Chapter

Workstation 13

Contents

Now that server deployments are done, the administrators can focus on installing the individual workstations and creating a typical configuration.

13.1. Configuring the X11 Server

The initial configuration for the graphical interface can be awkward at times; very recent video cards often don't work perfectly with the X.org version shipped in the Debian stable version.

A brief reminder: X.org is the software component that allows graphical applications to display windows on screen. It includes a driver that makes efficient use of the video card. The features offered to the graphical applications are exported through a standard interface, *X11* (*Jessie* contains its *X11R7.7* version).

PERSPECTIVE

X11, XFree86 and X.org

X11 is the graphical system most widely used on Unix-like systems (also available, in addition to the native system, for Windows and Mac OS). Strictly speaking, the "X11" term only refers to a protocol specification, but it is also used to refer to the implementation in practice.

X11 had a rough start, but the 1990's saw XFree86 emerge as the reference implementation because it was free software, portable, and maintained by a collaborative community. However, the rate of evolution slowed down near the end when the software only gained new drivers. That situation, along with a very controversial license change, led to the X.org fork in 2004. This is now the reference implementation, and Debian *Jessie* uses X.org version 7.7.

Current versions of X.org are able to autodetect the available hardware: this applies to the video card and the monitor, as well as keyboards and mice; in fact, it is so convenient that the package no longer even creates a `/etc/X11/xorg.conf` configuration file. This is all made possible by features provided by the Linux kernel (in particular for keyboards and mice), by having each driver list the video cards it supports, and by using the DDC protocol to fetch monitor characteristics.

The keyboard configuration is currently set up in `/etc/default/keyboard`. This file is used both to configure the text console and the graphical interface, and it is handled by the *keyboard-configuration* package. Details on configuring the keyboard layout are available in section 8.1.2, "Configuring the Keyboard" page 147.

The *xserver-xorg-core* package provides a generic X server, as used by the 7.x versions of X.org. This server is modular and uses a set of independent drivers to handle the many different kinds of video cards. Installing *xserver-xorg* ensures that both the server and at least one video driver are installed.

Note that if the detected video card is not handled by any of the available drivers, X.org tries using the VESA and fbdev drivers. The former is a generic driver that should work everywhere, but with limited capabilities (fewer available resolutions, no hardware acceleration for games and visual effects for the desktop, and so on) while the latter works on top of the kernel's framebuffer device. The X server writes its messages to the `/var/log/Xorg.0.log` log file, which is where one would look to know what driver is currently in use. For example, the following snippet matches what the `intel` driver outputs when it is loaded:

```
(==) Matched intel as autoconfigured driver 0
(==) Matched modesetting as autoconfigured driver 1
(==) Matched vesa as autoconfigured driver 2
(==) Matched fbdev as autoconfigured driver 3
(==) Assigned the driver to the xf86ConfigLayout
(II) LoadModule: ”intel”
(II) Loading /usr/lib/xorg/modules/drivers/intel_drv.so
```

EXTRA

Proprietary drivers

Some video card makers (most notably nVidia) refuse to publish the hardware specifications that would be required to implement good free drivers. They do, however, provide proprietary drivers that allow using their hardware. This policy is nefarious, because even when the provided driver exists, it is usually not as polished as it should be; more importantly, it does not necessarily follow the X.org updates, which may prevent the latest available driver from loading correctly (or at all). We cannot condone this behavior, and we recommend you avoid these makers and favor more cooperative manufacturers.

If you still end up with such a card, you will find the required packages in the *non-free* section: *nvidia-glx* for nVidia cards, and *fglrx-driver* for some ATI cards. Both cases require matching kernel modules. Building these modules can be automated by installing the *nvidia-kernel-dkms* (for nVidia), or *fglrx-modules-dkms* (for ATI) packages.

The “nouveau” project aims to develop a free software driver for nVidia cards. As of *Jessie*, its feature set does not match the proprietary driver. In the developers' defense, we should mention that the required information can only be gathered by reverse engineering, which makes things difficult. The free driver for ATI video cards, called “radeon”, is much better in that regard although it often requires a non-free firmware.

13.2. Customizing the Graphical Interface

13.2.1. Choosing a Display Manager

The graphical interface only provides display space. Running the X server by itself only leads to an empty screen, which is why most installations use a *display manager* to display a user authentication screen and start the graphical desktop once the user has authenticated. The three most popular display managers in current use are *gdm3* (*GNOME Display Manager*), *kdm* (*KDE Display Manager*) and *lightdm* (*Light Display Manager*). Since the Falcot Corp administrators have opted to use the GNOME desktop environment, they logically picked `gdm3` as a display manager too. The `/etc/gdm3/daemon.conf` configuration file has many options (the list can be found in the `/usr/share/gdm/gdm.schemas` schema file) to control its behaviour while `/etc/gdm3/greeter.dconf-defaults` contains settings for the greeter “session” (more than just a login window, it is a limited desktop with power management and accessibility related tools). Note that some of the most useful settings for end-users can be tweaked with GNOME's control center.

13.2.2. Choosing a Window Manager

Since each graphical desktop provides its own window manager, choosing the former usually implies software selections from the latter. GNOME uses the `mutter` window manager, KDE uses `kwin`, and Xfce (which we present later) has `xfwm`. The Unix philosophy always allows using one's window manager of choice, but following the recommendations allows an administrator to best take advantage of the integration efforts led by each project.

