Fedora 16

Release Notes

Release Notes for Fedora 16

Edited by The Fedora Docs Team

Abstract

This document details the release notes for Fedora 16.

1. Dedicated to Dennis Ritchie

During the preparation of Fedora 16, the computing world lost one of its great contributors: Dennis Ritchie. Ritchie co-invented Unix and the C language. He also co-authored "The C Programming Language", a book that taught many programmers just at the time personal computing was exploding. Without Ritchie computing would be nothing like it is today.

A humble man, not well-known outside his field, Dennis will always be remembered by those of us who practice the craft. Thank you Dennis.

2. Welcome to Fedora 16

2.1. Welcome to Fedora

You can help the Fedora Project community continue to improve Fedora if you file bug reports and enhancement requests. Refer to *Bugs And Feature Requests*[1], on the Fedora wiki, for more information about bug and feature reporting. Thank you for your participation.

To find out more general information about Fedora, refer to the following pages, on the Fedora wiki (*http:// fedoraproject.org/wiki/*):

* *Fedora Overview*[2]

* *Fedora FAQ*[3]

* *Help and Discussions*[4]

* *Participate in the Fedora Project*[5]

2.1.1. Need Help?

There are a number of places you can get assistance should you run into problems.

> **Ask Fedora**
>
> A new website is available to answer your questions

Fedora has recently introduced a new site, "Ask Fedora". If you run into a problem and would like some assistance, go to *http://ask.fedoraproject.org*. Many answers are already there, but if you don't find yours, you can simply post a new question. This has the advantage that anyone else with the same problem can find the answer, too.

You may also find assistance on the **#fedora** channel on the IRC net **irc.freenode.net**. Keep in mind that the channel is populated by volunteers wanting to help, but folks knowledgable about a specific topic might not always be available.

2.2. Overview

As always, Fedora continues to develop (*RedHat contributions*[6]) and integrate the latest free and open source software (*Fedora 16 Features)*[7]. The following sections provide a brief overview of major changes from the last release of Fedora.

The following are major features for Fedora 16:

* Enhanced cloud support including Aeolus Conductor, Condor Cloud, HekaFS, OpenStack and pacemaker-cloud

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[1] http://fedoraproject.org/wiki/BugsAndFeatureRequests
[6] http://www.fedoraproject.org/wiki/Red_Hat_contributions
[7] http://fedoraproject.org/wiki/Releases/16/FeatureList

- KDE Plasma workspaces 4.7

- GNOME 3.2

- A number of core system improvements including GRUB 2 and the removal of HAL.

- An updated libvirtd, guest inspection, virtual lock manager and a pvops based kernel for Xen all improve virtualization support.

For more details about other features that are included in Fedora 16 refer to their individual wiki pages that detail feature goals and progress: *http://fedoraproject.org/wiki/Releases/16/FeatureList*[8].

2.3. Hardware Overview

2.3.1. Processor and memory requirements for x86 Architectures

Fedora 16 may be installed on most "modern" x86 processors. (There are some "secondary architectures" supported by special interest groups for processors like Power PC, System/390 and ARM).

The minimum processor speed depends on the end use, the method of installation, and the specific hardware. Although some configurations might work on a Pentium 3, most users should consider a Pentium 4 or more modern processor, or the equivalent processor from other manufacturers. Fedora 16 is able to take full advantage of modern, multi-core architectures.

- Minimum RAM for text-mode: 768 MiB

- Minimum RAM for graphical: 768 MiB

- Recommended RAM for graphical: 1152 MiB

2.3.2. Processor and memory requirements for x86_64 architectures

- Minimum RAM for text-mode: 768 MiB

- Minimum RAM for graphical: 768 MiB

- Recommended RAM for graphical: 1152 MiB

2.3.3. Hard disk space requirements for all architectures

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.

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[8] http://fedoraproject.org/wiki/Releases/16/FeatureList

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

2.4. Feedback

Thank you for taking the time to provide your comments, suggestions, and bug reports to the Fedora community; this helps improve the state of Fedora, Linux, and free software worldwide.

2.4.1. Providing Feedback on Fedora Software

To provide feedback on Fedora software or other system elements, please refer to *Bugs And Feature Requests*[9]. A list of commonly reported bugs and known issues for this release is available from *Common F16 bugs*[10], on the wiki.

2.4.2. Providing Feedback on Release Notes

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

- If you have a Fedora account, edit content directly at *Docs-Beats*[11] page on the wiki.

- Fill out a bug request using *this template*[12] - *This link is ONLY for feedback on the release notes themselves.* Refer to the admonition above for details.

