

## **A Time Line of the GPL and Linux**

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There are many types of Free Open Source Software (FOSS) licenses today and many see Linux as just another example of FOSS; however, the reality is that we would not have Linux if were not for the GNU General Public License (GPL). The GPL forms the foundation of FOSS. Here is a time line to show how Linux was one of several free Unix-like operating systems. What makes Linux unique is that it is the only GPL'd production operating system.

[http://en.wikipedia.org/wiki/Free\\_software\\_movement](http://en.wikipedia.org/wiki/Free_software_movement)

1950's and 60's

In the beginning of the computer industry, mainframe and minicomputer manufactures openly shared system source code with customers to assist hardware sales. It is a time of great experimentation in computer architecture and many computer models have minimal software such as hardware diagnostic programs, simplistic operating systems, assemblers, and debuggers.

Along with hardware customers receive detailed circuit diagrams of the hardware as well as source code to the system software. Customers also join manufacture-sponsored user groups to share system and application program source code. Many times system documentation would include a catalog of the user group library and programs that could be ordered on punched cards, paper tape, or nine track magnetic tape. Thus, since the beginning of the computer industry there always has been a culture of sharing information about the details of the hardware and software.

[http://en.wikipedia.org/wiki/History\\_of\\_free\\_software](http://en.wikipedia.org/wiki/History_of_free_software);

[http://en.wikipedia.org/wiki/SHARE\\_\(computing\)](http://en.wikipedia.org/wiki/SHARE_(computing)); <http://en.wikipedia.org/wiki/DECUS>

1969

Bell Labs terminates its involvement with the Multiplexed Information and Computing Service (MULTICS) project, which was a joint operating system development project with MIT and General Electric. Researchers Ken Thompson and Dennis Ritchie return to Bell Labs. Later they develop an operating system on a salvaged PDP-7. The new operating system has concepts brought over from the MULTICS project. The name UNIX is coined as a play on the word MULTICS, replacing the "MULTI" with "UNI" and the "CS" with "X"

1971 - 1980

Richard Stallman joins the MIT AI laboratory and assists with system software development for a DEC PDP-10 mainframe. Using assembly language, the team extends the DEC TOPS-10 operating system into its own version called the Incompatible Timesharing system (ITS). Stallman works on a program called Emacs, which also extends the old macro-based DEC Text Editor and Corrector (TECO) utility. Stallman strongly committed to sharing software and resists the introduction of account passwords saying that it would restrict software development.

1973 - 1975

Thompson and Ritchie continue to improve and introduce new concepts into UNIX as it evolves through five editions. UNIX is also ported from the PDP-7 to the PDP-11/20 and then to the

PDP-11/45. In its first application, the Bell Labs legal department uses UNIX as a timesharing system for word processing legal documents.

1976 - 1980

Executing on a \$10,000 mini-computer, the UNIX timesharing system had matured to the point that it meets, and in some cases exceeds, the functionality of the \$500,000 mainframe TOPS-10 timesharing system. Although a mainframe executed programs faster than a minicomputer, UNIX dramatically reduced the cost of timesharing computers. In spite of having its own Western Electric computers and a powerful operating system, the AT&T telephone monopoly was not permitted by government regulation to sell its computers or software. However, researchers at Bell Labs were allowed to license the 6<sup>th</sup> Edition of UNIX, with source code, to four-year colleges and universities including MIT for educational purposes. The the 6<sup>th</sup> Edition software license permits use the source code in the classroom. John Lions writes a Commentary on UNIX 6<sup>th</sup> Edition Source Code which quickly spread among university computer science programs.

The 6<sup>th</sup> Edition of UNIX is modified, extended and re-released as various versions of the Berkley Standard Distribution (BSD) from the University of California under the Bell Labs software license. In this way, many universities would obtain a Bell Labs license, put UNIX in a drawer, and order the BSD tape. (The 7<sup>th</sup> Edition and subsequent AT&T licenses restricted use of source code in university courses.)

Stallman and others begin to appreciate the "Unix philosophy" as well as Unix concepts and methods which change how software was developed at the MIT AI laboratory and many other places.