BACK TO BASICS

Window manager

True to the Unix tradition of doing one thing only but doing it well, the window manager displays the "decorations" around the windows belonging to the currently running applications, which includes frames and the title bar. It also allows reducing, restoring, maximizing, and hiding windows. Most window managers also provide a menu that pops up when the desktop is clicked in a specific way. This menu provides the means to close the window manager session, starting new applications, and in some cases, change to another window manager (if installed).

Older computers may, however, have a hard time running heavyweight graphical desktop environments. In these cases, a lighter configuration should be used. "Light" (or small footprint) window managers include WindowMaker (in the *wmaker* package), Afterstep, fvwm, icewm, blackbox, fluxbox, or openbox. In these cases, the system should be configured so that the appropriate window manager gets precedence; the standard way is to change the `x-window-manager` alternative with the `update-alternatives --config x-window-manager` command.

DEBIAN SPECIFICITY

Alternatives

The Debian policy lists a number of standardized commands able to perform a particular action. For example, the `x-window-manager` command invokes a window manager. But Debian does not assign this command to a fixed window manager. The administrator can choose which manager it should invoke.

For each window manager, the relevant package therefore registers the appropriate command as a possible choice for `x-window-manager` along with an associated priority. Barring explicit configuration by the administrator, this priority allows picking the best installed window manager when the generic command is run.

Both the registration of commands and the explicit configuration involve the `update-alternatives` script. Choosing where a symbolic command points at is a simple matter of running `update-alternatives --config` *`symbolic-command`*. The `update-alternatives` script creates (and maintains) symbolic links in the `/etc/alternatives/` directory, which in turn references the location of the executable. As time passes, packages are installed or removed, and/or the administrator makes explicit changes to the configuration. When a package providing an alternative is removed, the alternative automatically goes to the next best choice among the remaining possible commands.

Not all symbolic commands are explicitly listed by the Debian policy; some Debian package maintainers deliberately chose to use this mechanism in less straightforward cases where it still brings interesting flexibility (examples include `x-www-browser`, `www-browser`, `cc`, `c++`, `awk`, and so on).

13.2.3. Menu Management

Modern desktop environments and many window managers provide menus listing the available applications for the user. In order to keep menus up-to-date in relation to the actual set of available applications, each package usually provides a `.desktop` file in `/usr/share/applications`. The format of those files has been standardized by FreeDesktop.org:

➨ http://standards.freedesktop.org/desktop-entry-spec/latest/

The applications menus can be further customized by administrators through system-wide configuration files as described by the "Desktop Menu Specification". End-users can also customize the menus with graphical tools such as *kmenuedit* (in KDE), *alacarte* (in GNOME) or *menulibre*.

➨ http://standards.freedesktop.org/menu-spec/latest/

HISTORY
The Debian menu system

Historically — way before the FreeDesktop.org standards emerged — Debian had invented its own menu system where each package provided a generic description of the desired menu entries in `/usr/share/menu/`. This tool is still available in Debian (in the *menu* package) but it is only marginally useful since package maintainers are encouraged to rely on `.desktop` files instead.

13.3. Graphical Desktops

The free graphical desktop field is dominated by two large software collections: GNOME and KDE. Both of them are very popular. This is rather a rare instance in the free software world; the Apache web server, for instance, has very few peers.

This diversity is rooted in history. KDE was the first graphical desktop project, but it chose the Qt graphical toolkit and that choice wasn't acceptable for a large number of developers. Qt was not free software at the time, and GNOME was started based on the GTK+ toolkit. Qt became free software in the interval, but the projects haven't merged and evolved in parallel instead.

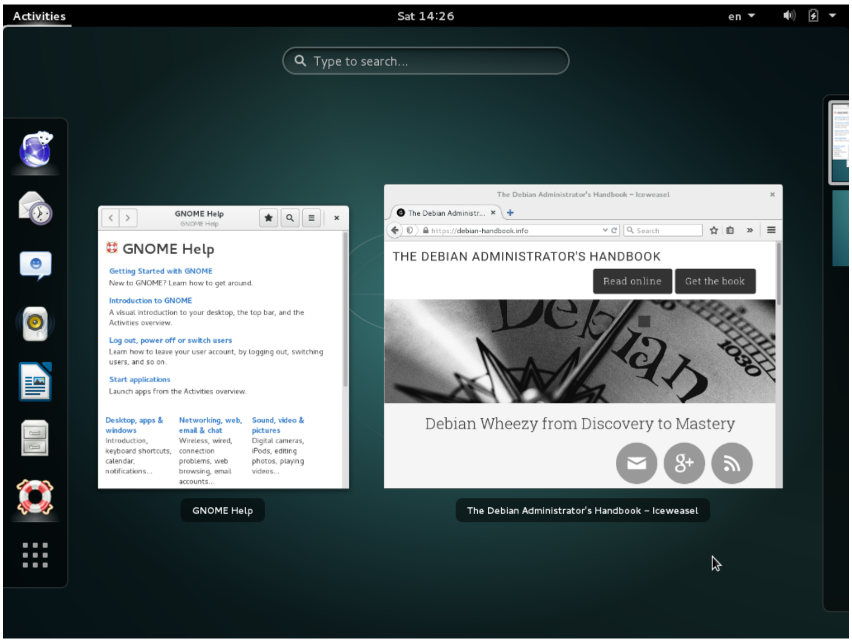
GNOME and KDE still work together: under the FreeDesktop.org umbrella, the projects collaborated in defining standards for interoperability across applications.