- E-mail the Release-Note mailing list at `relnotes@fedoraproject.org`

3. Changes in Fedora for System Administrators

3.1. Kernel

Fedora 16 features the new 3.1.0 kernel. In spite of the dramatic number change, there are no dramatic feature changes. Even Linus says you shouldn't care about it:

```
I decided to just bite the bullet, and call the next version 3.0. It will get released close
enough to the 20-year mark, which is excuse enough for me, although honestly, the real reason
is just that I can no longer comfortably count as high as 40.
```

3.2. Boot

Fedora 16 takes advantage of several new technologies to improve the speed, security and efficiency of the boot process:

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[9] http://fedoraproject.org/wiki/BugsAndFeatureRequests
[10] http://fedoraproject.org/wiki/Common_F16_bugs

3.2.1. GPT Disk Labels

New Disk Labels

Manually partitioned installations may require additional steps

Starting in Fedora 16, on non-EFI x86 (32 and 64 bit) systems, anaconda will default to creating GPT disklabels (partition tables) instead of MSDOS disklabels. On these systems, when booting from a GPT-labelled disk, it is strongly recommended (not necessarily required in all cases, depending on the system's BIOS/firmware) to create a small (1MiB) BIOS boot partition. This partition will be used by the bootloader (GRUB2) for storage.

Automatic partitioning will create the partition when appropriate, but users who choose custom partitioning will have to create this partition for themselves.

This BIOS boot partition is only necessary on non-EFI x86 systems whose boot device is a GPT-labelled disk.

3.2.2. GRUB 2

The *GNU Grand Unified Bootloader (GRUB)* receives a major update in Fedora 16. *GRUB 2* allows better configuration options, better support for non x86 architectures, scripting and localization support. *GRUB 2* has new configuration formats and files — please consult the GRUB manual for more information.

GRUB user required

Anaconda allows for setting a GRUB password during installation. With the original GRUB, only the password was requested. With GRUB 2, the user is also prompted for a user name. The user `root` may be used.

3.2.3. SysVinit scripts ported to systemd

Fedora 15 saw the introduction of *systemd*, a new system and service manager for Linux. The integration of *systemd* continues in Verne, with many more SysV init scripts converted to native systemd service files. The result is a faster, more efficient boot process and simpler service management.

3.2.4. rc.local no longer packaged

The `/etc/rc.d/rc.local` local customization script is no longer included by default. Administrators who need this functionality merely have to create this file, make it executable, and it will run on boot.

Upgrades are not affected by this change.

3.3. UID Range Change

> ⚠️ **New UID and GID ranges**
>
> UID and GID values for user accounts now start at 1000 instead of 500 as in previous versions.

Fedora 16 changes the UID and GID allocation policy: user accounts now start from value 1000 instead of the previous value 500. This policy is now globally set in **/etc/login.defs** variables GID_MIN and UID_MIN, refer to **login.defs(5)** for more details. Upgrades from earlier Fedora releases will keep their configuration, starting user accounts from 500.

If you need to install a new system from scratch, while starting user accounts from 500 (to connect the system to a network with globally-defined UIDs), install using a kickstart script that places **/etc/login.defs** on the file system before package installation starts.

3.4. Virtualization

3.4.1. USB Emulation
• Support for USB 2.0 (EHCI) devices has been added.

3.4.2. CDROM Emulation
• Many fixes to comply with the ATAPI specification

• GET_EVENT_STATUS_NOTIFICATION: Implement 'media' subcommand that helps report tray open/close, media present/absent states to guests. Newer Linux guests (kernels 2.6.38+) rely on this command to revalidate discs.

• Major code refactoring and cleanup

3.4.3. Security
The qemu-kvm package has been compiled with full RELRO and PIE support which can help mitigate certain types of attacks. Exploiting the host system or other VMs running on the same host is more difficult with these compilation options.

3.4.4. Upstream release notes
• Update to qemu 0.15, refer upstream changes at *http://wiki.qemu.org/ChangeLog/0.15*.

3.4.5. Xen
• Xen support merged into QEMU

3.4.6. x86
• Stable guest TSC across migration

- Support for VIA CPU features

3.4.7. General

- Several memory leak fixes in all virtio devices

3.4.8. qemu-img

- The performance of qemu-img convert has been improved

- qemu-img convert and rebase now support the -p option which enables progress display

3.4.9. qcow2

- Improved the performance of creating/deleting internal snapshots

3.4.10. Guest Agent

- Added the guest agent that supports snapshotting,

3.5. Web Servers

httpd was updated from 2.2.17 to 2.2.19. This version is principally a security and bugfix release. This release also corrects a versioning incompatibility in 2.2.18; users are advised that 2.2.19 now restores compatibility with modules compiled against earlier versions of 2.2 (other than 2.2.18 which is considered abandoned).

- Revert ABI breakage in 2.2.18 caused by the function signature change of ap_unescape_url_keep2f(). This release restores the signature from 2.2.17 and prior, and introduces ap_unescape_url_keep2f_ex().

3.6. Cloud

3.6.1. Aeolus Conductor

The Aeolus Conductor is a web UI and tools to create and manage cloud instances across a wide variety of cloud types, all from the same UI. More information about the UI and what is supported is available at the *Aeolus home page*[13].

