Linus Torvalds

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1 Introduction

Linus Torvalds is one of the most famous computer scientists in the world. He is the founder and principal developer of the Linux kernel. Linux is a free open-source operating system, just like Windows and Mac OS X, and it is an Unix-based operating system. When we are searching in Google, reading on Kindle, shopping online, people do not know, the software and services are supported by thousands of Linux server. Users can get it for free from the Internet, the source code can be arbitrarily modified by users. Because of this, countless programmers from around the world are involved in Linux modifications today. Meanwhile, Linus is also the creator of Git, the source code management system used by developers worldwide. Git is similar to other control systems like CVS, but it’s distributed. Today, nearly every programmer uses Git to manage their code and cooperation with other team members. GitHub is git repository Web-based hosting service.

Linux didn’t even start by people contributing code, it was more that people started contributing ideas. Linus Torvalds made a comment that would hold true for the rest of his career: “In fact, somebody else takes an interest in your code and looks at it. It is enough to actually give you feedback and give you ideas that were a huge thing for me.” [5]

2 Early life

Linus Torvalds was born in Helsinki, Finland. He was named after Linus Pauling, a famous Nobel Prize-winning American chemist. Linus said in his autobiography: “I think I was named equally for Linus the Peanuts cartoon character”, noting that this makes him a half "Nobel Prize-winning chemist" and half "blanket-carrying cartoon character” [2]. His mother, Anna Torvalds worked as a translator and a creator for a Finnish newspaper. His father, Nils Torvalds was a radio journalist and a communist. Both his parents were radicals at the University of Helsinki during the 1960s. His parents got divorced when he was very young. Then, he lived with his mother and his grandfather. His maternal grandfather, Leo Tornqvist, was a professor of statistics at the
University of Helsinki, who had the most influence on young Linus. Linus exhibited extraordinary mathematical abilities and reading skill from an early age due to his good family education environment. Tornqvist bought a Commodore VIC-20 in 1981 and wrote some basic language programs. [13] Meanwhile, he asked young Linus to type his program into it. "He wanted me to share in the experience and get me interested in math," [1] Linus said. Because of his extraordinary genius, Linus enjoyed the world of math and computer the most. His father tried to interest him in social activities and sports, but he completely immersed in his computer world. Linus became bored very soon, and he set about doing programming by assembly language. After Commodore VIC-20, [10] Linus used his own savings to purchase his first computer - a Sinclair QL is a vintage computer which was designed for the business world, and the QL was one of the first 32 bit computers. [14] Linus used to write his own software rather than relying on software written by someone else. He reminisced about his life in Finland early years in one google interview and said: "Because it was so hard to get software for it in Finland, and I wrote my own assembler and editor (in addition to Pac-Man graphics libraries)" [6] for the QL, as well as a few games. However, Linus obsoleted QL system very soon because the operating system in the ROM was unreliable. The system could not be reprogrammed by the programmer. This might be one of the motivations he wanted to invent the open source system later. [1]

3 Education and Career

3.1 Education and Linux kernel

In 1988, Linus attended the University of Helsinki which is the oldest and largest university in Finland. Before he went to college, he was already an experienced programmer and had strong mathematics knowledge. In the summer of 1989, he fulfilled his mandatory military service in Finland. In 1990, he took his first class in the C programming language, the language that he would soon use to write the Linux kernel. [8]
In January 1991, Linus spent three thousand and five hundred dollars to purchase his first personal computer and the purchase price was paid in installments. Many people were laughing this computer is the one who Linus first fell in love with. He still remembers his first computer configuration even after five years later. The one was Intel 386 processor with 33MHZ, 4MB of memory and a 14-inch monitor. In the same year, he dabbled UNIX operating system in university’s computer. He attended a very short Unix course running with Ultrix (Unix brand name) VAX microcomputer. He was deeply enchanted by UNIX within minutes. He thought that this was exactly what a programming interface should look like. During this course, one of the textbooks was operating systems design and implementation by Andrew S. Tanenbaum. This book was not only very detailed description of how to write an operating system, but also came with a small operating system Minix source code. [2]

Everybody said Unix was very complicated operating, but programming in UNIX was simple for Linus. After first impressions with UNIX, he recognized it was a very stable and powerful operating system. Thus, he tried to obtain UNIX operating system for his new computer. Unfortunately, it cost too much. [2]