Choosing "the best" graphical desktop is a sensitive topic which we prefer to steer clear of. We will merely describe the many possibilities and give a few pointers for further thoughts. The best choice will be the one you make after some experimentation.

13.3.1. GNOME

Debian *Jessie* includes GNOME version 3.14, which can be installed by a simple `apt-get install gnome` (it can also be installed by selecting the "Debian desktop environment" task).

GNOME is noteworthy for its efforts in usability and accessibility. Design professionals have been involved in writing standards and recommendations. This has helped developers to create satisfying graphical user interfaces. The project also gets encouragement from the big players of computing, such as Intel, IBM, Oracle, Novell, and of course, various Linux distributions. Finally, many programming languages can be used in developing applications interfacing to GNOME.


Activities
Sat 14:26
en
Type to search...
GNOME Help
GNOME Help
GNOME Help
Getting Started with GNOME
Introduction to GNOME
Log out, power off or switch users
Start applications
Desktop, apps & windows
Networking, web, email & chat
Sound, video & pictures
GNOME Help
The Debian Administrator's Handbook – Iceweasel
The Debian Administr...
https://debian-handbook.info
Search
THE DEBIAN ADMINISTRATOR'S HANDBOOK
Read online
Get the book
Debian Wheezy from Discovery to Mastery
The Debian Administrator's Handbook – Iceweasel

New to GNOME? Learn how to get around.

A visual introduction to your desktop, the top bar, and the Activities overview.

Learn how to leave your user account, by logging out, switching users, and so on.

Launch apps from the Activities overview.

Introduction, keyboard shortcuts, calendar, notifications...

Wireless, wired, connection problems, web browsing, email accounts...

Digital cameras, iPods, editing photos, playing videos...

Figure 13.1 *The GNOME desktop*

For administrators, GNOME seems to be better prepared for massive deployments. Application configuration is handled through the GSettings interface and stores its data in the DConf database. The configuration settings can thus be queried and edited with the `gsettings`, and `dconf` command-line tools, or by the `dconf-editor` graphical user interfaces. The administrator can therefore change users' configuration with a simple script. The following website lists all information of interest to an administrator tasked to manage GNOME workstations:

➨ https://help.gnome.org/admin/

13.3.2. KDE

Debian *Jessie* includes version 4.14 of KDE, which can be installed with `apt-get install kde-standard`.

KDE has had a rapid evolution based on a very hands-on approach. Its authors quickly got very good results, which allowed them to grow a large user-base. These factors contributed to the overall project quality. KDE is a perfectly mature desktop environment with a wide range of applications.

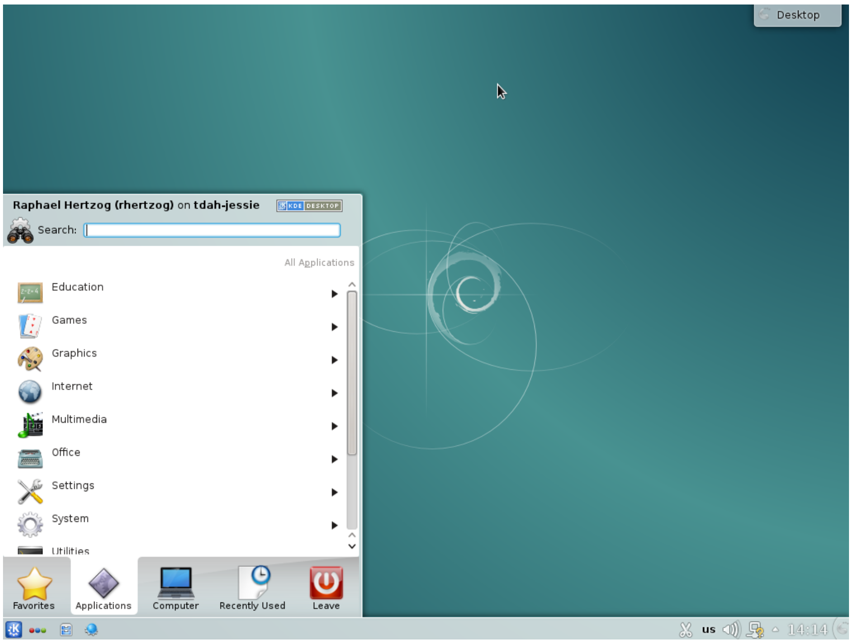


Figure 13.2 *The KDE desktop*

Since the Qt 4.0 release, the last remaining license problem with KDE is no more. This version was released under the GPL both for Linux and Windows (whereas the Windows version was previously released under a non-free license). Note that KDE applications must be developed using the C++ language.

13.3.3. Xfce and Others

Xfce is a simple and lightweight graphical desktop, which is a perfect match for computers with limited resources. It can be installed with `apt-get install xfce4`. Like GNOME, Xfce is based on the GTK+ toolkit, and several components are common across both desktops.

Unlike GNOME and KDE, Xfce does not aim at being a vast project. Beyond the basic components of a modern desktop (file manager, window manager, session manager, a panel for application launchers and so on), it only provides a few specific applications: a terminal, a calendar (Orage), an image viewer, a CD/DVD burning tool, a media player (Parole), sound volume control and a text editor (mousepad).