3.6.2. Condor Cloud

Condor Cloud is an Infrastructure as a Service (IaaS) cloud implementation. It allows you to create as many VMs from an image or images as you wish, distributing them across a pool of configured hosts. The user interface is the Deltacloud API (*http://deltacloud.org*). The backend is implemented using Condor (*http://www.cs.wisc.edu/condor/*) which in turn starts VMs using libvirt and KVM.

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[13] http://aeolusproject.org

3.6.3. HekaFS

HekaFS 0.7 enhances the feature set of GlusterFS with multi-tenancy, security, and management features.

HekaFS deployment requires knowledge of how to set up OpenSSL keys and certificates to facilitate authentication at both the management and I/O levels.

Network and storage encryption are both optional, and incur a significant performance penalty if used.

Quota/billing support is under active development within GlusterFS, and will not be available for this release of HekaFS.

Enhanced local file distribution/replication and wide-area replication are planned as eventual features of HekaFS, but are not in this release.

3.6.4. Matahari

Fedora 16 features *Matahari*, a collection of APIs accessible over remote and local interfaces for system monitoring and management. Matahari APIs are served via a collection of Agents. *Matahari* also includes a framework for adding new Agents and APIs.

The available agents are:

- `Host` - An agent for viewing and controlling hosts

- `Networking` - An agent for viewing and controlling network devices

- `Services` - An agent for viewing and controlling system services

3.6.5. pacemaker-cloud

Pacemaker-Cloud provides high availability for application services inside virtual machines on a single node. This feature provides a shell for creating virtual machine images, associating resources with the virtual machines, and combining these images into a deployable. A deployable can then be launched and monitored for high availability. If virtual machines or applications fail, these components will be restarted reducing MTTR (mean time to repair) improving availability over manual operator restart.

Fedora guest virtual machines using *systemd* are currently non-functional until the following bugzilla is merged into rawhide: See *systemd defect 702621*[14] discussion.

3.7. Database Servers

3.7.1. systemd

MySQL and PostgreSQL have been updated to use native *systemd* unit files for startup, in place of the SysV-style init scripts. This should eliminate various unfortunate problems that occurred in Fedora 15 due to *systemd*'s rather poor handling of SysV scripts. Also, handling of cases where the database server is

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[14] https://bugzilla.redhat.com/show_bug.cgi?id=702621

slow to start up is significantly better than it ever was in the SysV scripts, since *systemd* can just wait until the server is really ready without slowing the boot down.

3.7.2. PostgreSQL

The **service postgresql initdb** and **service postgresql upgrade** actions that were supported by the SysV init script cannot be provided by the *systemd* unit file. There is a new standalone script, **postgresql-setup** that provides these functions. For example, to initialize a new postgresql database, do something like

```
sudo postgresql-setup initdb
```

If you need to run more than one postgresql server on the same machine, you can duplicate and modify the **postgresql.service** file, as is customary with *systemd* services. (Remember that custom service files should go into **/etc/systemd/system/** not **/lib/systemd/system/**.) Notice that PGDATA and PGPORT settings for alternate servers must now be specified in the custom service files.

Copy **/lib/systemd/postgresl.service** to **/etc/systemd/myservice.service**, adjust PGDATA and PGPORT in the new file. To set it up, run

```
sudo postgresql-setup initdb myservice
```

postgresql-setup will then extract the PGDATA setting from that service file instead of **postgresql.service**.

The files in **/etc/sysconfig/pgsql/** are no longer used.

3.8. System Daemons

3.8.1. systemd

> ⚠️ **Many service names have changed**
>
> Under systemd, the **systemctl** command replaces many operations previously performed by **chkconfig**, **service**, and **ntsysv**. In addition, the names of a number of services have changed.

In Fedora 16, most services are controlled by **systemd**. Refer to the Fedora System Administrators Guide, "Services and Daemons" for information on how to manage system services under **systemd**.

3.8.2. Chrony

Fedora 16 uses *Chrony* as the default Network Time Protocol (NTP) client. *Chrony* is designed to work well even on systems with no permanent network connection (such as laptops), and is capable of much faster time synchronisation than standard ntp. *Chrony* has several advantages when used in systems

running on virtual machines, such as a larger range for frequency correction to help correct quickly drifting clocks, and better response to rapid changes in the clock frequency. It also has a smaller memory footprint and no unnecessary process wakeups, improving power efficiency.

3.8.3. HAL Removal

Fedora 16 does not ship with the *HAL* daemon and *libhal*, which have been replaced with *udisks*, *upower* and *libudev*. If a specific application requires libhal to function, please file a bug against it to be ported to the new technology.

