. Some of these packages are modified in Fedora to remove proprietary software dependencies, and to make use of GCJ's ahead-of-time compilation feature. Use the Fedora repositories to update these packages, or use the JPackage repository for packages not provided by Fedora. Refer to the [JPackage website](#)⁴⁰ for more information about the project, and the software it provides.

An incompatibility between Fedora and the JPackage *jpackage-utils*, that prevented installing JPackage's *jpackage-utils* on Fedora, is [resolved](#)⁴¹ in this release.

³⁸ <http://jnlp.sourceforge.net/netx/>

³⁹ <http://jpackage.org/>

⁴⁰ <http://jpackage.org/>

⁴¹ https://bugzilla.redhat.com/show_bug.cgi?id=260161



Mixing Packages from Fedora and JPackage

Research package compatibility before you install software from both the Fedora and JPackage repositories on the same system. Incompatible packages may cause complex issues.

16. System Services



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

16.1. Upstart

Fedora 9 features the Upstart initialization system. All System V init scripts should run fine in compatibility mode. However, users who have made customizations to their `/etc/inittab` file will need to port those modifications to upstart. For information on how upstart works, see the **init(8)** and **initctl(8)** man pages. For information on writing upstart scripts, see the **events(5)** man page, and also the Upstart Getting Started Guide:

<http://upstart.ubuntu.com/getting-started.html>

Due to the change of init systems, it is recommended that users who do an upgrade on a live file system to Fedora 9, reboot soon afterwards.

16.2. NetworkManager

Fedora 9 features *NetworkManager*⁴². NetworkManager 0.7 provides improved mobile broadband support, including GSM and CDMA devices, and now supports multiple devices, ad-hoc networking for sharing connections, and the use of system-wide network configuration. It is now enabled by default on all installations. When using NetworkManager, be aware of the following:

- NetworkManager does not currently support all virtual device types. Users who use bridging, bonding, or VLANs may need to switch to the old network service after configuration of those interfaces.
- NetworkManager starts the network asynchronously. Users who have applications that require the network to be fully initialized during boot should set the **NETWORKWAIT** variable in `/etc/sysconfig/network`. Please *file bugs*⁴³ about cases where this is necessary, so we can fix the applications in question.

16.3. Autofs

Autofs is no longer installed by default. Users who wish to use Autofs can choose it from the **System Tools** group in the installer, or with the package installation tools.

⁴² <http://fedoraproject.org/wiki/NetworkManager>

17. Multimedia



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

Fedora includes applications for assorted multimedia functions, including playback, recording, and editing. Additional packages are available through the Fedora Package Collection software repository. For additional information about multimedia in Fedora, refer to the Multimedia section of the Fedora Project website at <http://fedoraproject.org/wiki/Multimedia>.

17.1. Multimedia Players

The default installation of Fedora includes **Rhythmbox** and **Totem** for media playback. The Fedora repositories include many other popular programs such as the **XMMS** player and KDE's **amaroK**. Both GNOME and KDE have a selection of players that can be used with a variety of formats. Third parties may offer additional programs to handle other formats.

Totem, the default movie player for GNOME, now has the ability to switch playback back-ends without recompilation or switching packages. To install the xine back-end, run the following command as root:

```
yum install totem-xine
```

To run *Totem* with the xine back-end once, run the following command as root:

```
totem-backend -b xine totem
```

To change the default back-end to xine for the entire system, run the following command as root:

```
totem-backend -b xine
```

While using the xine back-end, it is possible to temporarily use the GStreamer back-end. To use the GStreamer back-end, run the following command as root:

```
totem-backend -b gstreamer
```

17.2. Ogg and Xiph.Org Foundation Formats

Fedora includes complete support for the Ogg media container format and the Vorbis audio, Theora video, Speex audio and FLAC lossless audio formats. These freely-distributable formats are not encumbered by patent or license restrictions. They provide powerful and flexible alternatives to more popular, restricted formats. The Fedora Project encourages the use of open source formats in place of restricted ones. For more information on these formats and how to use them, refer to the Xiph.Org Foundation's web site at <http://www.xiph.org/>.