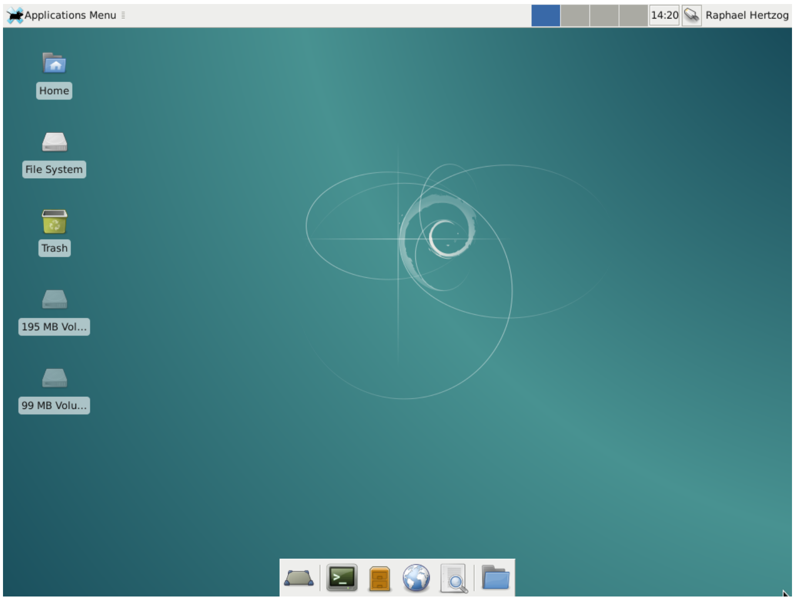


Figure 13.3 *The Xfce desktop*

Another desktop environment provided in *Jessie* is LXDE, which focuses on the "lightweight" aspect. It can be installed with the help of the *lxde* meta-package.

13.4. Email

13.4.1. Evolution

COMMUNITY
Popular **packages**

Installing the *popularity-contest* package enables participation in an automated survey that informs the Debian project about the most popular packages. A script is run weekly by `cron` which sends (by HTTP or email) an anonymized list of the installed packages and the latest access date for the files they contain. This allows differentiating, among the installed packages, those that are actually used.

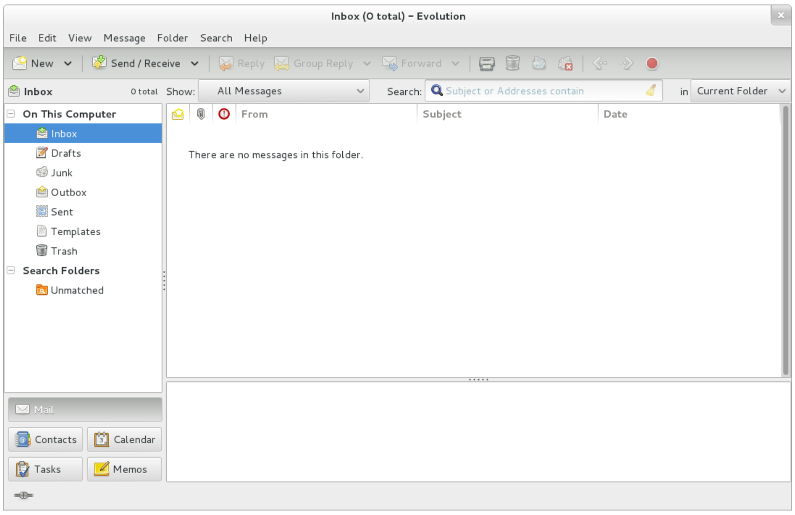
This information is a great help to the Debian project. It is used to determine which packages should go on the first installation disks. The installation data is also an important factor used to decide whether to remove a package with very few users from the distribution. We heartily recommend installing the *popularity-contest* package, and participating in the survey.

The collected data are made public every day.

➨ http://popcon.debian.org/

These statistics can also help choose between two packages that would seem otherwise equivalent. Choosing the more popular package increases the probability of making a good choice.

Evolution is the GNOME email client and can be installed with `apt-get install evolution`. Evolution goes beyond a simple email client, and also provides a calendar, an address book, a task list, and a memo (free-form note) application. Its email component includes a powerful message indexing system, and allows for the creation of virtual folders based on search queries on all archived messages. In other words, all messages are stored the same way but displayed in a folder-based organization, each folder containing messages that match a set of filtering criteria.



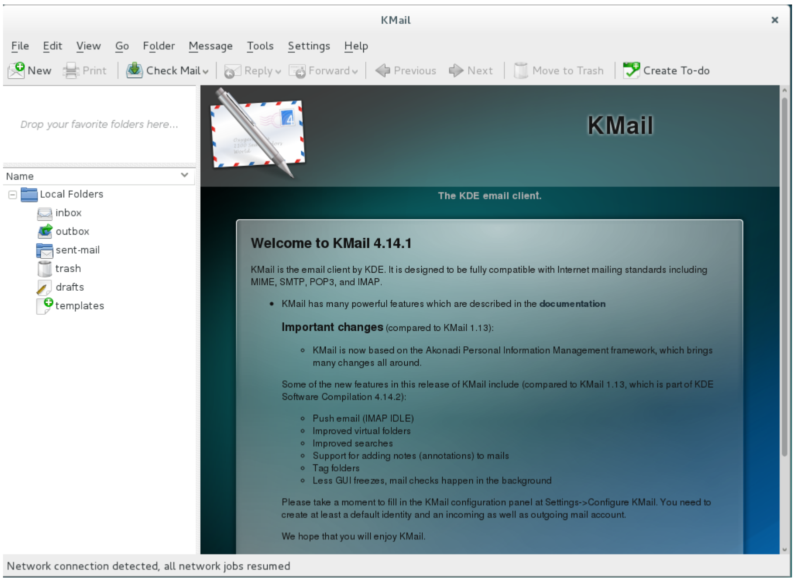
There are no messages in this folder.