4. Changes in Fedora for Desktop Users

4.1. Productivity

4.1.1. autojump

autojump is a command line tool for moving around between different parts of the filesystem more easily than cd. Fedora 16 now includes version 15 of *autojump*. The project's wiki may be found at *https://github.com/joelthelion/autojump/wiki*.

4.1.2. autokey

autokey is a desktop automation utility for Linux, that allows the automation of virtually any task by responding to typed abbreviations and hot keys. It offers a full-featured GUI that makes it highly accessible for novices, as well as a scripting interface offering the full flexibility and power of the Python language.

One use case is for auto "text expansion" or assigning "hot strings", that help reduce typing the same phrase again and again.

The tool has been also featured on lifehacker (a productivity blog):

* *http://lifehacker.com/5310976/autokey-does-customized-text-replacement-for-linux*.

* *http://lifehacker.com/5623889/use-autokey-to-customize-application-shortcut-keys*.

* *http://lifehacker.com/5790776/autohotkey-script-gives-inactive-windows-a-transparent-fade*.

The projects homepage is at : *http://code.google.com/p/autokey/*

4.1.3. calcurse

calcurse is a text based calendaring and scheduling application. Version 2.9.0 includes new features:

* Usage of short form dates such as "29/5/10" instead of "29/05/2010", "23" for the 23rd of the currently selected month and year or "3/1" for Mar 01 (or Jan 03, depending on the date format) of the currently selected year.

* "backword-kill-word" line editing function.

- Automatically drop empty notes after editing.

- Documentation and man pages now are in AsciiDoc format which is easier to maintain and can be translated to several formats such as HTML, PDF, PostScript, EPUB, DocBook and much more.

- Manual and man pages contain updated links to our new website and mailing lists, as well as instructions on how to use Transifex.

For more details, refer to *http://calcurse.org/*.

4.1.4. cuneiform

cuneiform is an open source OCR system and is new to Fedora 16. Complete details may be found at *https://launchpad.net/cuneiform-linux*.

4.1.5. ease

Also new to Fedora 16 is *ease*. *ease* is a simple, GNOME-based presentation system For more information refer to *http://www.ease-project.org/*.

4.1.6. oo2gd

oo2gd is an add on to LibreOffice that allows export of office documents to Google Docs. The project's website maybe found at *http://code.google.com/p/ooo2gd/*.

4.1.7. pal

pal is a command line calendar program, similar to *gcal* but with a number of additional features. Additional details are at *http://palcal.sourceforge.net/*.

4.1.8. routino

Another new to Fedora 16 package is *routino*. *routino* provides routing on OpenStreetMap data. Additional information, including an online demonstration, may be found at *http://www.routino.org/*.

4.1.9. writetype

'writetype is a program that helps younger students experience success in writing. It is designed especially for schools to transform technology from a barrier into an opportunity for success. *http://writetype.bernsteinforpresident.com/*.

4.2. Networking

4.2.1. ckermit

New to Fedora 16 is *ckermit*, an updated implementation of the venerable Kermit file transfer program. The Kermit protocol is available on almost all architectures, so may well be the file transfer mechanism of choice when dealing with a less capable platform. The project's website is *http://www.columbia.edu/kermit/ck90.html*.

4.2.2. hotot

hotot is a lightweight microblogging client. It supports the native notification systems of both KDE and GNOME. The project's website is at *http://hotot.org/*.

4.2.3. ike

ike is a free IPSEC VPN client can be used to communicate with Open Source IPSEC VPN servers as well as some commercial IPSEC VPN servers. Version 2.1.7 is included in Fedora 16. *http://www.shrew.net/*.

4.2.4. qodem

qodem is an open-source re-implementation of the DOS-era Qmodem serial communications package, updated for modern systems. *http://qodem.sourceforge.net/*.

4.3. Internationalization

4.3.1. IBus

ibus now supports X keyboard layouts and switching between them and/or input methods. X keyboard layouts can be added to the ibus context menu in addition to input method engines. This puts keyboard layouts and input methods on the same level for ibus users.

The ibus trigger shortcut, by default Control+Space, now toggles to the previously used input method instead of switching ibus on and off. The off-state is replaced by the default keyboard layout. The new behaviour is similar to how MacOS and ChromiumOS behave with respect to input method switching. There is a configuration option in ibus-setup to switch back to the previous Control+Space behaviour for those who prefer it. However this may be removed in the future: feedback on the new default behaviour is welcome.

Other trigger shortcut bindings specific to certain countries have been moved to the appropriate input method engine's configuration: only Control+Space is provided by default as a shortcut now. E.g. the Hangul key is now only defined for Korean engines, and Zenkaku_Hankaku is available only for Japanese engines only.

