The GNOME Census:

Who writes GNOME?

Dave Neary & Vanessa David, Neary Consulting

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Introduction

What is GNOME?

The GNOME project was founded with the goal of creating a free software desktop user environment for Unix-type operating systems. Since its inception, the project has been a leader among free software projects.

It was one of the first projects to adopt a time-based release schedule, occasionally omitting or deferring features to keep a schedule, rather than apply the widespread "when it's ready" standard for releases which many projects followed at that time. These days, time based releases are the norm.

GNOME was also a key leader in providing accessible technologies to its users, and ensuring that all GNOME applications were accessible by default.

The project pioneered a focus on usability in the free/open source world, occasionally clashing with its traditional early-adopter user base because of the policy to choose sensible defaults rather than add configuration options.

Beyond the core GNOME release sets, a number of key desktop middleware packages have also been born from initiatives in the GNOME project, and there are a large number of GNOME applications available on most Linux distributions or as separate downloads, and the GNOME project is moving to broaden its definition of what constitutes a GNOME application.

Project governance

The GNOME project has adopted a governance model similar to that of other projects. The GNOME Foundation was created in 2001 to deal with administrative matters related to the running of the project

and its infrastructure, co-ordination of fund-raising activities, and to facilitate relationships with commercial partners who were investing in the project.

However, the technical agenda for the project is not set by the foundation. The developers and maintainers of individual modules instead set their own priorities, and a number of well respected developers are also nominated to the GNOME release team, who will occasionally set project-wide goals and direction.

The GNOME Foundation is a member organisation, and any person active in the GNOME project can become a member. The primary decision-making body of the foundation is the board of directors, elected annually from the members.

The Executive Director of the foundation is primarily responsible for coordinating fund-raising activities, and building relationships. Stormy Peters has been the Executive Director of the foundation since 2008.

Another important structure in the GNOME Foundation is the advisory board. Made up of representatives from companies and non-profits who are supporting the GNOME project, this provides an important communication channel from the project to its partners, and vice versa. The current members of the GNOME advisory board are Canonical, Collabora, Debian, Free Software Foundation, Google, IBM, Igalia, Intel, Motorola, Mozilla Foundation, Nokia, Novell, OLPC, Oracle, Red Hat and the Software Freedom Law Center.

Why survey GNOME?

This study grew from a number of questions which have been asked frequently by press and partners in recent years. How big is the GNOME project? What is its make-up? How do decisions get made? How many GNOME developers are there?

For some, this information is sought as part of an evaluation of the risk associated with choosing the GNOME platform as part of their product strategy. For others, there is a desire to understand how free software projects work.

Information on which companies contribute to GNOME may also be useful to prospective customers, when making purchasing decisions. Customers may be happier buying high-level support from companies who employ more module maintainers or committers to the project.

For companies seeking custom application development, knowing which developers are maintainers of key modules in the development platform may also influence purchasing decisions.

There is also a general interest in comparing the GNOME project to other projects which have performed similar analyses, such as the Linux kernel (Kernel09). Shedding light on the ways in which different projects work is useful and interesting in its own right.

The GNOME project constitutes a large database of source code, covering a history of 13 years, and thus provides a great source of data relating to the evolution of popular, community based distributions. Researchers have used GNOME as their source in the past (German02, German03, Berdou07), allowing us to see how the projects has evolved in the past few years as well.

Scope and methodology

To answer the question "how many people work on GNOME?" we first need to define what we mean by GNOME, and what we mean by "work". There are several possible definitions we could use, each corresponding to a different answer:

1. All GNOME or GTK+-based applications

2. Only GNOME or GTK+-based applications which are hosted at gnome.org

3. The GNOME platform and core applications, including external dependencies

4. Modules which are included in an official GNOME release set only

We felt that the inclusion of all GNOME or GTK+ based applications in our study would have been impossible to accomplish, and would have made the results less useful. Since there are many useful GNOME applications hosted outside gnome.org, and many of the modules which are still available on gnome.org are not actively maintained, we also felt that restricting components analysed to those on gnome.org would not provide any useful insights into the project.

On the other hand, we felt that including only the core modules in the release set would not reflect the influence which the GNOME project has had in the development of the middleware stack for Linux through freedesktop.org.

One final decision was the decision to omit deprecated GNOME modules from the study. While the omission of these modules undoubtedy affects the results for historical supporters of the project and for our earliest developers, GNOME discouraging the use of these APIs suggested to us that these modules are not considered a core part of the release at this point.

We thus decided to measure all modules included in an official GNOME 2.30 release set (Platform, Desktop, Platform bindings, Admin, Developer tools), or listed as an external dependency of GNOME, which was developed primarily for use in the GNOME desktop environment.