- [Xiph.Org Formats](#)⁴⁴

17.3. MP3, DVD, and Other Excluded Multimedia Formats

Fedora cannot include support for MP3 or DVD video playback or recording. The MP3 formats are patented, and the patent holders have not provided the necessary licenses. DVD video formats are patented and equipped with an encryption scheme. The patent holders have not provided the necessary licenses, and the code needed to decrypt CSS-encrypted discs may violate the Digital Millennium Copyright Act, a copyright law of the United States. Fedora also excludes other multimedia software due to patent, copyright, or license restrictions, including Adobe's Flash Player and Real Media's Real Player. For more on this subject, please refer to <http://fedoraproject.org/wiki/ForbiddenItems>.

While other MP3 options may be available for Fedora, Fluendo now offers an MP3 plugin for GStreamer that has the related patents licensed for end users. This plugin enables MP3 support in applications that use the GStreamer framework as a backend. We cannot distribute this plugin in Fedora for licensing reasons, but it offers a new solution for an old problem. For more information, refer to the [Installing Fluendo MP3 Plug-in](#)⁴⁵ or [Installing MP3 Plug-in with Codeina](#)⁴⁶ pages.

- [MP3 Support](#)⁴⁷
- [DVD Support](#)⁴⁸
- [Flash Support](#)⁴⁹

17.4. CD and DVD Authoring and Burning

Fedora include a variety of tools for easily mastering and burning CDs and DVDs. GNOME users can burn directly from the Nautilus file manager. The Fedora software repositories also contain additional software, such as *brasero*, *gnomebaker*, or *k3b*, for these tasks. Console tools include **wodim**, **readom**, **genisoimage**, and other popular applications.

17.5. Screencasts

You can use Fedora to create and play back screencasts, which are recorded desktop sessions, using open technologies. Fedora includes *istanbul*, which creates screencasts using the Theora video format, and 'byzanz', which creates screencasts as animated GIF files. You can play back these videos using one of several players included in Fedora. This is the preferred way to submit screencasts to the Fedora Project for either developers or end-users. For more comprehensive instructions, refer to the [ScreenCasting](#)⁵⁰ page.

17.6. Extended Support through Plugins

Most of the media players in Fedora support the use of plugins to add support for additional media formats and sound output systems. Some use powerful backends like the *gstreamer* package to handle media format support and sound output. Fedora offers plugin packages for these backends and for individual applications, and third parties may offer additional plugins to add even greater capabilities.

⁴⁵ <http://fedoraproject.org/wiki/Multimedia/fluendo-mp3>

⁴⁶ <http://fedoraproject.org/wiki/Multimedia/Codeina>

⁵⁰ <http://fedoraproject.org/wiki/ScreenCasting>

18. Games and Entertainment



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

Fedora provides a selection of games that cover a variety of genres. Users can install a small package of games for GNOME (called *gnome-games*) and KDE (*kdegames*). There are also many additional games that span every major genre available in the repositories.

The Fedora Project website features a section dedicated to games that details many of the available games, including overviews and installation instructions. For more information, refer to:

<http://fedoraproject.org/wiki/Games>

For a list of other games that are available for installation, select **Applications** → **Add / Remove Software**, or via the command line:

```
yum groupinfo "Games and Entertainment"
```

For help using **yum** to install the assorted game packages, refer to the guide available at

<http://docs.fedoraproject.org/yum/>

19. Virtualization



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

Virtualization in Fedora 9 includes major changes, and new features, that continue to support the Xen and KVM platforms.

19.1. Kernel Integration Improvements

The Xen kernel is now based on the paravirt ops implementation from the upstream kernel. Previously, the Xen kernel was created by forward-porting Xen bits from the 2.6.18 kernel into the current Fedora kernel. This task was arduous and labor intensive, and resulted in the Xen kernel being several releases behind the bare-metal kernel. The inclusion of paravirt ops now makes this process unnecessary. Once paravirt ops is merged upstream, Xen will no longer require a separate kernel.

However, the Xen kernel now lacks Dom0 support. An existing Xen host/Dom0 must continue to run Fedora 8. Xen Dom0 support will be added back in Fedora 10.

Fully virtualized Linux guests now have 3 possible installation methods:

- PXE boot from the network.

- Local CDROM drive / ISO image.
- Network install from a FTP/HTTP/NFS hosted distribution tree.

The latter allows for fully automated installation through the use of kickstart files. This provides parity between Xen HVM and KVM guests in terms of installation methods.

For more information refer to: <http://fedoraproject.org/wiki/Features/XenFullvirtKernelBoot>.

19.2. Improved Storage Management

Previously, Fedora introduced the ability to manage existing guest domains remotely using *libvirt*. It was not possible to create new guests due to the lack of storage management capabilities. In Fedora 9, new storage management can create and delete storage volumes from a remote host using *libvirt*.