The ibus-gnome3 gnome-shell extension provides a gnome-shell indicator icon with menu and input method candidate window instead of usual GTK versions. The indicator uses text symbols to show the current input method or keyboard layout of image icons. Keyboard layouts are displayed as letter country codes (e.g. 'us', 'fr', 'de', etc) and native characters (like '', '') are used for input methods. ibus-gnome3 is provided in a ibus subpackage as a technology preview for Fedora 16. The plan is to integrate it into gnome-shell itself in a future release upstream hopefully in time for Fedora 17. ibus-gnome3 can be enabled using the Shell Extensions in 'gnome-tweak-tool'. See also *Features/GnomeInputIntegration*[15].

ibus has some support now for X compose keys (as provided by libX11 XIM) in a unified way for all GTK, QT and X11 applications. Currently support is available for US International mode and also cedilla mode if the desktop locale is Brazilian Portuguese.

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[15] http://fedoraproject.org/w/index.php?title=Features/GnomeInputIntegration

ibus engines can now define XKB options. For example, when a user enables Indic engines provided by ibus-m17n, Alt_R will be automatically mapped to AltGr; if the user then switches back to ibus-anthy, AltGr will be unmapped again.

The eekboard on-screen keyboard can now be activated through IBus, in addition to desktop accessibility. See *setup instruction for tablet PC*[16].

ibus-gucharmap is a new input method engine providing Unicode input method, which supports in-place character-map view, character search based on Unicode names, and easy navigation with various keyboard shortcuts.

Tamil support has been added to Indic Typing Booster predictive text input method and supports Tamil-99 and Inscript layouts.

4.3.2. Fonts

Fedora now includes font for Nastaleeq script, one of the main script styles used in writing the Perso-Arabic script, and traditionally the predominant style in Persian calligraphy.

Arabic script support for the Urdu language has been improved by adding following new font packages: nafees-naskh-fonts, nafees-nastaleeq-fonts, nafees-tehreer-naskh-fonts, nafees-riqa-fonts, and nafees-pakistani-naskh-fonts.

The WQY Microhei font is now used by default for Chinese. Chinese users requiring more fonts support can install them by yum groupinstall of 'simplified-chinese-support' or 'traditional-chinese-support'.

4.4. Multimedia

4.4.1. gnome-paint

gnome-paint is a simple, easy-to-use paint program for GNOME. Fedora 16 includes version 0.4.0. The project's web page may be found at *https://launchpad.net/gnome-paint*.

4.4.2. blender

blender has been updated to 2.5. The new release provides a number of new features, but in particular, an enhanced GUI. There is also now support of openCOLLADA for exchange 3D modelling data to other applications

4.5. Entertainment

4.5.1. New Games

Fedora 16 introduces a number of new games to the repository:
• *Naev* is a 2D space trading and combat game, featuring fast-paced combat, many ships, a large variety of equipment and a large galaxy to explore.

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[16] https://fedorahosted.org/eekboard/wiki/TabletGuide

- *Golly* is an open source, cross-platform application for exploring Conway's Game of Life and other cellular automata.

- *Puzzle-Master* is an easy-to-use, fun and addictive jigsaw puzzle game.

- *Sudoku Savant* is a simple GUI-driven application to solve and generate sudoku puzzles, and supports manual solving, pencil marks and cell colouring.

4.5.2. Game Updates

- *Teeworlds*, a retro multiplayer shooter, is updated to version 0.6. Improvements include a reworked ninja powerup, a friend list, an upgraded spectator mode, and improved graphics.

- *Plee the Bear* is upgraded to version 0.5.1, with a new mini-game system and new characters.

- *The Mana World* receives a major upgrade to version 0.5.2, with big improvements to the client.

- *Battle Tanks* is updated to version 0.98, bringing a major engine update, an improved multiplayer experience thanks to internal network queueing, and several performance enhancements.

5. Changes in Fedora for Developers

5.1. Development Tools

5.1.1. Ada

Ada is a modern programming language designed for large, long-lived applications – and embedded systems in particular – where reliability and efficiency are essential. It was originally developed in the early 1980s (this version is generally known as Ada 83) by a team led by Dr. Jean Ichbiah at CII-Honeywell-Bull in France. The language was revised and enhanced in an upward compatible fashion in the early 1990s, under the leadership of Mr. Tucker Taft from Intermetrics in the U.S. The resulting language, Ada 95, was the first internationally standardized (ISO) Object-Oriented Language. Under the auspices of ISO, a further (minor) revision was completed as an amendment to the standard; this version of the language is known as Ada 2005. Work is currently in progress on some additional features (including support for program annotations) and is expected to be completed in 2012.

Fedora 16 includes the latest open-source Ada development tools.

- Fedora 16 includes full stack of tools for Ada Development: Compiler (gcc-gnat), Project Builder (gprbuild), IDE (GPS) and some others

- Ada bindings for most popular tools such as: GTK, Qt, zeromq, Databases (PostgreSQL, MySQL and SQLite) etc

5.1.2. autoconf-archive

The GNU Autoconf Archive is a collection of more than 450 macros for GNU Autoconf that have been contributed as free software by friendly supporters of the cause from all over the Internet. Version 2011.04.12 is now included in Fedora 16. Refer to *http://www.gnu.org/software/autoconf-archive/index.html* for the project details.