We omitted some external dependencies from consideration because

they were developed independently of the project, and their inclusion would have skewed results. We decided, for example, to omit Webkit from the external dependencies, since clearly it was not developed primarily for GNOME, and is not only used by Linux desktop environments. This does have the unfortunate side-effect of omitting a large number of contributions to WebKitGtk.

We decided to make changesets the primary unit of "work" for our study. Documentation, localisation and development work all go through GNOME git, and while we may be omitting some important contributions in the area of evangelism, web development, event co-ordination and other non-code contributions, we felt that this was the right balance to strike.

We also did not consider modules included in the GNOME Mobile release set, or those modules which will be part of GNOME 3.0, but were not yet ready for inclusion in GNOME 2.30. Again, this has the side-effect of omitting many significant modules such as Modest, Tinymail, GNOME Shell, and the DBus port of at-spi.

Tools and Observations on Data Quality

Source modules were analysed with the "CVSAnaly" and gitdm tools. CVSAnaly allows classification of commits into three categories: code, translations and documentation. The tool gives the number of lines of code in a project, the number of lines modified in a commit, and much more. This information is stored in raw form in a MySQL database, where it can be analysed and visualised afterwards. For visualisation of data we used Gnumeric, Artichow and a number of custom PHP scripts. gitdm works directly on Git logs, and provides a very useful mechanism for matching of email addresses to employers.

Some of the problems which we encountered when dealing with this large database was that many GNOME contributors have used

several email addresses to contribute over the history of the project. In cases where we could be sure that two email addresses matched to one person, we merged the commit counts for the addresses. Identifying the employer of a contributor is also unfortunately not as easy as parsing the domain name of an email address - many long-time GNOME contributors commit with their gnome.org email address, or with another personal email address, in spite of having worked for a number of GNOME-supporting companies over the years.

The Ubuntu project has also been issuing ubuntu.com email addresses to volunteers on their project - we observed that a number of Canonical employees contributed with one or more email addresses from canonical.com, ubuntu.com and gnome.org, and a number of Ubuntu volunteers also commit to GNOME with their ubuntu.com addresses.

Time is another factor which had to be taken into account - mergers and acquisitions, companies going out of business, and contributors changing employers were all issues we encountered, and we exercised judgement in each situation. For the purposes of our study, Sun Microsystems was considered a separate entity, but Opened Hand contributions were included in the count for Intel, HelixCode and Ximian commits were counted with Novell, and CodeFactory and Imendio commits were counted for Lanedo. LinkedIn, blog entries and a gitdm feature allowing an email address to be associated with an employer for a period of time were all very helpful in allowing us to track some of the more prolific contributors across different employers, but we believe that some historical supporters of GNOME have had their contribution under-counted simply because the data we have is incomplete.

Another issue which we had not anticipated was the significant number of contributors who are salaried employees of companies

who pay them to support free software, but who consider themselves volunteers in the project, and whose contributions to GNOME are primarily made during their free time. In cases where someone identified themselves as a volunteer, we respected that, even if they were working for a GNOME-supporting company at the time.

To mitigate these factors, and to clarify in the large number of cases where the employer was unknown, we performed a survey of all GNOME developers. We asked developers to categorise themselves as volunteers, independent contractors, or paid employees working on GNOME at work. We also asked if they worked on GNOME in their spare time as well. The response rate for the survey was a respectable 18%. One of the findings of this survey which was reassuring is that the majority of developers who work on GNOME as part of their job also continue to contribute to the project in their free time. Only 15% of respondents said that they had once contributed to the project, but were no longer active. However, this figure must be put into perspective, since it is likely lower than the real figure because of sample bias. We believe that active developers are more likely to respond to a survey about the project than inactive past developers.

Results and analysis

GNOME Project size

The GNOME 2.30 release and external dependencies consists of 189 modules, including 28 modules in the platform, 104 modules (mostly applications) spread across the Developer, Admin and Desktop suites, and 57 external dependencies. (See Appendix 1). Combined, this represents 13 years of coding, and over 468,000 individual changesets. Since the project's inception, over 3,000 individuals have committed changes.