19.3. PolicyKit Integration

Previously, the **virt-manager** application ran as root when managing a local hypervisor, and used **consolehelper** to authenticate from a desktop session. Running GTK applications as root is bad practice. PolicyKit integration now permits running **virt-manager** as a regular user.

19.4. Improved Remote Authentication

Previously, Fedora introduced support for secure remote management using TLS/SSL, and x509 certificates. Fedora 9 improves remote management capabilities by adding support for authentication by password database, Kerberos domain controller, or system authentication using PAM. This feature applies to all tools using *libvirt*.

19.5. Other Improvements

Fedora also includes the following virtualization improvements:

- a new P2V tool, shipping as a Live CD, for converting a bare-metal install to a virtual guest
- a new tool, **xenner**, for running Xen-paravirtual kernels on top of KVM
- storage and network paravirtual-drivers for KVM guests
- full support for monitoring network and block statistics of QEMU and KVM in *libvirt* and *virt-top*, bringing parity with statistics monitoring, previously only available to Xen guests

20. X Window System (Graphics)



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section contains information related to the X Window System implementation, X.Org, provided with Fedora.

20.1. Faster X Start-up and Shutdown

Fedora 9 features a number of changes designed to make X faster in starting and shutting down and to make other improvements. Full details of the project can be found through this feature page:

<http://fedoraproject.org/wiki/Features/OneSecondX>.

20.2. X Configuration Changes

The X.Org 1.4.99 X server has been modified to automatically detect and configure most hardware, eliminating the need to modify the `/etc/X11/xorg.conf` configuration file. The only hardware configured by default in the `xorg.conf` configuration file written by **Anaconda** is:

- the graphics driver, and
- the keyboard map

All other hardware, such as monitors (both LCD and CRT), USB mice, and touchpads, should be detected and configured automatically.

The X server queries the attached monitor for supported resolution ranges, and attempts to pick the highest resolution available with the correct aspect ratio for the display. Set the preferred resolution in **System** → **Preferences** → **Screen Resolution**, and the default resolution for the system in **System** → **Administration** → **Display**.

If the `/etc/X11/xorg.conf` configuration file is not present, X automatically detects the appropriate driver, and assumes a 105-key US keyboard layout.

In certain situations, the `evdev` driver was used, even when the `kbd` driver was specified in `/etc/X11/xorg.conf`. Removing the `evdev` driver caused errors and warnings such as the following:

```
(WW) Warning, couldn't open module evdev
(II) UnloadModule: "evdev"
(EE) Failed to load module "evdev" (module does not exist, 0)
(EE) No input driver matching `evdev'
[config/hal] NewInputDeviceRequest failed
(II) LoadModule: "evdev"
```

In Fedora 9, the XKB settings are read from `/etc/sysconfig/keyboard`, which gives users the correct layout. The `KEYTABLE` option, configured in `/etc/sysconfig/keyboard`, also sets the layout for X. The `XKB_VARIANT` and `XKB_OPTIONS` variables can be configured to customize XKB.

20.3. Third Party Video Drivers

Refer to the [Xorg third-party drivers](http://fedoraproject.org/wiki/Xorg/third-party%20drivers)⁵¹ page for detailed guidelines on using third-party video drivers.

21. Database Servers



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

⁵¹ <http://fedoraproject.org/wiki/Xorg/3rdPartyVideoDrivers>

<http://docs.fedoraproject.org/release-notes/>

21.1. MySQL

Fedora now provides MySQL 5.0.51.a. For a list of the enhancements provided by this version, refer to <http://dev.mysql.com/doc/refman/5.0/en/mysql-nutshell.html>.

For more information on upgrading databases from previous releases of MySQL, refer to the MySQL website at <http://dev.mysql.com/doc/refman/5.0/en/upgrade.html>.

21.1.1. DBD Driver

The MySQL DBD driver has been dual-licensed and the related licensing issues have been resolved (https://bugzilla.redhat.com/bugzilla/show_bug.cgi?id=222237). The resulting *apr-util-mysql* package is now included in the Fedora software repositories.

21.2. PostgreSQL

This release of Fedora includes PostgreSQL 8.3.0. For more information on this new version, refer to <http://www.postgresql.org/docs/8.3/static/release-8-3.html>.



Upgrading Databases

Before upgrading an existing Fedora system with a PostgreSQL database, check and then follow, if necessary, the procedure described at <http://www.postgresql.org/docs/8.3/interactive/install-upgrading.html>. Otherwise the data may be not accessible by the new version of PostgreSQL.