5.1.3. be

Bugs Everywhere is a "distributed bugtracker", designed to complement distributed revision control systems. By using distributed revision control as a backend for bug state, we gain several convenient features:

- Bugs and code that live on branches are tracked together—when a branch is merged, both the code changes and bug changes that the branch contains are merged alongside each other. We no longer have to be confused about whether a fix that is applied to the development branch but not yet present in the production branch means that our bug is "fixed".

- Users can fully modify bug state while offline, unlike with many centralized bugtrackers.

- When a user checks out your source code, she gets the current bug state for free.

- We can still provide access to a friendly web interface for users—in this model, a web interface becomes just another client that merges with the main repository.

Fedora 16 includes version 1.0.1.

5.1.4. btparser

btparser is a backtrace parser and analyzer, which works with backtraces produced by the GNU Project Debugger. It can parse a text file with a backtrace to a tree of C structures, allowing the developer to analyze the threads and frames of the backtrace and work with them. The project's trac page may be found at *https://fedorahosted.org/btparser/*.

5.1.5. caribou-devel

Caribou is a text entry and UI navigation application being developed as an alternative to the Gnome On-screen Keyboard. The overarching goal for Caribou is to create a usable solution for people whose primary way of accessing a computer is a switch device.

The initial goal is to make an in-place on-screen keyboard suitable for people who can use a mouse but not a hardware keyboard. This on-screen keyboard may also be useful for touch screen or tablet users. *http://live.gnome.org/Caribou*.

5.1.6. cddlib-static

cddlib is a C library implementing of the Double Description Method of Motzkin et al. for generating all vertices (i.e. extreme points) and extreme rays of a general convex polyhedron. *http://www.ifor.math.ethz.ch/~fukuda/cdd_home/*.

5.1.7. D2

The D2 programming language is available in Fedora 16. D is a modern language with high performance near C/C++ with an easy syntax. C/C++ and Java developers can easily migrate to D.

Additonal details are available on the *Feature Page*[17]. Information on the D language may be found at *http://www.digitalmars.com/d/2.0/index.html*.

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[17] http://fedoraproject.org/wiki/Features/D2_programming

5.1.8. emacs-ecb

emacs-ecb is an Emacs-based code browser. It displays a number of informational windows that allow for easy source code navigation and overview:

- A directory tree,

- a list of source files in the current directory (with full support and display of the VC-state),

- a list of functions/classes/methods/... in the current file, (ECB uses the CEDET-semantic, or Imenu, or etags, for getting this list so all languages supported by any of these tools are automatically supported by ECB too)

- a history of recently visited files (groupable by several criteria),

- a direct and auto-updated ecb-window for the semantic-analyzer for some intellisense,

- the Speedbar

- output from compilation (the compilation window) and other modes like help, grep etc. or whatever a user defines to be displayed in this window.

More information may be found at *http://ecb.sourceforge.net/*.

5.1.9. frama-c

frama-c is a C source code analysis tool, which may be used standalone, or integrated with Emacs. *frama-c* includes a source browser, and can calculate simple metrics such as sloc, call depth and cyclomatic complexity for a project. It can also generate simple call graphs. Various assertions about the code may be tested, and the code may be validated against a number of theorems. *frama-c* accepts user written plugins for additional custom analyses. More information on *frama-c* may be found at *http://frama-c.com/*.

5.1.10. GCC Python Plugins

GCC plugins that embed *Python 2* and *Python 3* are now available, enabling developers to more easily hook into GCC's inner workings (e.g. to add new compiler warnings). See the *Feature Page* [18] for more details.

5.1.11. jruby

jruby is a Java implementation of the Ruby language, offering Ruby programmers the platform independence of Java. Version 1.6.2 of *jruby* is new to Fedora 16. The project page may be found at *http://jruby.org*.

5.1.12. libpipeline

libpipeline provides a set of functions for manipulating pipelines of subprocesses in a flexible and convenient way. *http://libpipeline.nongnu.org/*.

---

[18] http://fedoraproject.org/w/index.php?title=Features/GccPythonPlugin

5.1.13. osm-gps-map-devel

osm-gps-map-devel, a GTK+ widget (and Python bindings) that when given GPS co-ordinates, draws a GPS track, and points of interest on a moving map display. Downloads map data from a number of websites, including openstreetmap.org. *http://nzjrs.github.com/osm-gps-map/*.

5.1.14. Perl 5.14

Fedora 16 ships with *Perl 5.14*, which boasts Unicode version 6 compatibility, more reliable and consistent exception handling, improved IPV6 support, and performance and memory handling improvements. For the full list of changes (including syntax changes), please see the official Perl documentation: *http:// perldoc.perl.org/perl5140delta.html*.

