CS3012-Biography of a Software Engineer - Linus Torvalds

Linus Torvalds is a Finnish American software engineer. He is seen as one of the most famous software engineers due to being the founding father of the Linux operating system and Git, the most used version control system for tracking changes in source code. He is now currently the project coordinator for Linux also.

Beginning of Linux

Torvalds originally hadn't an interest in developing a new operating system. Instead, he attempted to find a version of *UNIX* for his new computer. However, at the time operating systems were not cheap and so he could not find a version of *UNIX* for less than $5,000 USD. He then considered *MINIX*, a smaller version of *UNIX*. But he did not enjoy the fact that all the source code for most operating systems at the time was not made available to the public. Torvalds then decided to create an OS from scratch based on *UNIX* and *MINIX*. On September 17, 1991, Torvalds completed a very primitive version of his OS (not yet named), version 0.01. A short time later on October 5, he released the very first official version, 0.02. The OS could run both the bash shell and the GCC C compiler. Torvalds also made the source code open to the public and any interested programmer could add or modify the OS, with Torvalds having the final say on what gets added. This version started one of the largest collaboratives in computing history.

Torvalds originally gave the name *Linux* to the OS but decided that it sounded too egotistical naming it after himself and had planned to change the name to *Freax*. But Ari Lemmke, a friend of Torvalds had made a directory called *Linux* on his file transfer protocol and so the final name given to the OS was *Linux*. Torvalds released *Linux* under the GPL (GNU General Public License) which stipulated that anyone could use or modify the original software as long as they made their modified version of the software public also. This was a big attraction to many programmers all across the globe and soon the development of the OS began to accelerate rapidly. Linus himself mainly focused on developing a kernel for *Linux*. The kernel of an operating system is one of the primary components, it essentially "acts as a bridge applications and the data processed at the hardware level."(Technopedia) Fortunately while Torvalds was busy working on the kernel, Richard Stallman and his Free Software Foundation had already produced a number of programs for a version of *UNIX* such as *bash, GCC* and *GNU binutils*. These programs became major parts of the *Linux* operating system.

Complaints began to rise about *Linux* only being compatible with x86 Intel processors, Torvalds was quick to shut down these complaints and in 1994, he began promoting the

porting of *Linux* and soon the *SPARC* and *MIPS* processors could be used with *Linux*. When Torvalds moved to Silicon Valley in California, he took a back seat in the development of *Linux* when he accepted a position at Transmeta Corporation. Although Transmeta did allow him to devote part of his time to *Linux*.

http://www.linfo.org/linus.html.

https://www.famousinventors.org/linus-torvalds

Development of Git

At the time, there were a large number of developers working on *Linux* kernel with Torvalds being the project coordinator and director. Git was born out of the developer's frustration Version Control Systems at the time. They settled on a combination of *Bitkeeper* and *Concurrent Revisions Systems*. But in 2005, Larry McVoy, the creator of *Bitkeeper* revoked the free license of his software which locked out a lot of the *Linux* developers from using it. Linus decided that he would attempt to provide his team with an alternative to *Bitkeeper* and began drafting design criteria for a new Version Control System (VCS). He emphasized three main features that this new VCS should have. It needed to have a safeguard against content corruption, be high performance and have distributed development workflows. Linus also stressed that patching software should not take any more than three seconds. Although *Git* was created with the ideas of *Bitkeeper* in mind, it contains a more distributed and local-only workflow as collaborators can work on repositories even while offline, commit incrementally, can decide when their work is ready to be pushed, push changes to different branches and can decide which changes to share. *Git* was engineered almost perfectly for the needs of the *Linux* developers and Torvalds. It met every expectation that Torvalds outlined, and with efficiency and simplicity for the team. It didn't come without its shortcomings however. It is quite difficult to get used the large collection of commands which might not be very intuitive to new users. It also has trouble dealing with a large number of non-text files such as images which are updated regularly, *Git* can become very slow if such files exist within a repository.

https://medium.com/@willhayjr/the-architecture-and-history-of-git-a-distributed-version-control-system-62b17dd37742

Impact of Linus Torvalds' Work

Only about two percent of the entire Linux kernel is written by Linus Torvalds himself which is quite a large amount due to the size and complexity of the source code. The success which *Linux* holds can be attributed to Torvalds' Brilliance when it comes to the decisions made about both the technical aspects of the operating system as well as the method in which it would be licensed. Although *Linux* is an OS which is more complex to use than the other current popular operating systems such as *Windows* and *Mac OS,* the appeal of it is the fact that it is practically error free. It does not crash very often or carry viruses. Another great attribute is the adaptability of it. *Linux* itself is not a full operating system. *Linux* is a kernel strictly speaking. The developer of a *Linux* distribution such as *Ubuntu* or *Red Hat* completes the rest of the OS. This flexibility of the kernel allows developers to build a *Linux* system to be as large or as small as needed such as running a laptop, a watch, a phone or even a supercomputer. *Linux* also could be purchased for significantly less than other operating systems at the corporate level. Not only was it much less expensive, in many cases it could outperform other operating systems in efficiency. Smart phones are of course one of the most important inventions of all time. They are practically used in every aspect of our lives. The *Android* OS is the most used operating system on a phone worldwide. *Android* is developed off the *Linux* kernel. Although Torvalds has not directly developed any of the above-mentioned distributions, it shows that his initial idea of an open source, efficient operating system was extremely impactful of not just the computing industry, but also to the world as a whole.

Git, the version control system has also been very impactful in the programming world. The fact that *Git* is distributed made it very attractive compared to other VCS's at the time. It always gave a lot more security to a project due to every collaborator essentially have a copy of the project stored locally in case source data was lost. While at the beginning it seemed to be quite complex to use at the start, the sheer brilliance of the VCS inspired four people: Tom Preston-Werner, Scott Chacon, Chris Wanstrath and P.J Hyett to develop GitHub. GitHub is a free open source code hosting site. It is also a kind of social network for programmers by adding user profiles and open repositories and pull requests creating many communities of programmers. Both *Git* and *GitHub* benefitted off each other massively and is definitely why *Git* is the most used version control system in the world and why *GitHub* is the largest open source code hosting site. Many Applications and Integrated Development Environments now integrate *Git* and *GitHub* into them, making them more accessible than ever.

https://www.codacy.com/blog/the-impact-of-git-on-software-development/

https://www.techopedia.com/definition/3277/kernel

https://www.infoworld.com/article/3109204/linux-at-25-how-linux-changed-the-world.html

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