22. Internationalization (i18n)



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

This section includes information on language support under Fedora.

- Localization (translation) of Fedora is coordinated by the [Fedora Localization Project](#)⁵².
- Internationalization of Fedora is maintained by the [Fedora I18n Project](#)⁵³.

22.1. Language Coverage

Fedora features a variety of software which is translated in [many languages](#)⁵⁴. For a list of languages refer to the [translation statistics](#)⁵⁵ for **Anaconda**, which is one of the core software applications in Fedora.

22.1.1. Language Support Installation

To install additional language support from the *Languages* group, use **Applications** → **Add/Remove Software**, or run this command:

```
su -c "yum groupinstall language-support"
```

In the command above, *language* is one of **assamese, bengali, chinese, gujarati, hindi, japanese, kannada, korean, malayalam, marathi, oriya, punjabi, sinhala, tamil, telegu, thai**, and so on.

SCIM users upgrading from earlier releases of Fedora are strongly urged to install *scim-bridge-gtk*. This application works well with third-party C++ applications linked against older versions of *libstdc++*.

To add SCIM support to input a particular language, install *scim-lang-LANG*, where *LANG* is one of **assamese, bengali, chinese, dhivehi, farsi, gujarati, hindi, japanese, kannada, korean, latin, malayalam, marathi, oriya, punjabi, sinhalese, tamil, telugu, thai**, or **tibetan**.

22.1.2. Transifex

[Transifex](#)⁵⁶ is Fedora's online tool to facilitate contributing translations to projects hosted on remote and disparate version control systems. Many of the core packages use Transifex to receive translations from numerous contributors.

Through a combination of [new Web tools](#)⁵⁷, community growth, and better processes, translators can contribute directly to any upstream project through one translator-oriented Web interface. Developers of projects with no existing translation community can easily reach out to Fedora's established community for translations. In turn, translators can reach out to numerous projects related to Fedora to easily contribute translations.

22.2. Fonts

Fonts for all available languages are installed by default on the desktop to give good default language coverage. *dejavu-fonts* replaces *dejavu-lgc-fonts* as the default system font.

22.2.1. Chinese fonts

- The *wqy-zenkai-fonts* package has been added.

⁵⁴ <http://translate.fedoraproject.org/languages>

⁵⁵ <http://translate.fedoraproject.org/module/anaconda>

⁵⁶ <https://fedorahosted.org/transifex/>

⁵⁷ <http://translate.fedoraproject.org/>

22.2.2. Indic fonts

- The *samyak-fonts* package has been added.
- The *sarai-fonts* package has been added.
- The *smc-fonts* package has been added for Malayalam.

22.2.3. Japanese fonts

- *VLGothic-fonts* is the new default font for Japanese in Fedora 9. It now has a subpackage *VLGothic-fonts-proportional* for its proportional version.

22.2.4. Nepali fonts

- The *madan-fonts* package has been added.

22.2.5. Thai fonts

- The *thaifonts-scalable* package has been added, making Thai TrueType fonts available in Fedora.

22.3. Input Methods

It is now possible to start and stop the of Input Methods in GTK applications during runtime thanks to the new *imsettings* framework. The **GTK_IM_MODULE** environment variable is no longer needed by default but can still be used to override the *imsettings*.

22.3.1. im-chooser

With the new *imsettings* framework, **im-chooser** can now start and stop Input Method usage dynamically on the GNOME Desktop.

Input methods only start by default on desktops running in an Asian locale. The current list is: as, bn, gu, hi, ja, kn, ko, ml, mr, ne, or, pa, si, ta, te, th, ur, vi, zh. Use **im-chooser** via **System** → **Preferences** → **Personal** → **Input Method** to enable or disable Input method usage on your desktop.

22.3.2. SCIM hotkeys

SCIM now only defines trigger hotkeys for Asian languages as in the following table:

Language	Trigger hotkeys
Chinese	Ctrl-Space
Indic	Ctrl-Space
Japanese	Zenkaku_Hankaku , Alt-` , or Ctrl-Space
Korean	Shift-Space , Hangul , or Ctrl-Space

Table 1. Hotkeys

22.3.3. scim-python

This release adds the *scim-python* package, which allows writing Input Method Engines for SCIM in python.

