

# The evolution of the GNOME Project

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## Abstract:

The GNOME Project is an attempt to create a GUI desktop for Unix systems. Originally started by a handful of volunteers in 1996, GNOME has become the desktop of choice for Solaris, HP-UX, and Red Hat Linux, and it is currently developed by a team of approximately five hundred people around the world. The importance of GNOME to the Unix world has attracted the attention of several software companies who are actively participating in its development. At the same time, some of its volunteer developers have created enterprises who expect to sell services and products around GNOME. This extended abstract describes, first, the development model of GNOME, then the influence that private companies had had on the project: on one hand they are contributing a large amount of resources to the project, accelerating its development, and increasing its reliability and documentation; and on the other hand, the GNOME Foundation has been created to maintain the goal of the project to provide a free (as in freedom) software desktop for Unix, and avoid that the commercial interests of these partners could jeopardize the interests of the community.

## Introduction

The GNU Network Object Model Environment (GNOME) Project ([www.gnome.org](http://www.gnome.org)) is an attempt to create a free (as defined by the General Public License) desktop environment for Unix systems. It is composed of three main components: an easy-

to-use GUI environment, a collection of tools, libraries, and components to develop this environment, and an "office suite" [4]

The GNOME Project was founded by Miguel de Icaza in 1996 as a loosely coupled group of developers, scattered all over the world. Like many other open source projects, they use the World-Wide Web and email for intercommunication, the GNU tool suite (gcc, make, emacs, gdb, for software development), CVS (for software configuration management), and bugzilla (for bug tracking) as their main development platform. The project currently involves around five hundred developers. In 1997 the first tarball is posted (version 0.10). Version 1.0 was released in March 1999, which is integrated into Red Hat Linux as its default desktop. Version 1.4 is the latest version, released in 2001, and version 2.0 is in beta testing. GNOME is composed of a large collection of programs and libraries, comprising millions of lines of code [2,1].

## Project Administration

In order to handle a project of this magnitude, the code base is divided into *modules*. There are four main groups of modules: a) required libraries (19 modules); b) core application (4 modules); c) applications (16 modules), and d) other (several dozen modules and growing, these modules represent individual applications that are not considered part of the core of GNOME). Each module has one or more maintainers, who oversee the development of their corresponding module and coordinate and integrate the contributions of other developers to their module.

The architectural decisions were originally taken by consensus (using mainly the *gnome-devel-list* and the *gnome-hackers* mailing lists), and more recently through the GNOME Foundation (see section 4 for a discussion of the GNOME Foundation). Many of the modules have their own mailing lists that serve as communication channels for the different developers that participate in a single module. Decisions pertaining a single module are usually taken in these forums. A CVS repository is used to coordinate the development. Even though any developer with CVS access can modify any given module, it is expected that only a small group of them can do it directly. These developers have demonstrated to the maintainers of the module that their patches can be trusted. GNOME works, as many other open source projects, on the basis of merit. At the beginning of his or her contributions, a new developer is expected to send patches (or deltas from the current version of the module) to the maintainer of the module, until the maintainer acknowledges that the new developer can directly apply his or her patches to the CVS repository, and therefore, those patches will no longer require approval by the maintainers.

In some cases, a patch might be rejected. The rejection can take two forms. In its simplest form, the maintainer receives the patch from the developer and decides to reject it, hence, the patch is never applied to the CVS repository. A more complex situation arises when the developer applies her or his changes directly to the module, and one of the maintainers does not like the patch and rolls back these change. In either situation, the developer can appeal the decision of the maintainer to the community at large, and then, after a discussion of the pros and cons, a final decision is taken. This situation is very infrequent.

### **The Industry Connection**

A stable, easy-to-use desktop suite is seen as a requirement for Unix to become a viable alternative to Microsoft or Apple operating systems [7,1]. As a consequence, many Unix companies have a particular interest in seeing GNOME succeed.

GNOME 1.0 was the first version included in Red Hat Linux, and this decision acknowledged GNOME as an strategic collection of applications for Red Hat's goal to become a desktop operating system. Red Hat became aware of the immaturity of its code base and were concerned with its reliability. Red Hat Advance Development Labs

was setup by Red Hat to assist in the development of GNOME. Since 1999 they have dedicated several developers and documenters to the project [2].

At the end of 1999 two companies-Eazel and Ximian-were established to continue the development of GNOME components and to sell services around it. Eazel concentrated in the development of the file manager (Nautilus), while Ximian concentrated in the development of a groupware, email tool called Evolution, and in the release of a version of GNOME called "Helix GNOME". Due to lack of additional funding, Eazel folded early in 2001, while Ximian (a private company who was created by the founders of the GNOME Project, including Miguel de Icaza), continues to operate and currently has four seats in the board of directors of the GNOME Foundation. Helix has recruited some of the most active volunteer contributors to the project. Helix's main products are a shrink-wrapped version of Helix-GNOME "Ximian Connector", and a subscription-based service for the automatic updating of software in the client's machine. In 2000, Sun Microsystems decided to adopt GNOME as its future desktop software for Solaris (replacing CDE). As of today, they provide GNOME 1.4 for Solaris for a nominal fee, and expect to include GNOME 2.0 with future releases of Solaris. Sun has established the "Sun GNOME Accessibility Development Lab" which provides developers who work alongside members of the GNOME community to help define and drive accessibility support in GNOME as well as contribute writing code [5].

