Fedora 20
Release Notes

Release Notes for Fedora 20

The Fedora Docs Team

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Abstract

This document provides the release notes for Fedora 20. It describes major changes offered in Heisenbug as compared to Fedora 19. For a detailed listing of all changes, refer to the Fedora Technical Notes.

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1. Welcome to Fedora 20

1.1. 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, 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
- Fedora FAQ
- Help and Discussions
- Participate in the Fedora Project

1.1.1. Need Help?

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

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 knowledgeable about a specific topic might not always be available.

1.2. Overview

As always, Fedora continues to develop (Red Hat contributions) and integrate the latest free and open source software (Fedora 20 Changes). The following sections provide a brief overview of major changes from the last release of Fedora.

For more details about the features that are included in Fedora 20 refer to the individual wiki pages that detail feature goals and progress: http://fedoraproject.org/wiki/Releases/20/ChangeSet.

1.3. Hardware Overview

Fedora 20 provides software to suit a wide variety of applications. The storage, memory and processing requirements vary depending on usage. For example, a high traffic database server requires much more memory and storage than a business desktop, which in turn has higher requirements than a single-purpose virtual machine.

1.3.1. Minimum System Configuration

The figures below are a recommended minimum for the default installation. Your requirements may differ, and most applications will benefit from more than the minimum resources.

1GHz or faster processor
1GB System Memory
10GB unallocated drive space

Low memory installations

Fedora 20 can be installed and used on systems with limited resources for some applications. Text, vnc, or kickstart installations are advised over graphical installation for systems with very low memory. Larger package sets require more memory during installation, so users with less than 768MB of system memory may have better results preforming a minimal install and adding to it afterward.
For best results on systems with less than 1GB of memory, use the DVD installation image.

1.3.2. Display resolution

Graphical Installation requires 800x600 resolution or higher

Graphical installation of Fedora 20 requires a minimum screen resolution of 800x600. Owners of devices with lower resolution, such as some netbooks, should use text or VNC installation. Once installed, Fedora will support these lower resolution devices. The minimum resolution requirement applies only to graphical installation.

1.3.3. Graphics Hardware

1.3.3.1. Minimum Hardware for Accelerated Desktops

Fedora 20 supports most display adapters. Modern, feature-rich desktop environments like GNOME3 and KDE Plasma Workspaces use video devices to provide 3D-accelerated desktops. Older graphics hardware may *not support* acceleration:

Intel prior to GMA9xx
NVIDIA prior to NV30 (GeForce FX5xxx series)
Radeon prior to R300 (Radeon 9500)

1.3.3.2. CPU Accelerated Graphics

Systems with older or no graphics acceleration devices can have accelerated desktop environments using LLVMpipe technology, which uses the CPU to render graphics. LLVMpipe requires a processor with **SSE2** extensions. The extensions supported by your processor are listed in the **flags:** section of **/proc/cpuinfo**

1.3.3.3. Choosing a Desktop Environment for your hardware

Fedora 20's default desktop environment, GNOME3, functions best with hardware acceleration. Alternative desktops are recommended for users with older graphics hardware or those seeing insufficient performance with LLVMpipe.

Desktop environments can be added to an existing installation and selected at login. To list the available desktops, use the **yum grouplist** command:

```
yum grouplist -v hidden | grep desktop
```

Install the desired group:

```
yum groupinstall "KDE Plasma Workspaces"
```

Or, use the short group name to install:

```
yum install @mate-desktop-environment
```

1.4. Architecture Specific Content

1.4.1. Cloud Specific Content

Fedora 20 continues efforts to produce tested and proven cloud images. The images are now built using the same tooling as other release media, and the Fedora Cloud team has actively trimmed and improved their product. Get started using Fedora 20 in the cloud now at http://fedoraproject.org/en/get-fedora-options#clouds!

1.4.2. ARM Specific Content

ARM in Fedora is all grown up! With the release of Fedora 20, ARM is considered a primary architecture meaning that it receives the same amount of attention that the x86 and x86-64 releases get. Fedora ARM officially supports armv7hl, and work on AArch64 is underway. To find out how to help or learn about other unofficial ARM ports read the ARM section of the wiki. Architectures/ARM

1.5. 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.

1.5.1. Providing Feedback on Fedora Software

To provide feedback on Fedora software or other system elements, please refer to Bugs And Feature Requests. A list of commonly reported bugs and known issues for this release is available from Common F20 bugs, on the wiki.

1.5.2. 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 page on the wiki.
- Fill out a bug request using this template - *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

2. Changes in Fedora for System Administrators

2.1. Installation

2.1.1. Unversioned docdirs

Per package documentation is now installed into unversioned **`/usr/share/doc/`*`packagename`*** directories. Previously the directory name contained the package's version in addition to the package's name.