Figure 13.4 *The Evolution email software*

An extension to Evolution allows integration to a Microsoft Exchange email system; the required package is *evolution-ews*.

13.4.2. KMail

The KDE email software can be installed with `apt-get install kmail`. KMail only handles email, but it belongs to a software suite called KDE-PIM (for *Personal Information Manager*) that includes features such as address books, a calendar component, and so on. KMail has all the features one would expect from an excellent email client.


KMail
File Edit View Go Folder Message Tools Settings Help
New Print Check Mail Reply Forward Previous Next Move to Trash Create To-do
Drop your favorite folders here...
Name
Local Folders
inbox
outbox
sent-mail
trash
drafts
templates
KMail
The KDE email client.

Welcome to KMail 4.14.1

KMail is the email client by KDE. It is designed to be fully compatible with Internet mailing standards including MIME, SMTP, POP3, and IMAP.

- KMail has many powerful features which are described in the **documentation**

Important changes (compared to KMail 1.13):

- KMail is now based on the Akonadi Personal Information Management framework, which brings many changes all around.

Some of the new features in this release of KMail include (compared to KMail 1.13, which is part of KDE Software Compilation 4.14.2):

- Push email (IMAP IDLE)
- Improved virtual folders
- Improved searches
- Support for adding notes (annotations) to mails
- Tag folders
- Less GUI freezes, mail checks happen in the background

Please take a moment to fill in the KMail configuration panel at Settings->Configure KMail. You need to create at least a default identity and an incoming as well as outgoing mail account.

We hope that you will enjoy KMail.

Network connection detected, all network jobs resumed

Figure 13.5 *The KMail email software*

13.4.3. Thunderbird and Icedove

This email software, included in the *icedove* package, is part of the Mozilla software suite. Various localization sets are available in *icedove-l10n-** packages; the *enigmail* extension handles message encrypting and signing (alas, it is not available in all languages).

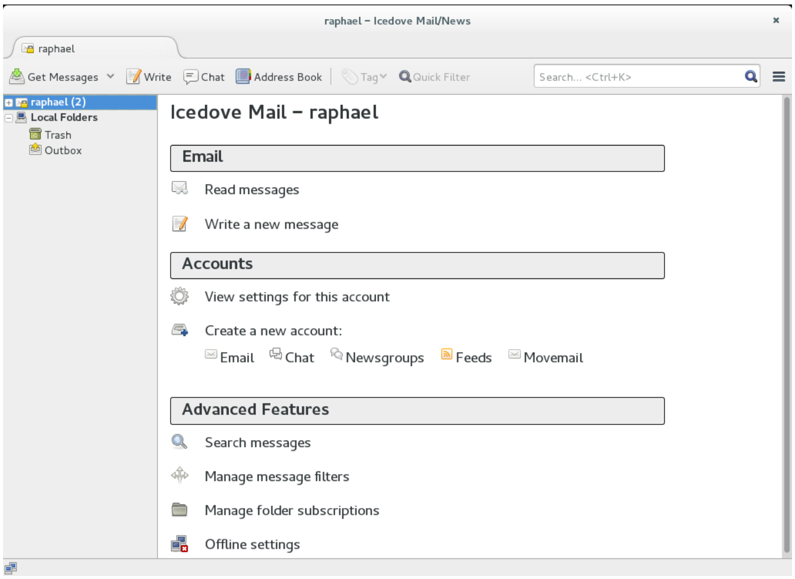


Figure 13.6 *The Icedove email software*

Thunderbird is one of the best email clients, and it seems to be a great success, just like Mozilla Firefox.

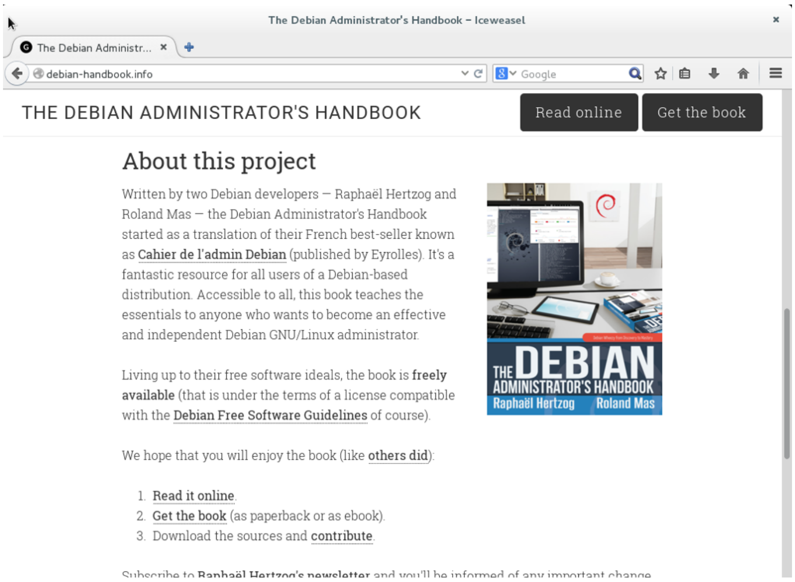
Strictly speaking, Debian *Jessie* contains Icedove, and not Thunderbird, for legal reasons we will detail in the sidebar "Iceweasel, Firefox and others" page 366; but apart from their names (and icons), there are no real differences between them.