Meanwhile, the microcomputer first appears as the MITS Altair 8800. It marks the beginning of the third generation of computer hardware: mainframes from the 50s, minicomputers from the 60s, and microcomputers from the 70s. But it also marks the third generation of computer programmers and users. As noted, concepts and methods were well established among business/scientific programmers and users of the first two computer generations. Microcomputers, on the other hand, had simplistic architectures, the peripherals were cobbled together with consumer parts such as televisions and cassette tape drives, and there was little to no system software. Needless to say, the beginning of the microcomputer generation was viewed with disdain and the microcomputer generation of programmers and users matured as a separate and independent group in the computer industry. In retrospect it is now obvious that if DEC had embraced the concept of the microcomputer early on, the company would still be in business today.

In Albuquerque, New Mexico, Bill Gates, the co-founder of Microsoft, takes out an advertisement in the Homebrew Computer Club Newsletter entitled: Open Letter to Hobbyists. In the letter Gates expresses dismay at copyright infringement among the hobbyist whom he claims are stealing his Altair BASIC interpreter software. This letter marked a milestone for the development and expansion of proprietary software since it is the antithesis of the GPL. The irony of this milestone is that the initial Altair BASIC interpreter was a modified and extended version of an open source PDP-8 BASIC interpreter obtained from DEC's DECUS user group library.

Computer manufactures, such as IBM and DEC, note how software was sold and accepted in the microcomputer market as well as the huge profit margins software sales generate. Computer vendors change the way computers were sold for the last 20 years. Manufactures begin to charge separately for the hardware and software and each version of the software was also sold separately without significant complaint from customers.

1981

An MIT spin-off company, Symbolics, is formed which hires many staff members from the MIT AI laboratory. These staff members also bring the laboratory software from MIT and it becomes the property of Symbolics. Stallman remains at the AI laboratory.

1982

Symbolics made extensive improvements to every part of the software, and continued to deliver source code to their customers including MIT. Richard Stallman, who helped developed the software was sharing his code with another MIT spin off, Lisp Machines, Inc. Eventually Symbolics had Stallman removed from the AI Lab for Copyright violations.

<http://en.wikipedia.org/wiki/Symbolics>

1983

MIT and DEC begin Project Athena which led to the X Window System for Unix. Initially, all software developed becomes the property of project partners (later the software would be released under the MIT open source license).

Also, a printer vendor requires that Stallman sign a non-disclosure agreement (NDA) if he is to have access to the driver source code for its printer. Stallman refuses to sign the NDA.

Richard Stallman views these events as a serious problem. He sees private companies taking control of the software that he has helped to develop. Stallman sends an email over the nascent Internet in which he proposes to write free GNU (GNU is not Unix) software. (This is eight years before the Linus Torvalds' email saying "I'm doing a (free) operating system...") Here is a copy of the email:

"From CSvax:pur-ee:inuxc!ixn5c!ihnp4!houxm!mhuxi!eagle!mit-vax!mit-eddie!RMS@MIT-OZ  
From: [RMS%MIT-OZ@mit-eddie](mailto:RMS%MIT-OZ@mit-eddie)

Newsgroups: net.unix-wizards,net.usoft

Subject: new UNIX implementation

Date: Tue, 27-Sep-83 12:35:59 EST

Organization: MIT AI Lab, Cambridge, MA

Free Unix! Starting this Thanksgiving I am going to write a complete Unix-compatible software system called GNU (for Gnu's Not Unix), and give it away free to everyone who can use it. Contributions of time, money, programs and equipment are greatly needed.

To begin with, GNU will be a kernel plus all the utilities needed to write and run C programs: editor, shell, C compiler, linker, assembler, and a few other things. After this we will add a text formatter, a YACC, an Empire game, a spreadsheet, and hundreds of other things. We hope to supply, eventually, everything useful that normally comes with a Unix system, and anything else useful, including on-line and hardcopy documentation..."

<http://www.gnu.org/gnu/initial-announcement.html>

1984

Richard Stallman re-releases what is now called GNU Emacs and other utilities under a new type of software license called the General Public License (GPL). The GPL is the first software license to use copyright law to allow the software user the right to redistribute the developer's software.

Douglas Comer releases the source code to Xinu for the PDP-11. Xinu is a minimal, yet functional, Unix-like kernel. Even though the OS is intended for education, Xinu employs a software license that restricts its redistribution.