2.2. Security

2.2.1. FreeIPA gains transitive trust support

FreeIPA 3.3.2 adds support for complex Active Directory forests containing multiple domains. Users from multiple AD domains can access resources in FreeIPA. FreeIPA administrators can selectively block

access per each AD domain.

2.2.2. SSSD adds ID mapping for CIFS shares

The Fedora 20 **System Security Services Daemon** has gained support for mapping between Windows SIDs and POSIX IDs. Administrators using **SSSD** on their networks can establish access control using two new utilities, **`setcifsacl`** and **`getcifsacl`**.

More information can be found in the upstream design document at https://fedorahosted.org/sssd/wiki/DesignDocs/IntegrateSSSDWithCIFSClient and the manpages for **`setcifsacl`**, **`getcifsacl`**, and other related SSSD packages.

2.2.3. Shared System Certificate Tools

Fedora's Shared System Certificate feature is being enhanced this release with the addition of the **p11-kit-trust** application. This package allows modification to trust anchors and blacklist keys and certificates. With a single command, administrators can make changes to their system's certificate database instead of adding a file to a special directory and running a special command. This new tool continues the development of the Shared System Certificate feature.

2.3. File Systems

2.3.1. SSD caching for block devices

Fedora 20 offers experimental support for adding solid state drives (SSDs) as fast, transparent caches to traditional rotating storage (HDDs). Filesystems on the SSD cached block devices offer both the speed of SSDs and volume of HDDs. Both traditional and LVM partitioning schemes can benefit from this functionality.

Make backups!

Always back up your data before making low level changes, such as migrating to a bcache device. Until tools like blocks are packaged for Fedora, users are advised to implement bcache by creating clean bcache devices and populating their filesystems from a recent backup.

Learn more about this functionality, called *bcache*, from:

https://git.kernel.org/cgit/linux/kernel/git/torvalds/linux.git/plain/Documentation/bcache.txt

http://bcache.evilpiepirate.org/

https://fedoraproject.org/wiki/Test_Day:2013-10-13_SSD_Cache

2.4. Virtualization

2.4.1. ARM emulation on x86 Hosts

Changes have been made to have smoother emulation of ARM guest virtual machines running on x86 hosts using standard **libvirt** tools, including **`virsh`**, **`virt-manager`** and **`virt-install`**. **`qemu`** has an ARM emulator that works well and is actively used in the Fedora ARM effort. However **libvirt** and **`virt-manager`** currently have issues launching qemu-system-arm VMs, mostly by encoding x86 assumptions in the generated command line that cause **`qemu-system-arm`** to fail to start. Changes have been made to fix this issue. More information can be found at https://fedoraproject.org/wiki/Changes/Virt_ARM_on_x86

2.4.2. Libvirt Client Access Control

The **libvirt** client allows for the setting of permission rules which can be applied to all managed objects

and API operations, thus allowing for all client connections to be limited to a minimal set of rules and privileges. There are three levels of access which can be assigned.

`Unauthenticated` access is initially used for all connections. This state allows all API operations that are required to complete authentication. Following a successful authentication, two more levels can be assigned: **`Unrestricted`**, which gives full access to all API operations, and **`Restricted`**, which allows read only access.

System administrators can set permission rules for authenticated connections. Every API call in libvirt has a set of permissions that are validated against the object that is being used. For example, User A wants to change a parameter in the domain object. When the user tries to save the change, virDomainSetSchedulerParametersFlags method will check whether the client has write permissions on the domain object. Additional checks and permission settings can be processed as well. Filtering can also be done to see which clients have permissions on which objects to allow for smother administration of permissions. Documentation for polkit access control can be found at http://libvirt.org/aclpolkit.html.

The libvirtd.conf configuration file is responsible for setting the access permissions. It uses the access_drivers parameter to enable this operation. Note that if more than one access driver is requested, all must succeed in order for permission to be granted.

More information can be found at https://fedoraproject.org/wiki/Changes/Virt_ACLs and http://libvirt.org/acl.html

2.4.3. Virt-manager snapshots

Virtual Machine Manager, or virt-manager, allows for easy management and monitoring of virtual machine snapshots of KVM guests. Note that virt-manager will pause the guest virtual machine for a few seconds while taking the snapshot. More information is available here:

http://fedoraproject.org/wiki/Changes/Virt_Manager_Snapshots

http://fedoraproject.org/wiki/Features/Virt_Live_Snapshots

http://libvirt.org/formatsnapshot.html

Snapshot section of **`man 1 virsh`**

http://fedoraproject.org/wiki/QA:Testcase_Virt_Snapshot_UI

2.5. Database Servers

2.5.1. MongoDB

MongoDB has been updated to version 2.4 adding full text search, support for a wider array of geospatial indexes, and security enhancements. For more information about this new version read the release notes at http://docs.mongodb.org/manual/release-notes/2.4/.