5.1.15. qwtpolar-devel

qwtpolar-devel is a library for plotting polar graphs. *http://qwtpolar.sourceforge.net/*.

5.1.16. shunit2

shunit2 is a unit test framework for shell scripts similar to PyUnit or JUnit. *http://code.google.com/p/ shunit2/*.

5.1.17. Static Analysis of CPython Extensions

Fedora now ships with a gcc-with-cpychecker variant of GCC, which adds additional compile-time checks to Python extension modules written in C, detecting various common problems (e.g. reference counting mistakes).

5.1.18. why-emacs

why-emacs is an Emacs add on for the Why software verification tool. *http://why.lri.fr/*. Why supports a number of theorem provers including Ergo, haRVey and Zenon, as well as a number of others.

5.1.19. wso2

New to Fedora 16, the WSO2 Web Services Framework for C++ is an enterprise grade C++ library for providing and consuming Web Services in C++. Fedora includes version 2.1.0 of the framework. Documentation may be found at *http://wso2.org/project/wsf/cpp/2.0.0/docs/*.

5.2. Haskell

5.2.1. GHC

ghc has been updated to *7.0.4*[19] with lots of *bugfixes*[20].

---

[19] http://haskell.org/ghc/docs/7.0.4/html/users_guide/release-7-0-4.html
[20] http://haskell.org/ghc/docs/7.0.4/html/users_guide/release-7-0-3.html

5.2.2. Haskell Platform

haskell-platform[21] has been updated to the latest stable 2011.2.0.1 release.

5.2.3. New packages

New packages include *cabal-dev*[22], *leksah*[23], and various new libraries.

6. Changes in Fedora for Specific Audiences

6.1. Scientific and Technical

6.1.1. ATpy

ATpy is a Python library for manipulating astronomical tables. Details are available at *http://atpy.github.com/*.

6.1.2. bowtie

bowtie is an ultrafast, memory-efficient short read aligner. It aligns short DNA sequences (reads) to the human genome at a rate of over 25 million 35-bp reads per hour. Bowtie indexes the genome with a Burrows-Wheeler index to keep its memory footprint small: typically about 2.2 GB for the human genome (2.9 GB for paired-end). *http://bowtie-bio.sourceforge.net/index.shtml*.

6.1.3. DSDP

The DSDP software is a free open source implementation of an interior-point method for semidefinite programming. It provides primal and dual solutions, exploits low-rank structure and sparsity in the data, and has relatively low memory requirements for an interior-point method. It allows feasible and infeasible starting points and provides approximate certificates of infeasibility when no feasible solution exists. The dual-scaling algorithm implemented in this package has a convergence proof and worst-case polynomial complexity under mild assumptions on the data. For full documentation refer to *http://www.mcs.anl.gov/hs/software/DSDP/*.

6.1.4. fastx_toolkit

fastx_toolkit is a collection of command line tools for Short-Reads FASTA/FASTQ files preprocessing. *http://hannonlab.cshl.edu/fastx_toolkit/index.html*.

6.1.5. IBSimu

Ion Beam Simulator or *IBSimu* is an ion optical computer simulation package for ion optics, plasma extraction and space charge dominated ion beam transport using Vlasov iteration. More information at *http://ibsimu.sourceforge.net/*.

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[21] http://hackage.haskell.org/platform

[22] http://hackage.haskell.org/package/cabal-dev

[23] http://leksah.org

6.1.6. gappa

gappa is a tool intended to help verifying and formally proving properties on numerical programs dealing with floating-point or fixed-point arithmetic. Fedora 16 upgrades to version 0.15.0. The project's web site may be found at *http://gappa.gforge.inria.fr/*.

6.2. Amateur Radio

6.2.1. ax25-tools-x

ax25-tools-x provides a GUI interface to various *soundmodem* configuration and diagnostics applications.

6.2.2. cutecw

cutecw has been updated to 1.0. Improvements include better training sequences, a greatly improved "read-to-me" mode, and a number of cosmetic enhancements. For more information refer to *http://www.hamtools.org/cutecw/*

6.2.3. hamlib

hamlib has been updated to version 1.2.13.1. Some of the significant features are:

* support for VX-1700, FUNcube, FiFi-SDR, KTH-SDR Si570, FT-5000, TS-590S

* A new rotor backend with new features

* Fixes and new features for TS-440S, K2, K3, SR-2200, THF6A, THF7E, NewCAT rigs serial port defaults, TM-D700

* Allow USB device's VID/PID/Vendor/Product to be explicitly specified

The complete upstream changelog is available at *http://hamlib.sourceforge.net/NEWS* and there is more general information on the project's wiki at *http://www.hamlib.org*.

6.2.4. xnec2c

xnec2c version 1.5 incorporates a number of improvements over 1.2:

* removed the restrictions in excitation to allow plotting the re-radiated pattern from a structure excited by incident field or elementary current source

* fix crashing of xnec2c 1.3 on long input file names (greater than 80 characters).