13.5. Web Browsers

Epiphany, the web browser in the GNOME suite, uses the WebKit display engine developed by Apple for its Safari browser. The relevant package is *epiphany-browser*.

Konqueror, the KDE file manager, also behaves as a web browser. It uses the KDE-specific KHTML rendering engine; KHTML is an excellent engine, as witnessed by the fact that Apple's WebKit is based on KHTML. Konqueror is available in the *konqueror* package.

Users not satisfied by either of the above can use Iceweasel. This browser, available in the *iceweasel* package, uses the Mozilla project's Gecko renderer, with a thin and extensible interface on top.


The Debian Administrator's Handbook – Iceweasel
The Debian Administr...
debian-handbook.info
Google
THE DEBIAN ADMINISTRATOR'S HANDBOOK
Read online
Get the book
THE DEBIAN ADMINISTRATOR'S HANDBOOK
Raphaël Hertzog
Roland Mas

About this project

Written by two Debian developers — Raphaël Hertzog and Roland Mas — the Debian Administrator's Handbook started as a translation of their French best-seller known as Cahier de l'admin Debian (published by Eyrolles). It's a fantastic resource for all users of a Debian-based distribution. Accessible to all, this book teaches the essentials to anyone who wants to become an effective and independent Debian GNU/Linux administrator.

Living up to their free software ideals, the book is **freely available** (that is under the terms of a license compatible with the Debian Free Software Guidelines of course).

We hope that you will enjoy the book (like others did):

1. Read it online.
2. Get the book (as paperback or as ebook).
3. Download the sources and contribute.

Subscribe to Raphaël Hertzog's newsletter and you'll be informed of any important change

Figure 13.7 *The Iceweasel web browser*

CULTURE
Iceweasel, Firefox and others

Many users will no doubt be surprised by the absence of Mozilla Firefox in the Debian *Jessie* menus. No need to panic: the *iceweasel* package contains Iceweasel, which is basically Firefox under another name.

The rationale behind this renaming is a result of the usage rules imposed by the Mozilla Foundation on the Firefox™ registered trademark: any software named Firefox must use the official Firefox logo and icons. However, since these elements are not released under a free license, Debian cannot distribute them in its *main* section. Rather than moving the whole browser to *non-free*, the package maintainer chose to use a different name.

The `firefox` command still exists in the *iceweasel* package, but only for compatibility with tools that would try to use it.

For similar reasons, the Thunderbird™ email client was renamed to Icedove in a similar fashion.

CULTURE
Mozilla

Netscape Navigator was the standard browser when the web started reaching the masses, but it was progressively left behind when Microsoft Internet Explorer came around. Faced with this failure, Netscape (the company) decided to “free” its source code, by releasing it under a free license, to give it a second life. This was the beginning of the Mozilla project. After many years of development, the results are more than satisfying: the Mozilla project brought forth an HTML rendering engine (called Gecko) that is among the most standard-compliant. This rendering engine is in particular used by the Mozilla Firefox browser, which is one of the most successful browsers, with a fast-growing user base.

Last but not least, Debian also contains the *Chromium* web browser (available in the *chromium-browser* package). This browser is developed by Google at such a fast pace that maintaining a single version of it across the whole lifespan of Debian *Jessie* is unlikely to be possible. Its clear purpose is to make web services more attractive, both by optimizing the browser for performance and by increasing the user’s security. The free code that powers Chromium is also used by its proprietary version called Google Chrome.

13.6. Development

13.6.1. Tools for GTK+ on GNOME

Anjuta (in the *anjuta* package) is a development environment optimized for creating GTK+ applications for GNOME. Glade (in the *glade* package) is an application designed to create GTK+ graphical interfaces for GNOME and save them in an XML file. These XML files can then be loaded by the *libglade* shared library, which can dynamically recreate the saved interfaces; such a feature can be interesting, for instance for plugins that require dialogs.

The scope of Anjuta is to combine, in a modular way, all the features one would expect from an integrated development environment.

13.6.2. Tools for Qt on KDE

The equivalent applications for KDE are KDevelop (in the *kdevelop* package) for the development environment, and Qt Designer (in the *qttools5-dev-tools* package) for the design of graphical interfaces for Qt applications on KDE.

13.7. Collaborative Work

13.7.1. Working in Groups: *groupware*

Groupware tools tend to be relatively complex to maintain because they aggregate multiple tools and have requirements that are not always easy to reconcile in the context of an integrated distribution. Thus there is a long list of groupware that were once available in Debian but have been dropped for lack of maintainers or incompatibility with other (newer) software in Debian. It has been the case of PHPGroupware, eGroupware, and Kolab.

➨ http://www.phpgroupware.org/

➨ http://www.egroupware.org/

➨ http://www.kolab.org/

All is not lost though. Many of the features traditionally provided by "groupware" software are increasingly integrated into "standard" software. This is reducing the requirement for specific, specialized groupware software. On the other hand, this usually requires a specific server. More interestingly, Citadel (in the *citadel-suite* package) and Sogo (in the *sogo* package) are alternatives that are available in Debian *Jessie*.