2.5.2. Hadoop

Fedora 20 offers the core of the thriving Hadoop platform and many related packages. For a detailed review of Hadoop in Fedora, refer to https://fedoraproject.org/wiki/Changes/Hadoop.

The packaging of the Hadoop platform is the latest work of the **`Fedora Big Data SIG`**. Find this **`Special Interest Group`** at https://fedoraproject.org/wiki/SIGs/bigdata, your gateway to using and participating in the effort.

2.6. Mail Servers

2.6.1. No default sendmail

Fedora 20 no longer includes a mail transfer by default. Previous releases of Fedora included *sendmail*, but it has limited usefulness without manual configuration.

2.7. Samba

2.7.1. SSSD adds ID mapping for CIFS shares

Information on this feature can be found in the Security section.

2.8. System Daemons

2.8.1. Syslog removed from default installation

syslog is no longer included in default installations. **journald** logging serves most use cases as well as, or better than, **syslogd**.

Users accustomed to checking **/var/log/messages** for system logs should instead use **journalctl**.

journalctl command examples

new journalctl	old messages
journalctl	**less /var/log/messages**
journalctl -f	**tail -f /var/log/messages**
journalctl --unit named.service	**grep named /var/log/messages**
journalctl -b	Shows logs from current boot, no simple equivalent.

2.8.2. systemd

2.8.2.1. New unit types: Scope

Systemd now has two new unit types, **scope** and **slice**.

scope units are automatically created by systemd out of existing processes. By grouping a process and its children together, a scope unit can be used to organize processes, apply resource units, or kill a group of processes. User sessions are one example of processes contained in a scope unit.

slice units are used to group units that manage processes into a hierarchy that allows control of resources allocated to the slice. The default slices are machine.slice, for virtual machines and containers; system.slice, for system services; and user.slice, for user sessions. These default slices are automatically populated.

Instance units, such as **getty@.service**, are spawned on demand using the template defined in their configuration file. Each type of template is given a subslice of the **system slice**, and instances are contained within that slice.

Scope and service units assigned to a slice are descendants of that slice's node in the control group tree. A slice's name describes its position relative to the root slice. The output below demonstrates how *user-1000.slice* is a child of *user.slice*, which is in turn a child of **.**, the root slice. Each session is further confined in a scope unit within the user's slice.

```
    systemctl status user.slice

Loaded: loaded (/usr/lib/systemd/system/user.slice; static)
Active: active since Sun 2013-09-08 01:23:40 MDT; 18h ago
  Docs: man:systemd.special(7)
CGroup: /user.slice
        ├─user-1000.slice
        │ ├─session-21.scope
        │ │ ├─9226 sshd: pete [priv]
        │ │ ├─9229 sshd: pete@pts/4
        │ │ ├─9230 -bash
        │ │ ├─9262 sudo su -
        │ │ ├─9270 su -
        │ │ ├─9271 -bash
        │ │ └─9509 screen -R
        │ ├─session-18.scope
        │ │ ├─ 7939 sshd: pete [priv]
        │ │ ├─ 7942 sshd: pete@pts/0
        │ │ ├─ 7943 -bash
        │ │ ├─ 7982 sudo su -
        │ │ ├─ 7988 su -
        │ │ ├─ 7989 -bash
        │ │ ├─ 8206 SCREEN
        │ │ ├─ 8207 /bin/bash
        │ │ ├─ 8237 /bin/bash
        │ │ ├─ 8486 less NEWS
        │ │ ├─ 8489 /bin/bash
        │ │ └─10637 systemctl status user.slice
        ## truncated ##
```

Services can be added to a slice with the **Slice=*slicename*** directive in their unit configuration file. Arguments allowing resource limitation within a slice or service unit are described in **man systemd.directives**. See also **man systemd.slice** and **man systemd.cgroup**.

2.8.2.2. systemd-cryptsetup for TrueCrypt

Support for TrueCrypt in Fedora is expanded by **systemd-cryptsetup** support for the technology, allowing easy authentication during boot.

2.8.2.3. Filtering by unit state with systemctl

systemctl now supports filtering the unit list output by load state. The **--state** option will accept any value or a comma-separated list of the values of **LOAD**, **SUB**, or **ACTIVE** states. For example,

```
    systemctl --state failed
```

2.8.3. journald

2.8.3.1. Viewing the logs of a specific boot

journalctl can now be used to view the logs from a specific boot. For example, to view logs from the current boot:

```
   journalctl -b
```

Or, view the logs from the previous boot:

```
journalctl -b -1
```

In addition to relative boot sequence, journald assigns a 128-bit boot ID that can be referenced. For example:

```
journalctl -b 38fd9c3303574ed38e822233457f6b77
```

2.8.3.2. Referencing the journal with cursors

journalctl can reference the contents of the journal by a record identifier known as a **cursor**. Similar to a git hash, the **cursor** uniquely identifies a point in the journal.