Plotting the number of changesets which are included in each release since the project turned 2.0 in October 2002 (Figure 1) reveals that not only has the rate of change been maintained over the past 8 years, it has increased.
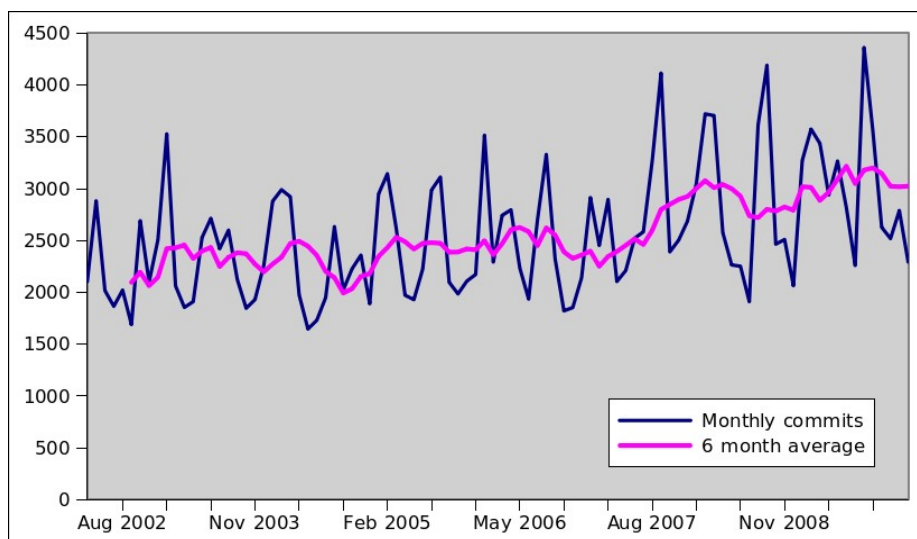

Figure 1: Number of check-outs per month across GNOME modules

The rate of changesets reflects the heartbeat of the project. A six-month GNOME release cycle begins with the previous release, after which the main focus is bug fixing. After a stable release, a merge window is open when proposals for new modules are accepted, and

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when developers typically merge larger less well tested features they wish to include in the following release. After 4 months, a feature freeze is declared, and any half-baked feature additions should be backed out at this stage. There follows a stabilisation period pre-release, with successive freezes for interface and string changes, to allow translators and documenters to have a steady target, before finally there is a full code freeze except for approved bug fixes for the week before the final release.

There are observable peaks of activity in the run-up to the biannual releases in March and September. The peak in activity in July and August may correspond to the enthusiasm generated by the annual GNOME community conference, GUADEC. The busiest month on record for the project is August 2009, when 4,361 changes were made to GNOME modules or their external dependencies. Similarly, August and September 2008 were very busy months for the project (3,613 and 4,190 commits).

The Long Tail

With such a large number of individuals, it is to be expected that the number of commits would vary wildly from the most prolific developers to the least prolific. Indeed, that is the case (see table 1). The top 40 developers have made 149,211 changes among them, representing 31% of all changes made. The most prolific 5% of developers (top 165) have made 302,459 changes, or 65% of all changes made in the 13 year history of GNOME. In fact, graphing the number of commits that a developer has against his relative rank shows a classic power law at play (see figure 2).

This phenomenon mirrors what has been observed by Greg Kroah-Hartman, Jon Corbet et al in the Linux kernel (Kernel09).

Delving deeper for these most prolific committers, we can identify two distinct patterns of contribution. Either the developer is a

maintainer of a large, stand-alone module, and has contributed very little to the rest of the desktop and platform, or the developer has made a significant number of changes to many modules.

Kjartan Maraas is the best example of the latter: he has over 100 commits in each of 17 different modules, and has made contributions to 114 modules in total. Kjartan is the most prolific unpaid contributor in the GNOME project. Alex Larsson has made commits in 31 modules, of which Nautilus, gvfs, gtk+ and glib are the most significant. Similarly, Matthias Clasen has made contributions to 61 modules, although his commits to gtk+ and glib make up over 90% of his contributions.

Jeffrey Stedfast, on the other hand, has made almost all of his contributions to Evolution and Evolution Data Server, Damien Sandras's commits have all been as the maintainer of Ekiga, and Carl Worth has made all but 20 of his commits to Cairo.

An interesting observation about this table is the place taken up by developers who are not employed to work on GNOME. Benjamin Otte was an unpaid contributor to GNOME until January this year; Kjartan Maraas, Christian Persch and Damien Sandras are also unpaid for their GNOME work. In addition to these, there are several translation co-ordinators in the top 40 committers, all of whom are unpaid contributors.
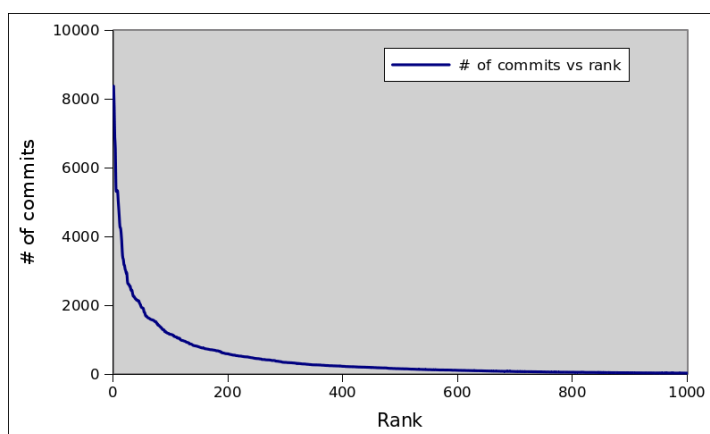