1985

Richard Stallman receives a letter from Don Hopkins in which he says "Copyleft--all rights reversed." Stallman subsequently uses the word copyleft interchangeably with GPL.

Stallman creates the Free Software Foundation (FSF), a tax exempt charity for free software development. The FSF also distributes GNU Emacs on a nine track tape and charges \$150.00 per tape.

1986

The FSF extends its distribution tape by adding other non-GNU free software.

Andrew Tanenbaum releases the source code to Minix, a version seven compatible Unix-like kernel. Like Xinu before it, Minix is intended for educational use, but its software license restricts redistribution of the software. Also, Minix is compiled with the proprietary Amsterdam Compiler Kit developed by Tanenbaum so even if Minix were freely redistributable, the compiler was not.

1987

Stallman now employs programmers in the Free Software Foundation (FSF) and they develop as well as maintain GNU software. Three key elements of the GNU tools are the C compiler by Stallman, the C library by Roland McGrath, and the Bash shell by Brian Fox. Copyright of these and other GPL utilities remain with FSF.

1988 - 1989

The GNU software system grows into a set of hundreds of utilities that can be compiled and run on most Unix systems. The GNU "tool set" becomes a standard addition to the many commercial versions of UNIX.

1990

Richard Stallman receives the MacArthur "Genius Grant." Stallman uses the personal award of \$250,000.00 to continue funding the FSF.

1991

The source code to 386BSD is released. 386BSD has its roots in the original Version 6<sup>th</sup> Edition code and therefore, like Xinu and Minix before it, 386BSD does not allow redistribution of the software.

The Internet has grown dramatically and Minix has a mailing list of over 10,000 Usenet users who wanted to contribute to Minix and transform Minix into a complete operating system, but Tanenbaum resists changing the restrictive Minix license.

Although Minix was a multi-tasking operating system, it had a limitation where only one user could access a file at one time. Not liking this single-user bottleneck in the Minix file manager, Linus Torvalds developed a minimal version of a Unix-like kernel named "Freax." Like Comer and Tanenbaum did before him, Torvalds used his own software license, which restricted the distribution of Linux and Linux versions 0.01 through 0.11 are released on the Minix mailing list.

1992

Ari Lemmke renamed the kernel "Linux" and Usenet users voted to create a separate Linux email list. Also, based upon requests to make Linux compatible with the GPL license, Linus Torvalds decides to re-license the kernel under the GPL. In doing this, Torvalds inadvertently releases the pent-up demand for a GPL'd Unix-like kernel and thousands of Minix users quickly switch to Linux and begin to extend

and enhance the minimal kernel. Linus quickly adapts to the vast interest in Linux by accepting, integrating, and re-releasing patches to the kernel, sometimes on a daily basis.

By the end of the year, Adam Richter announced the first Linux CDRom for sale by his Yggdrasil company.

Thus, eight years after the creation of the GPL, there is now an operating system kernel to go with the GNU tools. In contrast, Comer (Xinu), Tanenbaum (Minix), and the closed BSD development group are unable to offer cogent explanations as to why Linux is so popular compared to their versions of Unix.

Unix System Laboratories (a division of AT&T) brought a lawsuit against Berkeley Software Design, Inc (BSDi) and the Regents of the University of California for selling their version of Unix. The case was settled out of court and the settlement document sealed.

1993

College computer science departments employ 386BSD for Unix programming, mail, name service, as well as network-based backup storage. But BSD is still in legal limbo based upon copyright claims by AT&T.

The FSF programmers and others combine the Linux kernel with the GNU software system.

Ian Jackson developed the Debian package manager. Marc Ewing and Erik Troan developed the Red Hat Package Management system (RPM). These package managers use executable and/or source code archives to copy, uncompress, un-archive, install, verify, query, and configure the more than 22,000 software components that can be configured into a Linux system. These package managers were an essential part in creating the concept of a "Linux distribution."

Patrick Volkerding releases the Slackware Linux distribution. It is the first commercial, standalone, Linux distribution and quickly becomes popular with Linux users.

1994

College students and many others around the world download Linux 1.0.0 into their PCs and experience Unix for the first time. There are 500,000 estimated Linux users.