If you add **--show-cursor** to a journalctl query, the last line of output will contain the cursor value:

```
journalctl -b -u network --show-cursor --since 15:00
Sep 08 15:37:59 localhost.localdomain network[4074]: [FAILED]
Sep 08 15:37:59 localhost.localdomain systemd[1]: network.service: control
process exited, code=exited status=1
Sep 08 15:37:59 localhost.localdomain systemd[1]: Failed to start LSB: Bring
up/down networking.
Sep 08 15:37:59 localhost.localdomain systemd[1]: Unit network.service entered
failed state.
-- cursor:
s=13497722134642a2ac1544bada0c8836;i=1120d;b=8491c05dabd3444ca122e7069b5de0a9;m=d
b2118a46;t=4e5e7d81c7402;x=d177768ac95df831
```

The cursor can be used to identify that point in the journal in a broader query to provide context:

```
journalctl -c
"s=13497722134642a2ac1544bada0c8836;i=1120d;b=8491c05dabd3444ca122e7069b5de0a9
;m=db2118a46;t=4e5e7d81c7402;x=d177768ac95df831"
```

Scripts parsing journalctl's output can store the cursor value and use it on their next run to pick up where they left off:

```
journalctl --after-cursor
"s=13497722134642a2ac1544bada0c8836;i=1120d;b=8491c05dabd3444ca122e7069b5de0a9
;m=db2118a46;t=4e5e7d81c7402;x=d177768ac95df831"
```

3. Changes in Fedora for Desktop Users

3.1. Desktop

3.1.1. General

3.1.1.1. X2Go

X2Go is a featureful remote desktop solution based on a fork of NoMachine's GPL'ed NX3 libraries. X2Go packages allow Fedora 20 to work as a scalable server or versatile client. Entire desktop sessions can be paused and migrated, and the software supports audio and file transfers.

X2Go with accelerated desktops

X2Go may not start properly with 3D accelerated desktops like GNOME3. For best results, use a desktop environment that does not require acceleration.

Get started with X2Go using Fedora's X2Go packages and the documentation at http://wiki.x2go.org/doku.php/doc:start

3.1.2. Cinnamon

The community favorite desktop environment Cinnamon in Fedora 20 has been updated to version 2.0, with many new features and improvements.

Some features of the release include:

- Better edge tiling.
- Edge Snapping, like tiling but snapped windows are not covered by other windows.
- Fun and customizable sound effects
- Enhanced user management, and a new user applet for common tasks
- Many improvements in the file manager **nemo**, including system tray support for file operations, better file type handling, and updates to the user interface.
- More streamlined dependencies; **Cinnamon** no longer requires the entire GNOME Desktop Environment to be installed, and the two environments get along better when they are both installed.

To use Cinnamon on Fedora, install it with the command **`yum groupinstall "Cinnamon Desktop"`** and choose it when logging in. A detailed look at the features in Cinnamon 2.0 can be found at http://segfault.linuxmint.com/2013/10/cinnamon-2-0-released/

3.1.3. Enlightenment

Fedora 20 offers the newest version of Enlightenment. After over a decade of upstream development, the Enlightenment project has released the E17 desktop shell, a window manager and supporting suite of libraries. It can be configured as a fast, spartan window manager or as a visually appealing desktop environment with ample eye candy.

Enlightenment can be installed with the command **`yum install @enlightenment`** and used by choosing it at login. To learn more, read http://www.enlightenment.org/p.php?p=about&l=en

3.1.4. GNOME 3.10

3.1.4.1. GNOME Overview

Fedora 20 features GNOME 3.10. This latest version of the GNOME desktop will have a number of new applications and features:

- Fine grained scrolling when dragging the scroll bar handle, or scrolling while holding the **`shift`** key.
- Support for login and authentication with **`Smart Cards`**.
- *Header bars* merge title bars and toolbars into a single element, giving more screen space to window content and improving presentation of application controls.
- Improved **Magnifier** with caret tracking, press **F7** to activate caret.
- Lock screen background customization.
- A new geolocation framework allows features like automatic timezone updates when traveling and location detection in **Maps**.
- **GNOME Documents** support for OwnCloud

Drag and drop files between your computer and a **Boxes** guest. Windows guests will need http://spice-space.org/download/windows/spice-guest-tools/ installed, and Linux guests will need an updated version of spice-vdagent.

Boxes gains support for importing filesystem images.

Improved user interface for **Contacts**

Improved automatic scaling for high pixel density displays.