Figure 2: The long tail - a classic power law (only top 1000 graphed)

Name	Employer(s) (for GNOME)	Changesets	% of total	Primary modules
Matthias Clasen	Red Hat	8375	1.80%	gtk+, glib
Richard Hughes	Red Hat	7766	1.70%	gnome-power-manager, DeviceKit-power, packagekit,
Kjartan Maraas	(None)	6884	1.50%	e-d-s, gnome-applets, gnome-panel, gnome-utils, nautilus, gnome-session, gnome-desktop, gedit, gdm, gnome-games...
Benjamin Otte	Red Hat (Jan 10-)	6557	1.40%	swfdec, gstreamer, gst-plugins-base, gst-plugins-good
Christian Persch	(None)	5498	1.20%	Epiphany, gnome-games, gnome-terminal, evince, gucharmap, vte
Lennart Poettering	Red Hat	5336	1.10%	pulseaudio, avahi, libcanberra
Wim Taymans	Collabora, Fluendo	5320	1.10%	gstreamer, gst-plugins-base, gst-plugins-good
Jeffrey Stedfast	Novell	5311	1.10%	evolution, e-d-s
Bastien Nocera	Red Hat	5039	1.10%	totem, gnome-bluetooth, gnome-media, shared-mime-info, totem-pl-parser
Simon McVittie	Collabora	4800	1.00%	telepathy-glib, telepathy-mission-control
Alexander Larsson	Red Hat	4541	1.00%	nautilus, gvfs, gtk+, glib
Thomas Vander Stichele	Fluendo	4288	0.90%	gstreamer, gst-plugins-base, gst-plugins-good, gnome-media
Daniel Veillard	Red Hat	4253	0.90%	libxml2, libxslt, gamin
Behdad Esfahbod	Red Hat	4120	0.90%	pango, cairo, fontconfig, gnome-terminal, vte
Jürg Billeter	Codethink	3899	0.80%	vala, tracker
Owen Taylor	Red Hat	3573	0.80%	gtk+, pango, glib, cairo
Emmanuele Bassi	Intel	3384	0.70%	clutter, clutter-gtk, gnome-utils, gtk+, unique
George Lebl	(Academic), Eazel, Red Hat	3326	0.70%	gnome-panel, gdm, gnome-applets, gnome-utils, gnome-desktop
Dan Winship	Red Hat	3185	0.70%	evolution, e-d-s, libsoup
Vincent Untz	Novell	3159	0.70%	gnome-panel, gnome-session, libwnck, gnome-menus, gnome-desktop, libgweather, pessulus
Jorge Gonzalez Gonzalez	(None)	3052	0.70%	Spanish translator
Damien Sandras	(None)	3010	0.60%	Ekiga
Havoc Pennington	litl, Red Hat	2934	0.60%	metacity, dbus, gtk+, gconf, gnome-terminal
Chris Wilson	Intel	2932	0.60%	cairo, vte
Christian Rose	(None)	2716	0.60%	Swedish translation co-ordinator
Mark McLoughlin	Red Hat, Sun	2622	0.60%	gnome-panel, gnome-session, sabayon, vino, gconf, gnome-menus, gnome-netstatus
Olivier Crête	Collabora	2617	0.60%	farsight2
Priit Laes	(None)	2592	0.60%	Estonian translation co-ordinator
Rodrigo Moya	Canonical, Novell	2551	0.50%	libgda, evolution, e-d-s, gnome-control-center
Tim-Philipp Müller	Collabora, Fluendo	2547	0.50%	gstreamer, gst-plugins-base, gst-plugins-good
Matthew Barnes	Red Hat	2454	0.50%	evolution, e-d-s, evolution-exchange, gtkhtml
Daniel Nylander	(None)	2441	0.50%	Swedish translation co-ordinator
Tor Lillqvist	Novell	2432	0.50%	gtk+, glib, evolution, e-d-s, pango,

Ettore Perazzoli	Novell	2342	0.50%	evolution, gtkhtml
Francisco Javier F. Serrador	(None)	2270	0.50%	Spanish translator
William Jon McCann	Red Hat	2257	0.50%	gnome-screensaver, gdm, gnome-session, gnome-games
Radek Doulik	Novell	2248	0.50%	gtkhtml, evolution
David Schleef	Entropy Wave	2210	0.50%	gstreamer, gst-plugins-base, gst-plugins-good, liboil, swfdec
Murray Cumming	Openismus	2187	0.50%	C++ bindings (*mm)
Carl Worth	Intel, Red Hat	2183	0.50%	cairo

Table 1: The 40 most prolific GNOME developers

Effects of commercialisation

In her thesis about the GNOME project, Evangelia Berdou (Berdou07) documented the commercialisation of the GNOME community. She observed that an increasing number of GNOME contributors are being paid to work on GNOME and other projects. She postulated that this commercialisation was affecting the nature of contributions by volunteer developers.