1995

Linux 1.1.13 employs an "IP masquerade" kernel patch that allows firewall and private network configurations. This is a watershed year for Linux since it now has more functionality than its closest alternative, BSDi, which cost \$1,000.00 for a "six-user license."

1996

Linux 2.0 is released with the number of users estimated at 3,500,000.

1998

The K desktop environment (KDE) becomes popular, but it is built on top of Qt, a proprietary GUI toolkit library.

Linux 2.2 is released to an estimated user population of 7,500,000.

Bruce Perens and Eric Raymond define and promote the term "open source software" for non-GPL free

software. Richard Stallman disagrees with the concept since open source software licenses may restrict redistribution of the software. Open source software is embraced by business developers who disagree with Stallman's position that **all** software must be GPL'd.

Richard Stallman feels that the GNU tools are more significant than the Linux kernel and asks that Linux be renamed to "GNU/Linux."

Motivated by Eric Raymond's book, *The Cathedral and the Bazaar*, Netscape Communications Corporation released the source code for Netscape Communicator and began the Mozilla project which now holds Firefox and Thunderbird.

IBM adds the open source Apache software to its Websphere line.

Microsoft cites the GPL'd body of public knowledge, called Linux, as a "business competitor" in its anti-trust lawsuit. In a series of leaked memos marked "Microsoft confidential," open-source software, and the Linux operating system, are identified as a major threat to Microsoft's dominance of the software industry. The memos then offer ways in which Microsoft could disrupt general acceptance of open source software.

Consumer advocate Ralph Nader issues a press release to request that PC vendors (Dell, Gateway, Micron, etc.) offer non-Microsoft systems, including systems with Linux installed. Dell will eventually offer Linux to consumers, but not until 2007, nine years later.

The Google search engine appears which outperforms all the other search engines and it is implemented with Linux. But not just one Linux computer. Google configures hundreds of thousands of Linux PCs interconnected into a vast distributed operating system that holds the entire content of the Internet in its main memory banks. Google also develops many new system and kernel components such as the Google File System. However, as allowed under the GPL, Google does not release these Linux improvements to the public.

1999

There are so many additions to the Linux kernel that it becomes a **superset** of all Unix-like operating systems and traditional Unix vendors such as SGI and HP adopt Linux.

2000

IRIX, Ultrix, Tru64, SCO, HP-UX, AIX, and other Unix versions are or have been retired and are being replaced with Linux.

Sun Microsystems re-releases most of Star Office source code as Open Office under the GNU GPL.

Linux executes on 27% of all servers and 36% of Internet connected servers. Apache is found on 63% of all Internet connected servers.

The Qt GUI tool kit, used by the KDE desktop, is re-released under the GNU GPL.

Andrew Tanenbaum re-releases Minix under the BSD license open source. Had Minix been released with a non-restrictive software license in 1986, the Linux phenomena would have occurred much earlier and been called the Minix phenomena.

Microsoft begins a corporate campaign of filing hundreds of trivial software patents with the U.S. patent office.

2001

Linux 2.4 was released to a user population estimated at 15,000,000.

The 2.0 version of the the Apache Web server was released.

The year of "embedded Linux." Real time versions of Linux are used throughout the embedded processor industry. Examples are: Sony PS/2, TiVo, Axil Web camera, PDAs, IDAs, etc.

Committees are formed in large companies such as FedEx, BC/BS, and Bell South to investigate Linux for company wide integration.

The National Security Agency (NSA) releases SELinux under the GPL. SELinux offers an additional layer of security checks in addition to the standard Unix-like permissions system.

The cost to recreate the 22,000 software components contained a full Linux distribution is estimated to be more than \$1 billion. To match a Linux distribution using equivalent software from Microsoft, costs approximately \$40,000 per seat.

Microsoft files another thousand trivial software patents.

2002

Darl McBride became the CEO of Caldera, Inc. and had the company renamed to Santa Cruz Operation (newSCO), the same name of a Unix company it recently acquired (oldSCO). McBride received an email which described a six month oldSCO investigation into whether or not Linux contained proprietary Unix source code. The investigation found that "At the end, we had found absolutely \*nothing\*. ie no evidence of any copyright infringement whatsoever."