Improved application selection in the shell Overview.

Flickr integration with **GNOME Online Accounts** allows access to Flickr content in **GNOME Photos**.

Improved, integrated system status menu.

Redesigned **gnome-tweak-tool**, with improved design, extension integration, and expanded functionality.

A new application, **GNOME Maps**, brings a simple map application to the GNOME Desktop.

GNOME Music, a streamlined application for playing and sharing music.

System Status Area

The new **`System Status Area`** unifies many settings that had their own icon and menu in previous releases, such as wireless and other networking. Not all potential features are displayed at all times; for example, the volume slider for a microphone does not appear when a microphone is not present, and WiFi options do not appear when a wireless device is not detected. Learn more about the System Status Area at http://afaikblog.wordpress.com/2013/08/31/feature-focus-gnome-3s-new-system-status-area/ and https://wiki.gnome.org/GnomeShell/Design/Guidelines/SystemStatus

3.1.4.2. GNOME Software

GNOME in Fedora will offer a new, visually appealing application for browsing and installing applications. **GNOME Software** shows information relevant to users, such as descriptions, screenshots, reviews and more.

Applications describe themselves to **Software** and other supporting tools using the AppData Specification. In support of this functionality, Fedora contributors have combined their efforts to offer assistance and patches for AppData support to upstream projects.

The older package management GUI, gpk-application, is still available.

3.1.4.3. Further reading

To learn more about GNOME 3.10, see:

Upstream release notes: https://help.gnome.org/misc/release-notes/3.10/

New applications: https://help.gnome.org/misc/release-notes/3.10/more-apps.html

User Experience updates: https://help.gnome.org/misc/release-notes/3.10/more-core-ux.html

Internationalization notes: https://help.gnome.org/misc/release-notes/3.10/i18n.html

Sysadmin/Developer Notes: https://help.gnome.org/misc/release-notes/3.10/developers.html

3.1.5. KDE

3.1.5.1. KDE Plasma Workspaces 4.11

KDE Plasma Workspaces 4.11 is a long term release of the popular, full featured desktop environment. Major changes have been made to user experience, personal information management, and performance aspects of the platform.

User experience changes

- Taskbar has been ported to **QtQuick** , providing more consistent and fluent behavior.
- Battery widget now supports keyboard brightness, and displays status for multiple batteries in peripherals, such as in mice and keyboards.
- Notification popups now have a configure button, allowing customization of the type of notification displayed.
- **Kmix**, the KDE sound mixer, performs better and more stably, in addition to adding media player controls to the widget.
- Improved performance of Kwin, the KDE window manager.
- Text editor **Kate** has new plugins for Python2, Python3, Javascript, JQuery, and XML.
- Improved user interface design in **Kwallet**.
- **Kolourpaint**, a simple painting application, now supports the **WebP** image format.
- PDF viewer **Okular** adds review tools and undo/redo support for annotations and forms.
- The **JuK** audio player and tagger adds support for playback and metadata editing of Ogg Opus format files.

Personal Identity Management changes

- Improved Kontact Suite, including better archiving, scheduled mail sending, simple message filtering interface, better notifications, and scam detection in **Kmail**.

Performance Improvements

- Numerous optimizations to Dolphin reduce memory usage by up to 30%.
- Better indexing and various improvements to **Nemopuk** make searches up to 6x faster, adds indexing for ODF, docx and other document formats, and improves backup and restoration functionality.

Nemopuk and upgrading

Users upgrading to new versions of **Nemopuk** should expect their database to be automatically re-indexed and upgraded. The conversion will consume more system resources than normal but will only occur on the first login after upgrading.

3.1.5.2. Plasma-nm Network applet

KDE in Fedora 20 includes **Plasma-nm**, a new applet for network management. It supports user-friendly creation and editing of all connection types from **NetworkManager**, including bridges, bonds, and VPNs, with a modern and intuitive interface.

3.1.6. MATE

Because of compatibility issues with the new bluetooth stack, MATE does not include a bluetooth applet by default. Users that need this functionality should install the **bluedevil** package.

3.1.7. Sugar 0.100

The Sugar Learning Platform in Fedora 20 has been updated to version 0.100. The new release features integration with online services like Facebook and Twitter, multiple home views, a more featureful **Journal**, improved **Content Bundle** support, and more. For details, see the project's release notes at http://wiki.sugarlabs.org/go/0.100/Notes

3.2. Networking

3.2.1. NetworkManager Bonding and Bridging

NetworkManager now supports expanded bonding and bridging functionality, and incorporates better with existing bonding or bridging tools and configurations. This allows greater interoperability with virtualization solutions like libvirt. Managed devices will not appear in configuration applets unless the applet supports these device types.