13.7.2. Collaborative Work With FusionForge

FusionForge is a collaborative development tool with some ancestry in SourceForge, a hosting service for free software projects. It takes the same overall approach based on the standard development model for free software. The software itself has kept evolving after the SourceForge code went proprietary. Its initial authors, VA Software, decided not to release any more free versions. The same happened again when the first fork (GForge) followed the same path. Since various people and organizations have participated in development, the current FusionForge also includes features targeting a more traditional approach to development, as well as projects not purely concerned with software development.

FusionForge can be seen as an amalgamation of several tools dedicated to manage, track and coordinate projects. These tools can be roughly classified into three families:

- *communication*: web forums, mailing-list manager, announcement system allowing a project to publish news;
- *tracking*: task tracker to control progress and schedule tasks, trackers for bugs (or patches or feature requests, or any other kind of "ticket"), surveys;

- *sharing*: documentation manager to provide a single central point for documents related to a project, generic file release manager, dedicated website for each project.

Since FusionForge is largely targeting development projects, it also integrates many tools such as CVS, Subversion, Git, Bazaar, Darcs, Mercurial and Arch for source control management or “configuration management” or “version control” — this process has many names. These programs keep a history of all the revisions of all tracked files (often source code files), with all the changes they go through, and they can merge modifications when several developers work simultaneously on the same part of a project.

Most of these tools are accessible, or even managed, through a web interface, with a fine-grained permission system, and email notifications for some events.

13.8. Office Suites

Office software has long been seen as lacking in the free software world. Users have long asked for replacements for Microsoft tools such as Word and Excel, but these are so complex that replacements were hard to develop. The situation changed when the OpenOffice.org project started (following Sun’s release of the StarOffice code under a free license). Nowadays Debian contains Libre Office, a fork of OpenOffice.org. The GNOME and KDE projects are still working on their offerings (GNOME Office and Calligra Suite), and the friendly competition leads to interesting results. For instance, the Gnumeric spreadsheet (part of GNOME Office) is even better than OpenOffice.org/Libre Office in some domains, notably the precision of its calculations. On the word processing front, the OpenOffice.org and Libre Office suites still lead the way.

Another important feature for users is the ability to import Word and Excel documents received from contacts or found in archives. Even though all office suites have filters which allow working on these formats, only the ones found in OpenOffice.org and Libre Office are functional enough for daily use.

THE BROADER VIEW

Libre Office replaces OpenOffice.org

OpenOffice.org contributors have set up a foundation (*The Document Foundation*) to foster project development. The idea had been discussed for some time, but the actual trigger was Oracle’s acquisition of Sun. The new ownership made the future of OpenOffice under Oracle uncertain. Since Oracle declined to join the foundation, the developers had to give up on the OpenOffice.org name. The software is now known as *Libre Office*. After a period of relative stagnation on the OpenOffice.org front, Oracle decided to migrate the code and associated rights to the Apache Software Foundation, and OpenOffice is now an Apache project.

Debian only includes Libre Office. The OpenOffice software suite as published by the Apache Software Foundation is not currently available in Debian.

Libre Office and Calligra Suite are, respectively, available in the *libreoffice* and *calligra* Debian packages. There is no more package for GNOME Office (it was *gnome-office*). Language-specific packs for Libre Office are distributed in separate packages: *libreoffice-l10n-** and *libreoffice-help-** most notably; some features such as spelling dictionaries, hyphenation patterns and thesauri are in separate packages, such as *myspell-*/hunspell-**, *hyphen-** and *mythes-**. Note that Calligra Suite used to be called KOffice.

13.9. Emulating Windows: Wine

In spite of all the previously mentioned efforts, there are still a number of tools without a Linux equivalent, or for which the original version is absolutely required. This is where Windows emulation systems come in handy. The most well-known among them is Wine.

➨ https://www.winehq.org/

COMPLEMENTS

CrossOver Linux

CrossOver, produced by CodeWeavers, is a set of enhancements to Wine that broadens the available set of emulated features to a point at which Microsoft Office becomes fully usable. Some of the enhancements are periodically merged into Wine.

➨ http://www.codeweavers.com/products/

However, one should keep in mind that it is only a solution among others, and the problem can also be tackled with a virtual machine or VNC; both of these solutions are detailed in the sidebars "Virtual machines" page 370 and "*Windows Terminal Server* or VNC" page 370.

Let us start with a reminder: emulation allows executing a program (developed for a target system) on a different host system. The emulation software uses the host system, where the application runs, to imitate the required features of the target system.

Now let's install the required packages (*ttf-mscorefonts-installer* is in the contrib section):

```
# apt-get install wine ttf-mscorefonts-installer
```

On a 64 bit (amd64) system, if your Windows applications are 32 bit applications, then you will have to enable multi-arch to be able to install wine32 from the i386 architecture (see section 5.4.5, "Multi-Arch Support" page 94).

The user then needs to run `winecfg` and configure which (Debian) locations are mapped to which (Windows) drives. `winecfg` has some sane defaults and can autodetect some more drives; note that even if you have a dual-boot system, you should not point the C: drive at where the Windows partition is mounted in Debian, as Wine is likely to overwrite some of the data on that partition, making Windows unusable. Other settings can be kept to their default values. To run Windows programs, you will first need to install them by running their (Windows) installer under Wine, with a command such as `wine .../setup.exe`; once the program is installed, you can run it with `wine .../program.exe`. The exact location of the `program.exe` file depends on where the C: drive is mapped; in many cases, however, simply running `wine program` will work, since the program is usually installed in a location where Wine will look for it by itself.