NewSCO sends out SCOSource licenses to companies that use Linux asking them to pay \$699 for their use of Linux. Subsequently McBride files litigation against IBM, Red Hat, Daimler Chrysler, and Autozone for using Linux. McBride accused Linux of containing "line-by-line" copies of oldSCO's proprietary source code.

NewSCO violates the GPL by offering Linux for download from its servers, yet requiring the \$699 license fee for using Linux.

Microsoft files 2,000 software patents many of which deal with open source internet protocols and utilities.

2003

The Groklaw website appears. It is run by a paralegal named Pamela Jones who begins a detailed description of the legal gymnastics in the NewSCO lawsuits. Ms. Jones renames open source software to Free (as in freedom) Open Source Software or FOSS.

Microsoft purchases a SCOSource license for \$28 million, suggesting to many that Microsoft seems to be a silent partner in the newSCO lawsuits.

2004

A Groklaw member has the University of California under the State of California Public Records Law

release the 1992 sealed out-of-court settlement between AT&T and the University of California. The agreement stated that the University would cease distribution of certain AT&T files, but otherwise it was free to sell BSD software. Also, AT&T agreed to not prosecute others who sell Unix derivatives.

NewSCO files another lawsuit, this time against Novell, Inc. which licensed the original AT&T Unix to old SCO. NewSCO claims it owns the copyright to Unix, not Novell.

2006

In the newSCO lawsuit, two milestone decisions were reached. First, Judge Wells ruled from the bench and accepted IBM's motion to limit SCO's claims to just those supported by evidence. Second, Judge Dale A. Kimball affirmed Judge Brooke Wells' Order striking most of SCO's claimed evidence of code misuse as being too vague to be worth adjudicating.

After three years, newSCO removes Linux from its servers, claiming to the court that it did not violate the GPL.

The cost to recreate the 2.6 series Linux kernel is estimated to be more than \$630 million.

Microsoft files for 3000 software patents, awarded its 5000<sup>th</sup> software patent, and claims to own unspecified rights to the intellectual property contained within Linux.

Microsoft signs cross patent agreement with Novell stating that Microsoft will not sue Novell SuSE Linux customers in exchange for a fee from Novell.

2007

NewSCO has filed more than 1000 motions in its lawsuit against IBM. The motions are designed to obfuscate and confuse the issues before the court.

<http://www.groklaw.net/staticpages/index.php?page=20031016162215566>

Dell computer begins shipping some of its product line with Ubuntu Linux installed. However, the machines are priced higher than equivalent machines with Microsoft software.

Linux 2.6.22 was released to a user population estimated at 29,000,000 with the NSA's SELinux changes.

<http://kernel.org/>

<http://counter.li.org/>

GPL Version 3 is released which extends Microsoft-Novell type cross patent agreements to all GPL license holders.

<http://www.gnu.org/licenses/>

<http://www.groklaw.net/article.php?story=20070629113406794>

European Union examined 160 Microsoft presented patented technologies and concluded that among those only four of the 160 may deserve to claim "a limited degree of innovation."

[http://www.betanews.com/article/Microsoft\\_Responds\\_as\\_EU\\_Considers\\_BreakUp/1177353952](http://www.betanews.com/article/Microsoft_Responds_as_EU_Considers_BreakUp/1177353952)

US Supreme Court ruled that obvious patents can be overturned and lower courts immediately began to find in favor of the patent "infringers."

<http://www.groklaw.net/article.php?story=20070430121005424>

<http://online.wsj.com/article/SB118584454182682899.html>

Saugatuck Research says approximately 50% of businesses will run mission-critical business applications on Linux by 2012

<http://www.computerworld.com/action/article.do?>

[command=viewArticleBasic&articleId=9006990&intsrc=news\\_ts\\_head](http://www.computerworld.com/action/article.do?command=viewArticleBasic&articleId=9006990&intsrc=news_ts_head)

2008

Federal Appeals Court has struck down a wide swath of business method and software patents.

Software companies such as Microsoft and IBM have seen the majority of their software patents rendered unenforceable under this decision. This ruling clears away the Fear, Uncertainty, and Doubt (FUD) that has been hanging over the corporate endorsement of FOSS.

<http://www.law.com/jsp/article.jsp?id=1206960399823>

<http://www.groklaw.net/article.php?story=20080409033837121>

<http://www.groklaw.net/article.php?story=20081030150903555>