Example configurations are available at http://fedoraproject.org/wiki/Networking/Bridging and http://fedoraproject.org/wiki/Networking/Bonding

3.2.2. NetworkManager on the command line

The NetworkManager command line tool **`nmcli`** in Fedora 20 gains the ability to add and edit network connections.

3.2.3. Bluetooth stack updated to BlueZ 5

Fedora 20 includes the latest version of the BlueZ bluetooth management software. The 5.0 release includes numerous backend improvements, adds support for **`Low Energy`** profiles, and features the command line tool **`bluetoothctl`**.

For detailed information on the changes in this release, consult the upstream release notes at http://www.bluez.org/release-of-bluez-5-0/.

3.3. Internationalization

3.3.1. Input Methods

`ibus` now supports input method engine per window for non-GNOME desktop environments. It can be enabled from ibus-setup.

`ibus-cangjie` is a new ibus engine for users of the Cangjie and Quick input methods. It is primarily intended to Hong Kong people who want to input Traditional Chinese, as they are (by far) the majority of Cangjie and Quick users.

`ibus-rime` is a new Rime input method engine for Linux/IBus.

`ibus-typing-booster`, **`latn-post`**, and **`latn-pre`** input methods are not blacklisted anymore.

3.3.2. Font tools

`ttname` is a new CLI interface for editing the **`name`** table that contains the metadata in TrueType and OpenType fonts.

fntsample is a new program for making font samples that show Unicode coverage of the font.

`sfntly` is a library for using, editing, and creating SFNT based Fonts.

3.3.3. Fonts

trabajo-fonts is a new package designed for use with the Shavian alphabet, a phonemic spelling reform proposal for English, but also supports extended Latin, and basic Cyrillic. "Trabajo" (pronounced [tɾa 'βaxo] if you're Spanish or [tɹə'bɑːhoʊ] if you're English) is Spanish for "I work". Trabajo has become a Serif font as of version 2.0, for improved appearance.

campivisivi-titillium-fonts is a new package. Titillium is born inside the Accademia di Belle Arti di Urbino

as a didactic project Course Type design of the Master of Visual Design Campi Visivi.

mph-2b-damase-fonts is a new package. Mark Williamson's MPH 2B Damase is a free font for many non-Latin scripts encoding.

google-noto-fonts script coverage is increased. It now has support for additional scripts, as listed below:

- Avestan
- Bengali
- Brahmi
- Carian
- Cherokee
- Coptic
- Deseret
- Egyptian Hieroglyphs
- Glagolitic
- Gujarati
- Hanunno
- Imperial Aramaic
- Kaithi
- Kannada
- KayahLi
- Kharoshthi
- Lisu
- Lycian
- Lydian
- Malayalam
- Mandaic
- Meeteimayek
- Nko
- Old-south-Arabian
- Old Turkic
- Osmanya
- Phoenician
- Shavian
- Symbols
- Tagalog
- Tai Tham
- Tai Viet
- Telugu
- Ugaritic
- Vai

lohit-devanagari-fonts from lohit2 project by completely rewritten open type tables, support for both dev2 and deva.

liberation-fonts with improved Serbian locale support in it and minor bugfixes.

3.4. Printing

3.4.1. 3D Printing

3.4.1.1. slic3r

slic3r is a powerful tool for converting 3D models into printing instructions for a 3D printer. Fedora 20 includes the latest slic3r version, bringing a new wipe feature that retracts while moving along the last path, a spiral vase option for continuously raising Z coordinate while printing, and numerous other code improvements.

Detailed release notes are available at http://slic3r.org/releases/0.9.10b.

3.4.1.2. Cura

The latest version of 3D printing software Cura in Fedora 20 is a huge update compared to previous versions.

Work faster: There's no prepare button, because there is no need to prepare. Cura comes with a new and much faster slicing engine that slices in realtime while you prepare your printing plate. Models that took hours to prepare now take minutes.

Plan better: The **`Project Planner`** tool has been integrated into the main interface.

Build Stronger: Infills are done with a grid of squares rather than random lines, giving strength to your project without adding material.

For details on using Cura, refer to the project's manual at http://blog.ultimaker.com/cura-user-manual/

3.4.1.3. simarrange

Fedora 20 offers a new plating tool called **simarrange**. This command line utility takes a collection of STL files and arranges them to fit densely on a given plate size.

4. Changes in Fedora for Developers

4.1. Development

4.1.1. ACPICA Tools

Developers working with the ACPI subsystem now have more resources available from Fedora. The acpica-tools package replaces the existing iasl and pm-tools packages to provide all the tools from http://acpica.org.

4.1.2. Developer Assistant

Developer Assistant, a tool for starting coding projects with popular languages and platforms, has been updated to provide a graphical user interface and improved functionality.

Documentation for Developer Assistant is maintained at https://developer-assistant.readthedocs.org/.