This is not a new phenomenon - German (German03) analysed the early days of the Evolution project, and found that of the ten most active developers, only one was not an employee of Ximian. Over 65% of commits at that point were by Ximian developers.

Stormy Peters (Peters08) has written about the potentially damaging effects of large numbers of paid developers working on a project – the intrinsic motivations which attracted a developer to a project can be eroded, and replaced with purely financial motivation.

As part of a survey, we asked GNOME developers whether they contributed to GNOME as volunteers, as paid developers, or both. They were also asked whether they contributed only to GNOME projects, or whether they also worked on other free software projects. The results were overwhelming: 70% of respondents identified themselves as volunteers on GNOME, and a further 20% said that they contribute to GNOME both as a volunteer and a paid

developer. GNOME continues to attract large numbers of developers who are interested in development for intrinsic, rather than extrinsic, reasons.

How do you participate in the GNOME project?
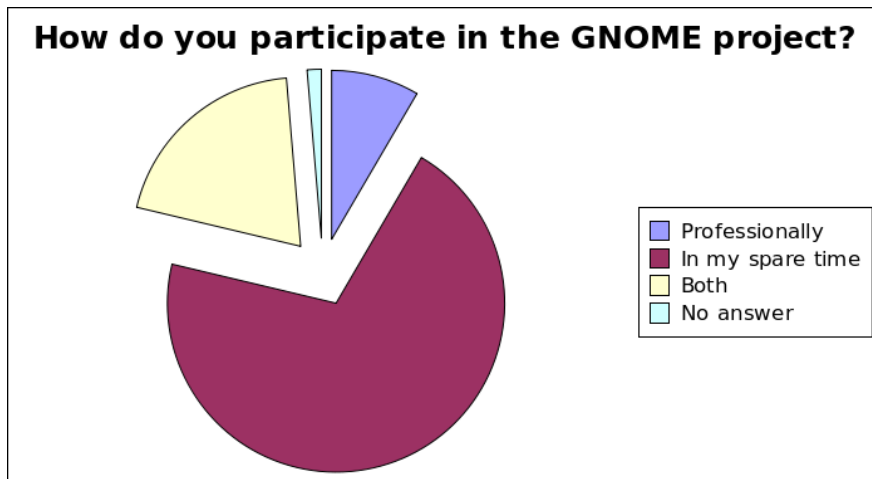
Who does the work?

While over 70% of GNOME committers are unpaid participants in the project, our study has shown that the majority of commits for GNOME come from paid participants.

A caveat: there is a degree of uncertainty in this data because of factors we have previously cited – in many cases we are unsure whether someone is gainfully employed to work on GNOME (or was at some point in the past). We anticipate that this uncertainty will be reduced in future revisions of the survey as information quality improves.

Employer information was gleaned in a number of ways:

1. Mapping company domain names to employer

2. Use of public resources such as LinkedIn, blog entries and Ohloh to identify employment history

3. A survey, asking people who their employer was

We identified 106 companies who have contributed to GNOME development. The top contributors are shown in table 3.

Company	Commits	% of total
None	101823	23.45
Unknown	73558	16.94
Red Hat	70790	16.30
Novell	45349	10.44
Collabora	21684	4.99
Intel	11160	2.57
Fluendo	10218	2.35
Lanedo	10090	2.32
Independent	8922	2.05
Sun	8862	2.04
Nokia	6183	1.42
Openismus	5303	1.22
Codethink	5276	1.21
Eazel	4734	1.09
Litl	4620	1.06
Canonical	4487	1.03
Movial	2988	0.69
Mandriva	2504	0.58
Non Profit:The Family International	2130	0.49
Entropy Wave	2056	0.47
(Academia)	1894	0.44
Mozilla Corporation	1040	0.24

Table 2: Top companies contributing to GNOME

There are some striking results from this table. First, assuming that unknown committers break down evenly between paid & unpaid, professional developers, who make up only 30% of GNOME's committers, contribute 70% of all commits.

Second, as they did in the similar study of the Linux kernel (Kernel09), Red Hat tops the table among commercial developers of GNOME. Given that they are the current or past employer of 16 of the top 40 individual GNOME contributors, this is unsurprising. Novell and Collabora complete the top three.

Consultancy and services companies specialising in the GNOME platform figure well. Collabora, Lanedo, Openismus and Codethink all figure in the top 20 companies. These companies have grown

around an expertise in specific modules – Collabora, for example, is a key maintainer of gstreamer and Telepathy, and related projects.

Rather than hiring developers from the community, Nokia, through the Maemo project, has encouraged the creation and growth of these companies, focusing internally on the user experience and integration of the GNOME platform into their products. The presence of these companies is evidence of the success of this strategy.