Because of his interest in education and learning, he started intense reading and learning. Basically, he only was doing two things at the time, one thing was doing nothing, the other was reading the 719-page book (operating system design and implementation). After reading this book, Linus had a more systematic understanding of the machine and code. [2]

In the early 1990s, MINIX was a popular operating system with its inexpensive proprietary license at the time. MINIX was created by operating systems expert Andrew Tanenbaum in the Netherlands to teach UNIX to university students. [13] MINIX is Unix-like computer operating system that based on a microkernel architecture [13]. The design pattern and idea of MINIX inspired Linus Torvalds in the development of the Linux kernel.
Linus installed MINIX operating system in his new computer, and he started to read kernel code of MINIX, which is less than 6000 lines. However, despite being better overall design than MS-DOS and designed to run on the Intel x86 processor, MINIX still had some serious drawbacks. Such as not all of the source code was made public. The biggest problem occurred on the terminal, such as MINIX can not provide the internet need of the terminal. Although the licensing fee was cheaper than for many other operating systems, but still cost much. [2]

Linus thus decided to create a new terminal emulator from scratch. Because college education in Finland is free, there was little pressure to graduate within four years, he decided to devote his full attention to this project. [2] He isolated himself in the laboratory for a long time. With the project progress and better understanding of the system, Linus realized this emulator can be developed into an operating system which was based on both MINIX and UNIX.

On August 25, 1991, he announced his initial creation on the Minix newsgroup comp.os.minix as follows:

Hello, everybody out there using minix- I’m doing a (free) operating system (just a hobby, won’t be big and professional like gnu) for 386 (486) AT clones. This has been brewing since April, and is starting to get ready. I’d like any feedback on things people like or dislike in MINIX, as my OS resembles it somewhat (same physical layout of the file-system due to practical reasons)among other things. I’ve currently ported bash (1.08) and GCC (1.40), and things seem to work. This implies that I’ll get something practical within a few months, and I’d like to know what features most people want. Any suggestions are welcome, but I won’t promise I’ll implement them Linus Torvalds torvalds@kruuna.helsinki.fi[7]

Ari Lemmke, Linus’ friend and a provider of FTP (file transfer protocol) services in Finland, encouraged him to upload his source code to a network. It would get comments, ideas and would be refined by other programmers.
Initially, Linus wanted to name his new operating system Freax (a combination of "free", "freak", and the letter X to indicate that it is an Unix-like system). However, Lemmke created a directory for it called Linux on his FTP (file transfer protocol) server, and thus Linux became the name of the system. [2]

On September 17 of the same year, after a period of self-isolation, he completed the original version of his new operating system (0.01). Thenceforward, he announced the first official version 0.02 on October 5. With the advent of 0.02, Linus felt that the time had come to roll out a full-fledged open operating system. It kicked off bash shell and GCC (the GNU C Compiler). This is the famous announcement has launched the world’s largest cooperative project so far. [12]

Do you pine for the nice days of minix-1.1, when men were men and wrote their own device drivers? Are you without a nice project and just dying to cut your teeth on an OS you can try to modify for your needs? Are you finding it frustrating when everything works on minix? No more all-nighters to get a nifty program working? Then this post might be just for you :-) As I mentioned a month ago, I’m working on a free version of a minix-lookalike for AT-386 computers. It has finally reached the stage where it’s even usable (though may not be depending on what you want), and I am willing to put out the sources for wider distribution. It is just version 0.02 (+1 (very small) patch already), but I’ve successfully run bash/GCC/gnu-make/gnu-sed/compress etc under it. Sources for this pet project of mine can be found at nic.funet.fi (128.214.6.100) in the directorpub/OS/Linux. The directory also contains some README-file and a couple of binaries to work under Linux (bash, update and gcc, what more can you ask for :-) Full kernel source is provided, as no minix code has been used. Library sources are only partially free, so that cannot be distributed currently. The system is able to compile "as-is" and has been known to work. Heh. . . . [3]

