Linus Torvalds

SHORT BIOGRAPHY BY CONRAD OPPERMANN

Linus Torvalds stands as a towering figure in the world of software engineering. He is the pioneering creator of both Linux and the Git version control system. Named one of Time's 100 Most Important People of the 20th century, his inventions are embedded in many of the electronics that we interact with daily.

EARLY LIFE

Born in Helsinki in 1969 to journalist parents, Torvalds was named after the Nobel Prize-winning chemist Linus Pauling. His interest in computers began early when he received a Commodore VIC-20 from his Grandfather. He fell in love with the machine often playing with it for days on end. He went to the local library to learn how to program the machine. BASIC was the first programming language he learned and he used it to create many programs that ran on his VIC-20.

Commodore VIC-20 *Source: Getty*

He later purchased a Sinclair QL because he was interested in the fact that it was one of the first 32-bit home computers. He made substantial modifications to the OS including writing his own editor and assembler because of his difficulty getting software in Finland.

In 1988, he was accepted into the University of Helsinki to study Computer Science. Due to Finland's mandatory military service, Torvalds took a break in his studies after the first year to take part in an 11-month officer training program.

Introduction to UNIX.

While taking part in his military training, Torvalds read Tanenbaum's "*Operating Systems: Design and Implementation*". This was his first introduction to the idea of Unix. After returning to university he again to experiment on UNIX-based computers.

Midway through his second year in college, Torvalds purchased an IBM computer with an Intel 80386 processor. While very happy with the machine, he felt the software didn't

make use of the capability of the hardware. He felt the MS-DOS could not take advantage of the new Intel Chip and 4mb RAM.

He wanted to run UNIX on his new computer but he found it too to be too expensive to licence. He considered using MINIX, which was a less powerful clone to UNIX, but he felt that it lacked some major features of UNIX and the performance wouldn't be good enough.

This lead him to create his own operating system based on UNIX and MINIX. He spent much of the summer of 1991 writing the foundation of what would later become Linux.

Linux

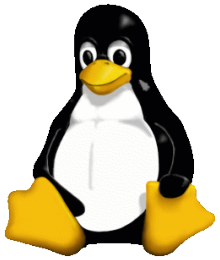
He launched an early prototype, Linux 0.02, in the autumn of 1991. The name "Linux" is a portmanteau of Linus and UNIX. Much of Linux's early architecture was based on MINIX with Torovalds describing it as a "Minix-lookalike".

At the urging of his friend, Linus uploaded the Linux source code to a public network. It was released under a General Public Licence which allowed anyone to use, study, refine, modify, extent, and redistribute the software for free.

At the time there was very little open-source UNIX software available as much of it was tied up in copy-write lawsuits, as part of the UNIX Wars. This drove users to Linux and they helped to improve it. As the user base grew this drove Torvalds to widen the scope of his project and his endeavour became more ambitious. He decided to focus his time and energy on the Linux kernel while other users developed other components to make Linux a more usable operating system.

Torvalds graduated from Helsinki University in 1996, his MSc thesis was titled "Linux: A Portable Operating System". He went on to take a job in a US superconductor firm based in California. He later went on to form a conglomerate under the Linux Foundation umbrella.

Torvalds' personal mascot is Tux, a cartoon penguin. Tux has been adopted by the Linux community as the Logo for Linux.



Tux *Source: Getty*

Linux's Impact on the World

In the mid-late 90s more and more developers and businesses were contributing code and expertise to the Linux project. Three million computers were running Linux by 1997. By 1999 that number had grown to seven million.

SpaceX Falcon 9 *Source: Getty*

Known for its robust nature, today Linux has been widely adopted in IT systems worldwide. Linux has the largest install base of any general-purpose OS. This is mainly due to the Android mobile OS, which is based on the Linux kernel. In 2019, 86.1% of smartphones worldwide were running Android.

As the owners of Android, Google has also made us of the Linux kernel in another one of its products. The Google Chromebook is a sub $300 laptop that runs Chrome OS with is Linux based. Despite the low cost, the Chromebook will deliver usable performance due to the low resource nature of Linux.

Chromebooks are the only truly popular consumer computers that run a Linux OS. While Linux is used, mainly in the tech industry, Windows and macOS are the dominant operating systems in the consumer market. Linux makes up less than 1.9% of global desktop OS. However, Linux is used heavily as the OS for web servers this is due to its security and the fact that it is open source and easily manipulated to meet the needs of the user. Over 99% of the world's supercomputers run off some form of Linux for the same reason.

Elon Musk is a loud proponent and supporter of Linux. Both Tesla and SpaceX use heavily modified versions of Linux as part of their product line. SpaceX uses Linux based software for their avionics and flight controls in the dragon capsule while recently completed a crewed mission to the International Space Station.

Linux has also become the go-to OS for smart home devices and smart TVs.

The success of Linux has also been a proof of concept for open-source software. Before Linux, large scale software was developed by a small team of people. Torvalds has described the development of Linux as a Darwinian exercise on natural selection. The software was not designed but it evolved. When things worked they were maintained and improved, when things didn't work they were removed and reengineered.

Torvalds explained that because they were releasing updates almost weekly, they received instant feedback from users and could therefore make quick decisions on the direction of the following week's code.

The Linux project also highlights an important aspect of software engineering. Evolution rather than design will only work for so much. The real success of Linux, in my opinion, is its versatility. It allows teams with a vision to create great software. It is a great foundation on which to build effective software. This points out the need for authoritarian design in the end stages of consumer-oriented software. I don't believe consumer software can just evolve, I think teams have to think through what they want to achieve for it to become a reality, they won't just happen on it.

Personal Life

Torvalds met his wife when he was her teacher at university. They have three children. He became a naturalized US citizen in 2010.

The Linux Foundation supports Torvalds's efforts to constantly improve Linux. He decides which new code is incorporated into the standard Linux kernel.

He is infamous for his rude remarks he makes against other programmers he disagrees with. He garnered such backlash from his fierce comments that he was forced to take a sabbatical and he attended counselling to learn to empathise with others.

He is the recipient of many prestigious awards such as the Lovelace Medal in 2000, he was inducted into the Internet Hall of Fame in 2012, and most recently the IEEE Masaru Ibuka Consumer Electronics Award in 2018.

Time named him one of the 100 most important people of the twentieth century.

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