A number of companies are notable for their absence. Igalia is a major contributor to several modules we did not include in the study, including WebKitGTK+ and several modules in the GNOME Mobile release set. IBM, who we expected to show up because of their contributions to accessibility in GNOME, do not figure in the top 20 companies. This is likely a result of inaccuracies in our employment data, but may also be because significant contributions such as LSR were abandoned before they had a chance to become part of the core desktop.

Canonical do not figure in the top 10 companies in terms of number of commits to the project, in spite of the importance of GNOME in the Ubuntu desktop experience. In September 2008, Mark Shuttleworth wrote that "Canonical is in a position to drive real change in the software that is part of Ubuntu." (Shuttleworth08) While there are certainly welcome signs that Canonical is investing more in developing GNOME, this has not yet shown through as a significant contribution to the core GNOME release.

Who maintains GNOME?

Most developers prefer writing new features or developing new applications over maintenance of existing code. It is interesting to consider where the maintenance burden falls for bug fixes, regular releases and maintenance updates when code has been part of GNOME and has been stable for some time.

In her thesis, Berdou (Berdou07) suggested that over time, professional developers would concentrate more on infrastructure and core applications, while volunteer effort would naturally focus on non-core applications and libraries, and non-code contributions such as documentation and localisation. Our results bear this out.

When considering the question of who was supporting the maintenance burden for a module, we considered only commits from March 2008 to March 2010. On certain occasions, the most active committers during this period were not those marked as maintainers in the module's MAINTAINERS file. In this case, credit was given to the most active developers, rather than the people listed as maintainers.

Also, it is worth noting that in a number of cases, the company which funded the original development of the module are not maintaining the module. Cairo, developed primarily by Carl Worth at Red Hat, is now maintained primarily by Carl Worth and Chris Wilson at Intel. Nautilus was initially developed by Eazel,
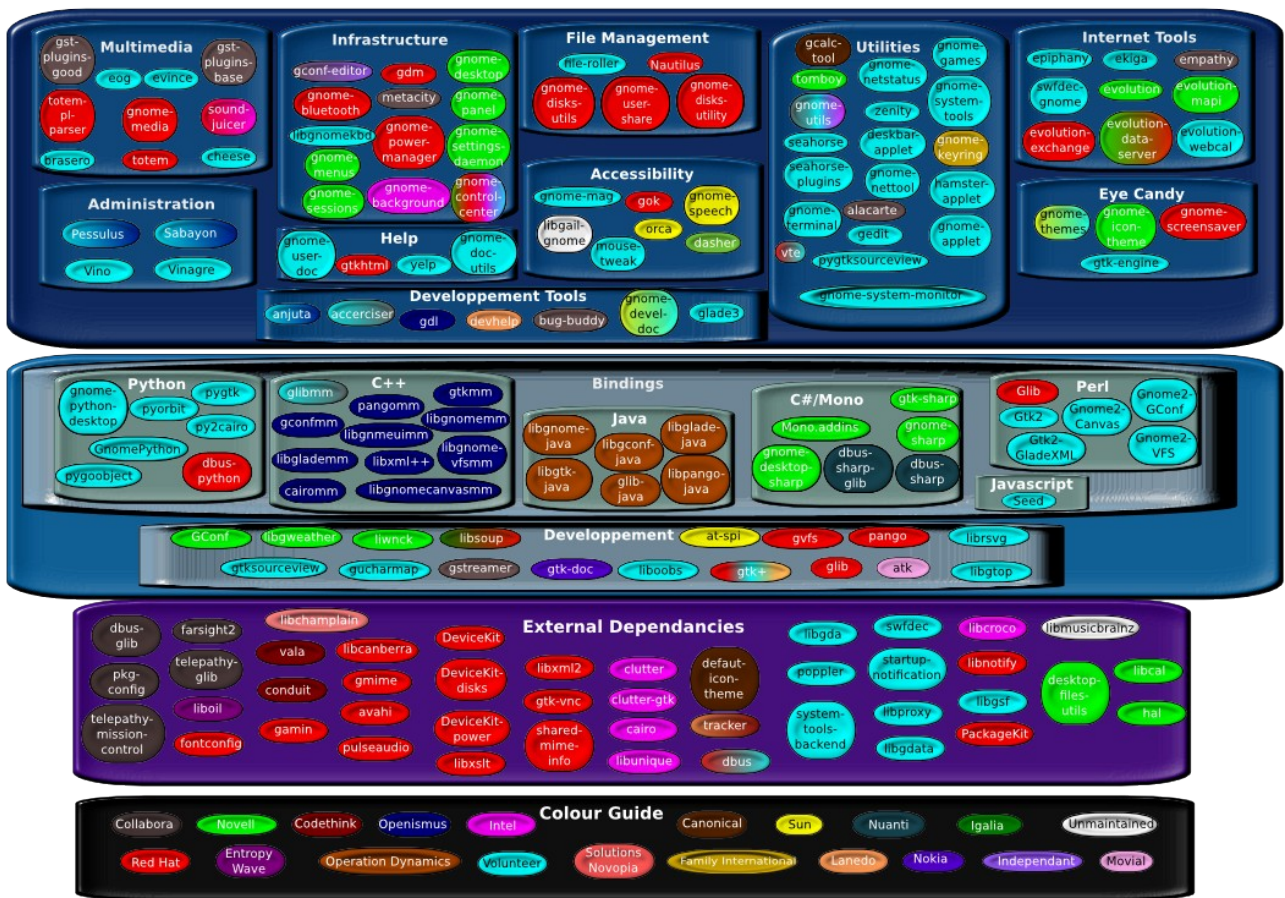
Figure 3: A maintenance "map" of the GNOME project