* Changed the handling of command line arguments so that the input file name may be specified without the use of the -i option.

* allow the calculation of front to back ratios when the antenna is modelled over ground.

More details may be found at *http://www.qsl.net/5b4az/pkg/nec2/xnec2c/doc/xnec2c.html*.

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A large number of people contribute to Fedora each release. Among these are a number of writers and translators who have prepared these release notes. The following pages list those contributors.

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B. Revision History

Revision 16.3   Tue Nov 29 2011   **John McDonough** *jjmcd@fedoraproject.org*

    Minimum RAM correction - BZ#754439
    Service name changes - BZ#754145
    Change verbiage around CPU requirements - BZ#499585

Revision 16.2   Mon Nov 7 2011   **John McDonough** *jjmcd@fedoraproject.org*

    Trusted boot didn't make it to F16 (Overview, Boot)
    Added Ask Fedora - BZ#748653
    Added list of contributors

Revision 16.1   Mon Oct 23 2011   **John McDonough** *jjmcd@fedoraproject.org*

    Various typos - BZ#741975
    Better prose on systemd database handling - BZ#743614
    Improved prose in setting up multiple PostgreSQL servers - BZ#743618
    Warning about GRUB user - BZ#737187
    Include mention of D2 - BZ#743960
    Warning about UID/GID change - BZ#739661
    Clean up links
    rc.local no longer packaged - BZ#745235
    Virtualization security - BZ#746015
    GTK capitalization - BZ#747940
    QEMU capitalization - BZ#746672 against VG

Dedication to Dennis Ritchie

Revision 16.0   Mon Oct 10 2011   **John McDonough** *jjmcd@fedoraproject.org*
Release

Revision 15.99   Mon Oct 10 2011   **John McDonough** *jjmcd@fedoraproject.org*
Mentions of F16 - BZ#741830
Typo in Grub - BZ#743981
Additional index terms

Revision 15.98   Fri Aug 16 2011   **John McDonough** *jjmcd@fedoraproject.org*
Release for F16 Beta

Revision 15.2   Thu Jun 23 2011   **John McDonough** *jjmcd@fedoraproject.org*
Required memory for installation (BZ#699770)

Revision 15.1   Fri Jun 3 2011   **John McDonough** *jjmcd@fedoraproject.org*
Typo in Virtualization (BZ#705928)
gnuplot not GNU plot (BZ#707318)
device naming (BZ#707730)
Correct version number of boost (BZ#707786)
Remove reference to disappeared GS-Theme-Selector (BZ#708085)

Revision 15.0   Sun May 8 2011   **John McDonough** *jjmcd@fedoraproject.org*
Memory (BZ#699770, 701780)
Xfce case (BZ#699977)
Wireshark permission changes (BZ#680165)
Powering off with systemd (BZ#701638)

Revision 14.98   Fri Apr 15 2011   **John McDonough** *jjmcd@fedoraproject.org*
Remove Dom0
Remove dnssec
Remove riak
Add warning about Network Connections
Add prose on IcedTea

Revision 14.97   Mon Apr 11 2011   **John McDonough** *jjmcd@fedoraproject.org*
Add index entries

Revision 14.96   Tue Apr 5 2011   **John McDonough** *jjmcd@fedoraproject.org*

Point Kernel to kernelnewbies (Kernel)
Point features to F15 instead of general feature page (Overview)
Correct boxgrinder URL (Virtualization)
Correct Python URL (Developer Tools)
Correct Rails URL (Developer Tools)
Correct avr-gcc URL (Embedded Development)
Correct avr-c++ URL (Embedded Development)
Correct avr-binutils URL (Embedded Development)
Correct dfu-programmer URL (Embedded Development)
Correct xlog URL (Amateur radio)
Correct splat URL (Amateur radio)
Remove redundant systemd and add administrative user per Rahul

Revision 14.95   Tue Apr 5 2011   **John McDonough** *jjmcd@fedoraproject.org*

Converted beats

Revision 14.90   Tue Mar 22 2011   **John McDonough** *jjmcd@fedoraproject.org*

Empty Fedora 15 skeleton

Revision 14.1   Sun Oct 31 2010   **John McDonough** *jjmcd@fedoraproject.org*

Remove boot section and with it all reference to systemd

Revision 14.0   Fri Oct 15 2010   **John McDonough** *jjmcd@fedoraproject.org*

Preparation for GA
Add mouse changes
Add Pino/Gwibber changes
Mark systemd as preview
Remove draft status

Revision 13.95   Mon Sep 13 2010   **John McDonough** *jjmcd@fedoraproject.org*

Preparation for beta release

Revision 0   Sat Sep 4 2010   **John McDonough** *jjmcd@fedoraproject.org*

Initial creation of book by publican

Initial wiki conversions

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