Linux quickly turned into a group project for software developers around the world. Linus did not start Linux a collaborative project he started it as
one in a series of many projects he had done at the time. He made it publicly available and it wasn’t even open source at that point. It was open source, but there was no intention behind using the kind of open source methodology that we think of today to improve. He was 21 at the time and he was young, but he had already programmed for half his life basically. He does love other people who comment and get involved in his project and made it so much more. He was interested in the technology and the project. The big part to him was getting the community then the community grew gradually. Linux is now supported by major corporations such as IBM and Intel. [6]

3.2 Move to the USA

In the spring of 1996, Linus was 27 at the time and he successfully released the version 2 of the Linux kernel. After spending nearly a decade as a student, researcher and instructor at the University of Helsinki, Linus was tired of ordinary days and sleepless life programming in Finland. In 1996, Linus got an offer from Transmeta Corporation, USA. Linus thought it was time for change. It was not only an opportunity for his career and to experience a much-improved climate. Thus, in 1997, he moved to sunny Santa Clara in California’s fabled Silicon Valley to accept a position with Transmeta Corporation [12]. His main job was to contribute to the development of commercial software, to facilitate communication between the operating system and the company’s microprocessor. [12] In 2003, Torvalds left Transmeta to focus exclusively on the Linux kernel. [2]

3.3 Git

Git is Linus’ second big project which was only created for him to maintain his first big project. Linus wanted to code something useful, so every single project he had ever done was necessary for him.

When a company grows from 10 people or 100 even have 10,000 people working on a project, people are involved in even small changes. 1000 people from Linux kernel development team were involved in every single release and that’s every two months, roughly two or three months. And
they went through a lot of pain. CVS was the one most commonly used at the time, but people were all tired of the limitations and difficulty of CVS. [11]

“I really never wanted to do source control management at all and felt that it was just about the least interesting thing in the computing world (with the possible exception of databases), and I hated all SCM’s with a passion. But then BitKeeper came along and really changed the way I viewed source control.” [5]

In 2002, the Linux kernel development team began using BitKeeper as a code version management tool. The main idea of version-control systems is to promote synergic software projects by maintaining a central repository of source code. BitKeeper is a proprietary software tool for distributed revision control of computer source code [9]. It meets the technical requirements of Linux kernel development. However, BitKeeper is only temporarily free software for Linux and other open source software team.

In April 2005, the Linux kernel community faced a demoralizing challenge, the copyright holder of BitKeeper, Larry Mcvoy, had withdrawn the Linux kernel community free use license of their product. Linus tried to find a version-control system similar to BitKeeper. [4]

Linus created Git in 2005 as the better way to control Linux kernel. The initial idea for Git is to allow Linux community group more conveniently to develop and maintain the code at the same time.

4 Linus Torvalds Today

After several years in the Silicon Valley, Linus’s family tired of uniform technology life. He and his wife, Tove, a former Finnish karate champion, decided to move to Oregon which is a vibrant and young city for their daughter. Linus is now working on the Linux kernel full-time for Open Source Development Lab (OSDL), which is based in Beaverton, Oregon. Founded in 2000 and supported by a global consortium of computer companies, including
IBM, OSDL. Linus transformed technology not just once but twice. Today, he is likely to continue to serve as the key person of the Linux kernel development. Because he is not tired of this job, and wants to put his life in a new direction. Linux kernel still needs him to do even greater improvements and changes.

5 Awards and Achievements

- In 1996, 9793 Torvalds (Asteroid)
- 1997, Academic Honors
- In 1998, Torvalds received an EFF Pioneer Award
- In 2000, he was awarded the Lovelace Medal from the British Computer Society.
- In 2001, he shared the Takeda Award for Social/Economic Well-Being with Richard Stallman and Ken Sakamura.
- In 2002, Torvalds received the World Technology Award from World Technology Network.
- In August 2005, Torvalds received the Vollum Award from Reed College.
- In 2008, he was inducted into the Hall of Fellows of the Computer History Museum in Mountain View, California, "for the creation of the Linux kernel and the management of open source development of the widely used Linux operating system."
- In 2010, he was awarded the C and C Prize by the NEC Corporation in 2010 for "contributions to the advancement of the information technology industry, education, research, and the improvement of our lives"
- In 2012, Millennium Technology Prize; Internet Hall of Fame
- In 2014, IEEE Computer Pioneer Award
References