Modules were considered to be co-maintained by two entities if both had over 10% of the commits in the module over the time period investigated. Some modules had many co-maintainers, and a large number had significant contributions which were underneath the 10%.

The phrase "co-opetition" has been used to describe the phenomenon of competitors working together in their common interest on parts of an ecosystem, while competing fiercely in other areas. The phenomenon is very visible in GNOME. Large modules including GTK+, Evolution, Evolution Data Server, Tracker, and Gstreamer have seen significant contributions from employees of more than one company over the past two years. Other modules like gnome-control-center, gnome-utils and gnome-games have stabilised, and are

maintained by a large group of contributors.

Having said that, we can see that different companies have different focusses across the project.

While Red Hat CEO Jim Whitehurst has said that they are not focused on "a traditional desktop product for the consumer market" (RedHat08), the company has clearly continued to invest significantly in the production of a high-quality, well-integrated desktop platform.

Red Hat is contributing to a large number of modules in the middleware layer relating to device detection, core desktop services like sound, and service discovery, including Dbus, DeviceKit, pulseaudio, avahi, PackageKit, gvfs, gnome-power-manager, nautilus, etc.

Novell focusses most of their upstream contributions on Evolution, gnome-desktop, gnome-panel, and Mono-related modules. Collabora focusses almost entirely on Telepathy and Gstreamer related modules, including Farsight2 and Empathy, and Intel is the primary maintainer of Cairo and Clutter, modules related to low-level graphics.

One thing which should concern the community is the way in which different companies have "carved out" areas in which they are the only, or primary, contributor. This compares unfavourably with the Linux kernel, where there are several active maintainers for each subsystem.
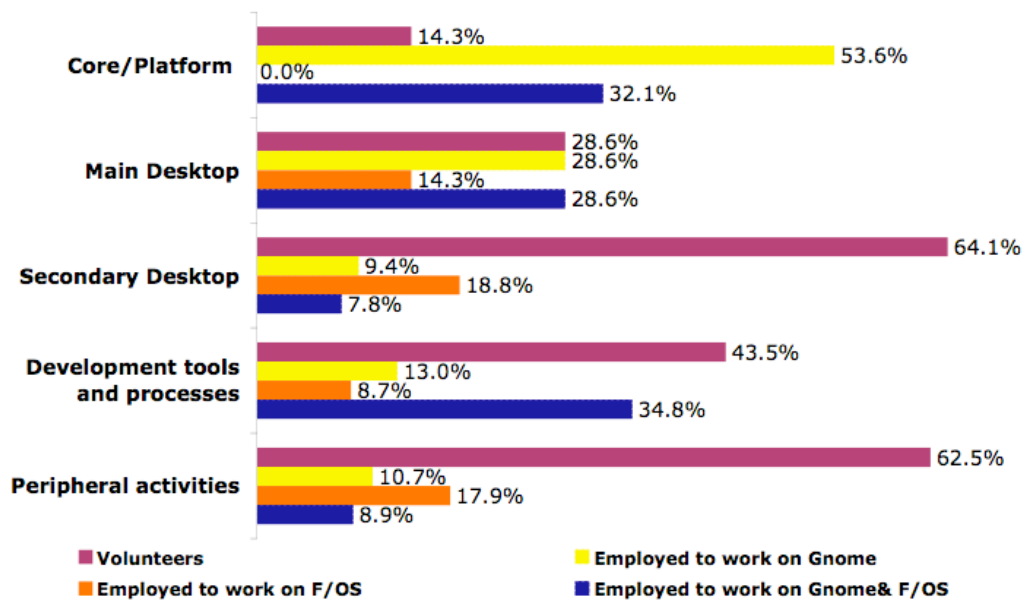
Figure 4: Contribution of paid vs unpaid contributors in GNOME (Credit: Evangelia Berdou)

The data supports Evangelia Berdou's conclusions from 2007: paid contributors do the lion's share of commits in the core platform and middleware parts of the project, and unpaid developers tend to contribute much more in non-core applications, language bindings and developer tools.