22.3.4. scim-python-chinese

The *scim-python* package also includes a subpackage *scim-python-pinyin* that provides PinYin and ShuangPin Input Methods for improved input of Simplified Chinese. The PinYin Input Method replaces *scim-pinyin* as the default input method for Simplified Chinese. The *scim-python-xingma* package provides a number of tables for other Chinese input methods.

23. Backwards Compatibility



Latest Release Notes on the Web

These release notes may be updated. To view the latest release notes for Fedora, visit:

<http://docs.fedoraproject.org/release-notes/>

Fedora provides legacy system libraries for compatibility with older software. This software is part of the **Legacy Software Development** group, which is not installed by default. Users who require this functionality may select this group either during installation or after the installation process is complete. To install the package group on a Fedora system, use **Applications** → **Add/Remove Software** or enter the following command in a terminal window:

```
su -c "yum groupinstall 'Legacy Software Development'"
```

Enter the password for the root account when prompted.

23.1. Compiler Compatibility

The *compat-gcc-34* package has been included for compatibility reasons:

<https://www.redhat.com/archives/fedora-devel-list/2006-August/msg00409.html>

23.2. KDE 3 Development Platform / Libraries

Fedora now features KDE 4.0, and no longer offers KDE 3 as a full desktop environment. Fedora does provide the following KDE 3.5 library packages to run and build the many existing KDE 3 applications:

- *qt3* , *qt3-devel* (and other *qt3-** packages): Qt 3.3.8b
- *kdelibs3* , *kdelibs3-devel* : KDE 3 libraries
- *kdebase3* , *kdebase3-devel* : KDE 3 core files required by some applications

In addition, Fedora offers a *kdegames3* package that includes games not ported to KDE 4 yet, and a KDE 3 version of *libkdegames* required by some third-party KDE 3 games.

Moreover, the KDE 4 *kdebase-runtime* package, which provides *khelpcenter* , also sets up *khelpcenter* as a service for KDE 3 applications, so help in KDE 3 applications works. The KDE 3 version of *khelpcenter* is no longer provided, and the KDE 4 version is used instead.

These packages are designed to:

- comply with the Filesystem Hierarchy Standard (FHS), and
- be completely safe to install in parallel with KDE 4, including the *-devel* packages.

In order to achieve this goal, Fedora KDE SIG members have made two changes to the KDE 4 *kdelibs-devel* packages:

- The library symlinks are installed to `/usr/lib/kde4/devel` or `/usr/lib64/kde4/devel` depending on system architecture.
- The **kconfig_compiler** and **makekdewidgets** tools have been renamed **kconfig_compiler4** and **makekdewidgets4**, respectively.

These changes should be completely transparent to the vast majority of KDE 4 applications that use **cmake** to build, since **FindKDE4Internal.cmake** has been patched to match these changes. The KDE SIG made these changes to the KDE 4 *kdelibs-devel* rather than to *kdelibs3-devel* because KDE 4 stores these locations in a central place, whereas KDE 3 applications usually contain hardcoded copies of the library search paths and executable names.

Note that *kdebase3* does **not** include the following:

- A complete KDE 3 desktop (workspace) which could be used instead of KDE 4; in particular, KDE 3 versions of KWin, KDesktop, Kicker, KSplash and KControl are **not** included.
- The KDE 3 versions of *kdebase* applications such as Konqueror and KWrite, which are redundant with the KDE 4 versions and would conflict with them.
- The *libkdecorations* library required for KWin 3 window decorations, as those window decorations cannot be used in the KDE 4 version of KWin.
- The *libkickermain* library required by some Kicker applets, as there is no Kicker in Fedora 9 and thus Kicker applets cannot be used.



Developing against the legacy API is discouraged

As with any backwards-compatibility library, developing new software against the legacy API is discouraged.

24. Package Changes

For a list of packages that were updated since the previous release, refer to <http://fedoraproject.org/wiki/Docs/Beats/PackageChanges/UpdatedPackages>. You can also find a comparison of major packages between all Fedora versions at <http://distrowatch.com/fedora>.

25. Fedora Project

The goal of the Fedora Project is to work with the Linux community to build a complete, general-purpose operating system exclusively from open source software. The Fedora Project is driven by the individuals that contribute to it. As a tester, developer, documenter, or translator, you can make a difference. Refer to <http://fedoraproject.org/join-fedora.html> for details. For information on the channels of communication for Fedora users and contributors, refer to <http://fedoraproject.org/wiki/Communicate>.