TIP

Working around a winecfg failure

In some cases, `winecfg` (which is just a wrapper) might fail. As a workaround, it is possible to try to run the underlying command manually: `wine64 /usr/lib/x86_64-linux-gnu/wine/wine/winecfg.exe.so` or `wine32 /usr/lib/i386-linux-gnu/wine/wine/winecfg.exe.so`.

Note that you should not rely on Wine (or similar solutions) without actually testing the particular software: only a real-use test will determine conclusively whether emulation is fully functional.

ALTERNATIVE

Virtual machines

An alternative to emulating Microsoft's operating system is to actually run it in a virtual machine that emulates a full hardware machine. This allows running any operating system. chapter 12, "Advanced Administration" page 302 describes several virtualization systems, most notably Xen and KVM (but also QEMU, VMWare and Bochs).

ALTERNATIVE

***Windows Terminal Server* or VNC**

Yet another possibility is to remotely run the legacy Windows applications on a central server with *Windows Terminal Server* and access the application from Linux machines using *rdesktop*. This is a Linux client for the RDP protocol (*Remote Desktop Protocol*) that *Windows NT/2000 Terminal Server* uses to display desktops on remote machines.

The VNC software provides similar features, with the added benefit of also working with many operating systems. Linux VNC clients and servers are described in section 9.2, "Remote Login" page 191.

13.10. Real-Time Communications software

Debian provides a wide range of Real-Time Communications (RTC) client software. The setup of RTC servers is discussed in section 11.8, "Real-Time Communication Services" page 292. In SIP terminology, a client application or device is also referred to as a user agent.

Each client application varies in functionality. Some applications are more convenient for intensive chat users while other applications are more stable for webcam users. It may be necessary to test several applications to identify those which are most satisfactory. A user may finally decide that they need more than one application, for example, an XMPP application for messaging with customers and an IRC application for collaboration with some online communities.

To maximize the ability of users to communicate with the wider world, it is recommended to configure both SIP and XMPP clients or a single client that supports both protocols.

The default GNOME desktop includes the Empathy communications client. Empathy can support both SIP and XMPP. It supports instant messaging (IM), voice and video. The KDE desktop provides KDE Telepathy, a communications client based on the same underlying Telepathy APIs used by the GNOME Empathy client.

Popular alternatives to Empathy/Telepathy include Ekiga, Jitsi, Linphone, Psi and Ring (formerly known as SFLphone).

Some of these applications can also interact with mobile users using apps such as Lumicall on Android.

➨ http://lumicall.org

The *Real-Time Communications Quick Start Guide* has a chapter dedicated to client software.

➨ http://rtcquickstart.org/guide/multi/useragents.html

TIP

Look for clients supporting ICE and TURN

Some RTC clients have significant problems sending voice and video through firewalls and NAT networks. Users may receive ghost calls (their phone rings but they don't hear the other person) or they may not be able to call at all.

The ICE and TURN protocols were developed to resolve these issues. Operating a TURN server with public IP addresses in each site and using client software that supports both ICE and TURN gives the best user experience.

If the client software is only intended for instant messaging, there is no requirement for ICE or TURN support.

Debian Developers operate a community SIP service at rtc.debian.org[1]. The community maintains a wiki with documentation about setting up many of the client applications packaged in Debian. The wiki articles and screenshots are a useful resource for anybody setting up a similar service on their own domain.

➨ https://wiki.debian.org/UnifiedCommunications/DebianDevelopers/UserGuide

ALTERNATIVE

Internet Relay Chat

IRC can also be considered, in addition to SIP and XMPP. IRC is more oriented around the concept of channels, the name of which starts with a hash sign #. Each channel is usually targeted at a specific topic and any number of people can join a channel to discuss it (but users can still have one-to-one private conversations if needed). The IRC protocol is older, and does not allow end-to-end encryption of the messages; it is still possible to encrypt the communications between the users and the server by tunneling the IRC protocol inside SSL.

IRC clients are a bit more complex, and they usually provide many features that are of limited use in a corporate environment. For instance, channel "operators" are users endowed with the ability to kick other users from a channel, or even ban them permanently, when the normal discussion is disrupted.

Since the IRC protocol is very old, many clients are available to cater for many user groups; examples include XChat and Smuxi (graphical clients based on GTK+), Irssi (text mode), Erc (integrated to Emacs), and so on.

QUICK LOOK

Video conferencing with Ekiga

Ekiga (formerly GnomeMeeting) is a prominent application for Linux video conferencing. It is both stable and functional, and is very easily used on a local network; setting up the service on a global network is much more complex when the firewalls involved lack explicit support for the H323 and/or SIP teleconferencing protocols with all their quirks.

If only one Ekiga client is to run behind the firewall, the configuration is rather straightforward, and only involves forwarding a few ports to the dedicated host:

[1] https://rtc.debian.org

TCP port 1720 (listening for incoming connections), TCP port 5060 (for SIP), TCP ports 30000 to 30010 (for control of open connections) and UDP ports 5000 to 5100 (for audio and video data transmission and registration to an H323 proxy).

When several Ekiga clients are to run behind the firewall, complexity increases notably. An H323 proxy (for instance the *gnugk* package) must be set up, and its configuration is far from simple.

Keywords

Firewall
Netfilter
IDS/NIDS