Conclusions

The GNOME project is a large body of work, covering functionality from middleware to user applications. We can see from this study that it continues to evolve rapidly, and with the upcoming GNOME 3.0 release, we can anticipate another increase in the rate of activity around the project.

There are thousands of people who have contributed to the success of the GNOME project, including over 3500 people who have made contributions to the core modules we evaluated. Over the history of the project, 106 companies have contributed to the project. We can see from this study which companies are the most significant contributors to the GNOME project, and in which areas of the desktop they contribute. A key result is that 70% of the people who contribute to GNOME do so on their own time, rather than as part of their job.

This does not include all of the peripheral tasks which get done in the project, including artwork, web design, administration, event organisation, etc. We can recognise that the minority of the GNOME developers who are paid to work on GNOME contribute over 70% of all changes to the project. This is not that surprising. When considering who to hire, companies will often consider first the people who are most active in the free and open source projects which interest them.

While this initial survey of the GNOME project is not perfect, it is a start, and has shown a number of conclusions which people outside the project may find surprising. We hope to be able to improve on this start by getting improved employment data for a follow-up study, and complimenting it with qualitative analysis of key modules. One key improvement would be to include modules typically found on GNOME-based mobile devices, and to consider modules which will

be part of GNOME 3.0.

We would like to thank the various people who helped us with elements of this study, including Vincent Mabillot of CoLibre and Germán Poo Camaaño, who shared some data he had also gathered about the project.

References

(Berdou07) "Managing the Bazaar: Commercialization and peripheral participation in mature, community-led Free/Open source software projects" *Evangelia Berdou, London School of Economics*: http://opensource.mit.edu/papers/PhD_Berdou.pdf

(German02) German, D., "The evolution of the GNOME Project," in Proc. of the 2nd Workshop on Open Source Software Engineering, May 2002

(German03) German, D.M., and A. Mockus, "Automating the measurement of open source projects," in Proc. of the 3rd Workshop on Open Source Software Engineering, May 2003

(Kernel09) "Linux Kernel Development: How Fast it is Going, Who is Doing It, What They are Doing, and Who is Sponsoring It" *Greg Kroah-Hartman, SuSE Labs/Novell Inc., Jonathan Corbet, LWN.net, Amanda McPherson, Linux Foundation: http://www.linuxfoundation.org/sites/main/files/publications/whowrit eslinux.pdf*

(Shuttleworth08) "Design, user experience and development at Canonical": http://www.markshuttleworth.com/archives/162

(RedHat08) What's Going On With Red Hat Desktop Systems? An Update: http://press.redhat.com/2008/04/16/whats-going-on-with-red-hat-desktop-systems-an-update/

Appendix 1: Modules included in survey

The list of modules included in GNOME 2.30 is available on the GNOME wiki at http://live.gnome.org/TwoPointTwentynine

We chose to omit deprecated modules from consideration for the GNOME platform.

When we were deciding what modules to include in the survey, the question of which external dependencies arose. Clearly modules such as Python, sqlite and Mozilla, which were developed independently of GNOME, don't make sense as part of the survey, but projects such as tracker, pulseaudio, PackageKit and DeviceKit, which grew out of GNOME initiatives and are housed at freedesktop.org, were relevant enough to include in the scope.

Among the external dependencies listed in the wiki, we chose to include the following in the survey:

avahi, cairo, cairomm, clutter, clutter-gtk, conduit, dbus, dbus-glib, dbus-python, desktop-file-utils, Devicekit-disks, Devicekit-power, farsight2, fontconfig, gamin, gmime, gtk-vnc, hal, hicolor-icon-theme, icon-naming-utils, intltool, libcanberra, libchamplain, libcolorblind, libcroco, libgda, libgdata, libgsf, libmusicbrainz, libnotify, liboil, libunique, libxml2, libxslt, PackageKit, pkg-config, polkit-gtk, poppler, pulseaudio, pycairo, shared-mime-info, startup-notification, swfdec, system-tools-backends, telepathy-glib, telepathy-mission-control, tracker, vala

The following modules were omitted. As previously mentioned, in the case of WebKit, there was a strong argument to be made to consider WebKitGTK+, but getting decent data for this proved difficult.

Berkeley DB (libdb), enchant, expat, gnutls, gpgme, iso-codes, libgcrypt, libggz, ggz-client-libs, libgpg-error, libical, libmapi, libproxy, libtasn1, libxklavier, Mono.Addins, mozilla (firefox), ndesk-

dbus, ndesk-dbus-glib, nspr, nss, opal, ptlib, Python, rarian, sqlite, WebKit