### **The influence of paid employees**

The influence of employees whose job is the development of GNOME has been instrumental the success of the project. Red Hat Labs currently dedicates six full time developers to the project (see <http://www.labs.redhat.com/projects.html>). Their main contribution has been the development of gtk+ and CORBA, two of the critical modules of the project. Eazel dedicated its developers to Nautilus, GNOME's file manager. Helix employs half a dozen developers in modules such as Evolution (e-mail, calendar, and address book), Gnumeric (spread-sheet), and many other smaller applications and modules and it is currently leading the development of Mono, a free implementation of the .net framework, including a C# compiler. One of the most visible contributions of Sun employees is the proposal of the GNOME

Accessibility Framework, which aims at guaranteeing that GNOME can be used by a vast variety of users, including persons with disabilities.

Paid employees normally concentrate in the core components of GNOME and are usually responsible for the following tasks: project design and coordination, testing, documentation, and bug fixing. These tasks are usually less attractive to volunteers. By taking care of them, the paid employees make sure that the development of GNOME continues at a steady pace.

Volunteers still play a very important role in the project and their contributions are everywhere: as maintainers and contributors to modules, as bug hunters, as documenters, as beta testers, etc. In particular, there is one area of GNOME that remains done mainly by volunteers:

internationalization. The translation of GNOME-it currently supports 13 languages-is done by small teams of volunteers (volunteers who usually speak the language in question and who are interesting in seeing support for their language in GNOME). As with any other open source project, GNOME is a meritocracy, where people are valued by the quality (and quantity) of their contributions. We are currently evaluating the commit logs to analyze the amount and type of contributions from these paid employees to the project and how they compare to the contributions of volunteers.

### **Change of Leadership: the end of the constitutional monarchy**

Until recently, the direction of the GNOME Project has been defined by a "legislature" where each of the developers has a vote. The developers' mailing list served as the legislature floor where each developer had a voice and where discussions regarding the present and future of the project took and continue to take place. Miguel de Icaza served as the "constitutional monarch" and "supreme court" of the project, and had the final say on any unsolvable disputes. This model of project management is very similar to the one followed by the Perl development team (this system of project management was described in a round table that included Larry Wall, the creator of Perl, during LinuxWorld Expo, 1999).

This model was starting to show some disadvantages. The increased number of developers made the decision process more difficult. Many decisions were taken behind "closed doors" by a handful of developers. Furthermore, the increase in the commercial

interests of some developers (including its founder Miguel de Icaza) made it clear that it was necessary to reorganize the leadership of the project, in order to guarantee that it will continue to follow the principles upon which it was founded.

### **The GNOME Foundation**

During August 2000, at the Linux World Expo, the GNOME team announced the creation of the GNOME Foundation. The mandate of the Foundation is "to further the goal of the GNOME Project: to create a computing platform for use by the general public that is completely free software." [3] The foundation fulfills the following four roles [6]: 1) it provides a democratic process in which the entire GNOME development community can have a voice; 2) it is the responsible for communicating information about GNOME to the media and corporations; 3) it will guarantee that the decisions on the future of GNOME are done in an open and transparent way; 4) it is a legal entity that can accept donations and make purchases to benefit GNOME.

The foundation is composed of three entities: the board of directors, the advisory board, and the executive director. As defined by the foundation's charter, the board of directors is the primary decision-making body of the GNOME Foundation. Interestingly, during the establishment of the foundation it was decided that in order to guarantee that the board represents the interests of the users, the members of the GNOME board of directors should be contributors to the project (who-it is assumed-are users themselves). Their contributions does not necessarily have to be code; they can be documentation, or bug reporting, for example. They are elected annually by the members of the GNOME Foundation by a direct ballot. In order to become member, it is necessary to demonstrate continuous contributions to the project. To avoid stale memberships, members should renew their membership every two years. The board is composed of 11 individuals with voting privileges, and, in order to guarantee that no single organization gains control of the board, no more than four can belong to the same organization (in last year's election, this rule had to be enforced against an employee of Ximian). Nonetheless, the members of the board are supposed to serve in a personal capacity and not as representatives of their employers.

The advisory board is composed of organizations and companies that support GNOME. Currently, the advisory board includes the following names: Borland, Compaq, Debian Project, Free Software Foundation, Gnumatic, Hewlett-Packard, IBM, MandrakeSoft, Object Management Group, Red Flag Linux, Red Hat, Sun Microsystems, TurboLinux, VA Linux, and Ximian. The advisory board provides a forum for these companies to communicate with each other and the GNOME Foundation members. The charter of the Foundation gives them no power to take decisions on the direction of the project.

The most visible effects of the board have been: better coordination and planning of the entire project; the ability to take faster decisions; and a cohesive front to the outside world. Miguel de Icaza has argued also that he is no longer in control of GNOME and it is the foundation who decides the future of the project. It is still early, however, to measure the full effect of the foundation in the development of the project.

## Conclusions

The GNOME Project has been successful in equally attracting volunteers and industry partners, while maintaining its goal of being free software. Many of the tasks usually avoided by volunteers (project planning, documentation, testing, and debugging) are done by paid employees. These paid developers have had a strong influence in the quality and speed of the development of the project. The GNOME Foundation was created in order to guarantee that GNOME continues to be developed with the interests of the free software community in mind, and to avoid that the industrial partners gain control of the project. The Foundation provides a transparent process for the taking of decisions involving the future of GNOME.

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## About the author

Daniel M. German is a member of the GNOME Foundation and was the maintainer of ggv, the PostScript viewer for the GNOME project. He is currently assistant professor of computer science at the University of Victoria, in Canada. In his spare time he enjoys hacking free software.