The Fedora Project is driven by the individuals that contribute to it. As a tester, developer, documenter, or translator, you can make a difference. See <http://fedoraproject.org/wiki/Join> for details. For information on the channels of communication for Fedora users and contributors, refer to <http://fedoraproject.org/wiki/Communicate>.

In addition to the website, the following mailing lists are available:


- fedora-list@redhat.com⁵⁸, for users of Fedora releases
- fedora-test-list@redhat.com⁵⁹, for testers of Fedora test releases
- fedora-devel-list@redhat.com⁶⁰, for developers, developers, developers
- fedora-docs-list@redhat.com⁶¹, for participants of the Documentation Project

To subscribe to any of these lists, send an email with the word "subscribe" in the subject to `<listname>-request`, where `<listname>` is one of the above list names. Alternately, you can subscribe to Fedora mailing lists through the Web interface at <http://www.redhat.com/mailman/listinfo/>.

The Fedora Project also uses several IRC (Internet Relay Chat) channels. IRC is a real-time, text-based form of communication, similar to Instant Messaging. With it, you may have conversations with multiple people in an open channel, or chat with someone privately one-on-one. To talk with other Fedora Project participants via IRC, access the Freenode IRC network. Refer to the Freenode website at <http://www.freenode.net/> for more information.

Fedora Project participants frequent the `#fedora` channel on the Freenode network, while Fedora Project developers may often be found on the `#fedora-devel` channel. Some of the larger projects may have their own channels as well. This information may be found on the webpage for the project, and at <http://fedoraproject.org/wiki/Communicate>.

In order to talk on the `#fedora` channel, you need to register your nickname, or *nick*. Instructions are given when you `/join` the channel.



IRC Channels

The Fedora Project and Red Hat have no control over the Fedora Project IRC channels or their content.

26. Colophon

As we use the term, a *colophon*:

- recognizes contributors and provides accountability, and
- explains tools and production methods.

26.1. Contributors

- [Alain Portal \(translator - French\)](#)⁶²
- [Amanpreet Singh Alam](#)⁶³ (translator - Punjabi)
- [Andrew Martynov](#)⁶⁴ (translator - Russian)
- [Andrew Overholt](#)⁶⁵ (beat contributor)
- [Anthony Green](#)⁶⁶ (beat writer)
- [Brandon Holbrook](#)⁶⁷ (beat contributor)

- [Bob Jensen](#)⁶⁸ (beat writer)
- [Chris Lennert](#)⁶⁹ (beat writer)
- [Clint Savage](#)⁷⁰ (editor)
- [Dave Malcolm](#)⁷¹ (beat writer)
- [David Eisenstein](#)⁷² (beat writer)
- [David Woodhouse](#)⁷³ (beat writer)
- [Deepak Bhole](#)⁷⁴ (beat contributor)
- [Diego Burigo Zacarao](#)⁷⁵ (translator - Brazilian Portuguese)
- [Dimitris Glezos](#)⁷⁶ (translator - Greek, tools)
- [Domingo Becker](#)⁷⁷ (translator - Spanish)
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- [Marek Mahut](#)¹⁰⁰ (translator - Slovak)
- [Mathieu Schopfer](#)¹⁰¹ (translator - French)
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- [Murray McAllister](#)¹⁰⁵ (editor)
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- [Patrick Barnes](#)¹⁰⁸ (beat writer, editor)
- [Paul W. Frields](#)¹⁰⁹ (tools, editor)
- [Pavol Simo](#)¹¹⁰ (translator - Slovak)
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- [Ville-Pekka Vainio](#)¹²⁵ (translator - Finnish)

- [Will Woods](#)¹²⁶ (beat contributor)
- [Yoshinari Takaoka](#)¹²⁷ (translator, tools)
- [Yuan Yijun](#)¹²⁸ (translator - Simplified Chinese)
- [Zhang Yang](#)¹²⁹ (translator - simplified Chinese)

... and many more translators. Refer to the Web-updated version of these release notes as we add translators after release:

<http://docs.fedoraproject.org/release-notes/>

26.2. Production Methods

Beat writers produce the release notes directly on the Fedora Project Wiki. They collaborate with other subject matter experts during the test release phase of Fedora to explain important changes and enhancements. The editorial team ensures consistency and quality of the finished beats, and ports the Wiki material to DocBook XML in a revision control repository. At this point, the team of translators produces other language versions of the release notes, and then they become available to the general public as part of Fedora. The publication team also makes them, and subsequent errata, available via the Web.