4.1.3. Perl 5.18

Perl in Fedora 20 has been updated to version 5.18, with a number of notable changes.

New features

- Unicode 6.2 is supported.
- Matching Unicode properties is faster now.
- Operators next, last, redo, and dump supports labels computed at run-time.
- The kill function allows to send a signal to a process group by symbolic name.
- Experimental support for lexical subroutines has been added.
- Config::Perl::V module to access perl -V data in structured way has been added into core modules.
- DTrace/SystemTap provides new probes op-entry, loading-file, and loaded-file.

Changes

- Hashes are randomized by default now. That means the order in which keys and values are returned from a hash changes on each perl run. One can disable the randomization by setting PERL_PERTURB_KEYS environment variable to 0.
- qw() operator does not imply surrounding parentheses any more.
- Unknown character names specified using \N{} syntax are processed at compile time and trigger a syntax error now.
- Vertical tab is considered as a white space now.
- Values stored into environment variables are byte strings by default.
- readline function on I/O reads given number of characters instead of bytes now.
- Here-document delimited with quoted marker starts always on line following the marker now.
- Alpha-numeric operators must always be separated from a regular expression delimiter now.
- Smart-match and lexical $_ became experimental because they proved being problematic.
- Swapping $< and $> variables can cause undesired effects. Localizing changed variable is recommended.

Removed features:

- PL_sv_objcount XS variable is deprecated.
- All character classifying XS functions are deprecated.
- to_uni_lower_lc, to_uni_title_lc, and to_uni_upper_lc XS functions are deprecated.

Perl developers should read http://search.cpan.org/dist/perl-5.18.0/pod/perldelta.pod and http://search.cpan.org/dist/perl-5.18.1/pod/perldelta.pod for a more comprehensive description of this release.

4.1.4. python-setuptools updated

The version of the python-setuptools package has been updated to the 0.9.x series. This release series merges the **`setuptools`** and **`distribute`** upstream projects which has introduced a variety of changes to the API and behavior.

Because this change is mostly compatible with the previous version, it should not impair any Python packages in the Fedora. If you are writing or deploying other Python software you suspect may be affected, please refer to http://pythonhosted.org/setuptools/merge.html and https://pypi.python.org/pypi/setuptools#changes for more details.

4.2. GCC Tools

4.2.1. Boost 1.54.0 Uplift

boost has been upgraded to version 1.54.0. Apart from a number of bugfixes, this brings in three new libraries: **`Boost.Log`** for logging, **`Boost.TTI`** for Type Traits Introspection, and **`Boost.TypeErasure`**

for runtime polymorphism based on concepts.

The upstream release notes at http://www.boost.org/users/history/version_1_54_0.html provide detailed information on the release.

4.2.2. GLIBC 2.18

Fedora 20 ships version 2.18 of the GNU C Library. For information on this release, see the upstream release announcement at https://sourceware.org/ml/libc-alpha/2013-08/msg00160.html

4.3. Haskell

4.3.1. ghc

GHC has been updated to version 7.6.3 and Haskell Platform to 2013.2. Many packages have been updated and new packages added include *idris* and various libraries. All packages have been updated to follow the new simplified revised Haskell Packaging Guidelines.

Note that ghc-7.6 does not officially support llvm-3.3 so there are some issues when using the llvm backend (particularly on ARM where it is the default).

4.4. Web Development

4.4.1. WildFly 8

Fedora 20 includes the WildFly 8 Application Server, formerly known as the JBoss Application Server, a very popular Java EE platform. WildFly is a very fast, modular and lightweight server. WildFly makes it easy to run and manage cluster of servers with many applications deployed.

Get started with WildFly at http://wildfly.org.

4.4.2. Ruby on rails

Fedora 20 includes version 4.0 of the popular Ruby on Rails web framework. This latest release includes improved functionality, speed, and security in addition to better modularization.

Documentation for Ruby on Rails 4.0 can be found at http://weblog.rubyonrails.org/2013/6/25/Rails-4-0-final/ and http://api.rubyonrails.org/

Developers moving to Ruby on Rails 4.0 can find assistance from the project's upgrade guide and detailed information in the upstream Release Notes.

5. Changes in Fedora for Specific Audiences

5.1. Circuit Design

5.1.1. gtkwave

gtkwave has been updated from 3.3.41 to 3.3.51. This includes a large number of upgrades including

- Adding more support for newer constructs in Vermin.
- Added scrollwheel support to rtlbrowse code windows.
- Added VPD support via vpd2vcd.
- Added preliminary do-nothing generate support in vermin.
- Added "Open Hierarchy" option that will expand the SST and select the hierarchy for a given signal

selected in the Signals window.

- Added preliminary support for FsdbReader.
- Added generate as scope type to VCD/FST/FSDB.
- Display signal direction column in SST if not all signals are declared as FST_VD_IMPLICIT.
- Added extraction of in/out/inout from FSDB into FST with vcd2fst helper executable.
- Added support for SV structures, unions, classes, packages, programs, and interfaces.
- Preliminary support for SV datatypes of bit, logic, int, shortint, longint, byte, enum, and shortreal in VCD and FST. Added sparse array datatype to FST (currently unused by gtkwave).
- Added support for attribute begin/end in FST. (Currently unused by gtkwave.) This allows embedding of various data inside the structure tree.
- Added ability to store $comment in FST files via the attribute mechanism (FST_AT_MISC/FST_MT_COMMENT).
- Added ability to store environment variable information in FST files (FST_MT_ENVVAR).
- Added direction filters to SST name filter search. That is, adding +I+, +O+, +IO+, +B+, or +L+ before the regular expression adds additional filtering criteria. Direction filters are case-insensitive.
- Added VHDL hierarchy types to FST, internal VCD loaders and also vcdfst/fst2vcd.
- Added in VHDL to FST (which will also allow other languages): gtkwave can process these types (e.g., signal + std_ulogic), but there are currently no simulators supporting them.
- Added "/File/Grab To File" PNG image grab menu option.
- Added VHDL package type to FST.
- Added fstWriterSetSourceStem() so writers can embed source stems in the FST file.
- Updated examples/gtkwaverc accel options to reflect the current state of the gtkwave main window main menu.

In addition, there are numerous bug fixes and internal improvements. More detail may be found in the **ChangeLog** or on the web site at http://gtkwave.sourceforge.net/.

5.1.2. XCircuit

xcircuit has been updated to 3.7.44. Version 3.7 has a modified selection mechanism that considers both points and segments of elements as well as entire elements. This allows the "edit" function to work as a stretch function to many elements at once.

Also added linewidth invariance on objects. Object instances (such as circuit symbols) can be made linewidth-invariant, such that an instance of the object can be scaled without changing the linewidth. This allows some circuit symbols to be resized relative to others on the same schematic without a discontinuity in wire width at the pins.

A number of other useful additions including:

- Tracking spline control points for adjoining splines in paths
- Clipmasks (shapes can be used to clip the view of other elements)
- polygon-to-curve conversion routine
- undo/redo on raise/lower elements
- single-step raise and lower elements
- gradient field generator---color graded fields are made from graphic image types

5.2. Amateur Radio

5.2.1. fldigi

fldigi has been upgraded to 3.21.76. Some of the changes include:

- Improvements to ADIF logging
- Better weak signal MFSK
- Improvements in THOR
- Allow display of UTF-8 when active ARQ client

Along with numerous others.

For complete details visit http://www.w1hkj.com/Fldigi.html.

5.2.2. gnuradio

Fedora 20 includes *gnuradio* 3.7.1.

Major new features include:

- GRC Bus Ports http://gnuradio.org/redmine/projects/gnuradio/wiki/Busports
- ControlPort http://gnuradio.org/doc/doxygen/page_ctrlport.html
- Performance Measurement Tools
- QT GUI Enhancements

New blocks include **`gr::analog::fast_noise_source`** and **`gr::analog::agc3_*`**. **`agc`**, **`agc2`** and **`agc3`** blocks now have a unified interface. New components **`gr-fec`** and **`gr-channels`** have been added. A new tool allows the creation of out-of-tree **`VOLK`** libraries.

http://www.gnuradio.org includes details of these changes as well as extensive documentation.

5.2.3. qucs

qucs has been upgraded to 0.0.17. Some key improvements:

- New BSIM nMOS and pMOS models
- m-code transient solver interface

For full details refer to http://qucs.sourceforge.net

5.2.4. trustedqsl

trustedqsl has been updated to 1.14.3. Updates include correcting some CQ zones, enhanced handling of duplicates, and improvements in some error messages.

The details may be found at the project web page at http://sourceforge.net/projects/trustedqsl/.

5.2.5. xastir

xastir 2.0.4 includes a large number of changes and performance improvements. Refer to the help file for details, or visit the project's web site at http://www.xastir.org.

5.2.6. xnec2c

xnec2c has been updated to 2.3. The differences between 2.1 and 2.3 are largely unnoticable to the user but reflect cleaning up the application's internal. Most of these changes actually affect the *nec2c*package which provides the calculation engine for *xnec2c*.

The application web site is at http://www.qsl.net/5b4az/pages/nec2.html.

A. Contributors

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 1.0-6	**Thu Dec 5 2013**	**Pete Travis**

Corrections to the GNOME beat

Revision 1.0-1	**Sun Oct 20 2013**	**Pete Travis**

F20 Beta Release notes, initial draft

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