MARC ANDREESSEN

BIOGRAPHY OF A SOFTWARE ENGINEER

JAMES COWAN - 19309917

TRINITY COLLEGE DUBLIN

Software Engineering - CS33012

Marc Lowell Andreessen has a long track record of technological and business accomplishments. Andreessen created the first notable consumer web browser; Mosaic for the University of Illinois at Urbana-Champaign, as well as its competitor Netscape Navigator, which was eventually sold to AOL for over $4.3 billion. Netscape with its flagship browser led a fight for market dominance against Microsoft's Internet Explorer in a fight to mainstream the internet that would come to be known as "The Browser Wars", bringing the internet to the masses. Andreessen is also founded Opsware, an early cloud computing SaaS with his future investing partner Ben Horowitz, and their venture went on to be sold to Hewlett Packard for $1.6 billion. More than anything, Andreessen is notable for his founding of the Silicon Valley venture capital firm, Andreessen Horowitz which invested in many of the most innovative and successful software companies of all time, including Airbnb, Jawbone, Stripe, GitHub, Coinbase, Oculus, Lyft, StackExchange, Medium, Figma, Roblox, and Clubhouse just to name a few. Andreessen is one of the pioneers of the early web, and with Netscape and Netscape Navigator, he created the first major web browser available to consumers and was almost singlehandedly responsible for bringing software out of the realm of business and science, and into the mainstream.

It's the school year in 1992 and in a dark basement at the University of Illinois Urbana-Champaign, computer science students Marc Andreessen and Eric Bina are working on the start of something that will change the world. Their project, Mosaic will be the first-ever consumer browser; an invention that will not only bring the internet to the masses but drive the dot-com bubble and change the face of computing and software forever. These students fueled on Skittles, cookies, and an obscene amount of coffee, have been furiously coding a graphical interface for Tim Berners-Lee's World Wide Web standards. Implemented in C, Mosaic was built to handle File Transport Protocol, Network News Transfer Protocol, and the aforementioned World Wide Web standards with a unique, first of its kind integrated graphical interface. This graphical interface was the key to Mosaic nothing of the kind of quality was available at the time. By the time it was nearly ready, Andreessen and Bina were excited to spin off the browser into a new company, there was, however, a bit of a hitch. When approaching their sponsor, the National Center for Supercomputing Applications (NCSA), they were told that they, despite developing the whole program almost singlehandedly, were not entitled to any ownership or rights to the program and that the NCSA and University would be licensing the software out to businesses. Rebuked, and a bit stung that all their work was seemingly for nothing, Andreessen resolved to leave the NCSA.

By February of 1994, Marc Andreessen had graduated from Illinois and was sought out by Jim Clark. Clark, a veteran of the software industry, had just left the graphics processing company he had founded, Silicon Graphics. Having seen the Mosaic Browser, impressed by its

capabilities, wanted to start a venture with Andreessen. In April, Andreessen and Clark founded Mosaic Communications Corporation. Originally, the duo were not planning on building a browser, but instead, an online gaming network that they planned to license to Nintendo. When the deal fell through, they needed a change of plans.

In October of 1994, Andreessen was confident enough in their new project to finally launch. Mosaic Netscape quickly dominated the browser market, and within four months, became the most popular web browser in the world, overtaking his old creation, the Mosaic browser. After the NCSA noticed the new browser, Andreessen was forced to rename the browser and his company to Netscape, and the first version of the browser: the Netscape Navigator. Andreessen and Clark made a great and impactful decision for Navigator that would ultimately lead to Mosaic's downfall, they made it free. Under this structure only those using the browser commercially would have to license the software, meaning that as consumers got more and more used to the Navigator, businesses would be more inclined to adopt the fledgling browser. It's important to note that the Netscape Navigator, despite being developed largely by former Mosaic employees, used no code from the Mosaic browser, and was built entirely from scratch, under the codename Mozilla.

Netscape, from a technical standpoint, was a marvel of software engineering. Fast, innovative, system-independent, and by 1998 was fully open source. Notably, Netscape was the first browser to load webpages on the fly, rather than waiting for pages to be fully downloaded over the painfully slow dial-up connections common at the time. Andreessen and his team pioneered new features like cookies, the content frame, and the ever-important and growing JavaScript, which amazed users with animation, interactivity, and enhanced features.

Netscape, however, would ultimately fail to continue the market dominance it had enjoyed. Microsoft, and its CEO at the time, Bill Gates, was worried that platform-independent browsers like Netscape threatened the dominance of their flagship Windows operating system and were determined to take on Andreessen and his team. Licensing the browser created by Spyglass, whose own software was largely composed of Andreessen's original Mosaic browser, the Windows team built Internet Explorer, and in doing so, started what would come to be known as the Browser Wars. These Browser Wars would push Netscape, and Andreessen out of business after a long struggle of features, dirty dealing by Microsoft, and a litany of lawsuits that nearly saw Microsoft broken up through anti-trust legislation. The decline of Netscape during the Browser Wars led to its acquisition by AOL in 1999 for more than 4.3 billion dollars, an immense sum especially for the time, and Marc Andreessen departed Netscape.

When Andreessen left, he did not end his software career and his impact on the industry at large was far from it. Again, Andreessen had an innovative and impactful idea that changed the whole of the software industry, cloud computing. Opsware, originally called Loudcloud, was the result of Andreesen and fellow software innovator Ben Horowitz's belief that computing and software services would be the future of consumer-facing e-commerce companies. Andreessen pioneered the idea of software as a service (SaaS) for Opsware's cloud computing systems, and by June of 2000, raised over $120 million during its second round of funding, the largest amount ever raised in a Series B at that time.

Andreessen's work at Opsware would lead to many of the features that have let cloud computing become what it is today. Notably, they were one of the first companies to integrate their datacenters and features end-to-end so that customers could handle all their cloud computing needs under the same platform. Andreessen accomplished this through a series of acquisitions and integrations that allowed them to eventually create enough value to be acquired by Hewlett-Packard in 2007 for over $1.65 billion in cash, almost sixteen times its average annual revenue, and formed a large part of Hewlett-Packard Enterprise, HP's flagship B2B SaaS offering.

Again, this latest company exit was not the end of Andreessen's impact on the software industry. This time, rather than founding companies, Andreessen and his fellow Opsware Co-founder, Ben Horowitz, would create Andreessen Horowitz, one of the most notable and successful Silicon Valley venture capital firms in history. Starting with a capitalization of $300 million, the pair quickly grew the firm's assets under management to more than $1.2 billion in under 2 years, by which time they had invested in a series of now notable companies including Okta, Skype, Facebook (now Meta), Groupon, Twitter, Zynga, Airbnb, and Stripe.

During 2012-2013, Andreessen Horowitz directed investments in some of the most notable, up-and-coming startups in a variety of technology niches, many of which are only now coming to the fore. Some of the most notable investments made at this time are in the cryptocurrency space and are now proving to have been visionary investments, especially that of Coinbase, the largest cryptocurrency platform in the US, and Ripple a blockchain payments platform that created one of the largest cryptocurrencies by market capitalization, XRP. Additionally, Andreessen and his firm invested around $100 million into GitHub and made significant investments in Lyft and Oculus during this time. For the next several years, Andreessen and Horowitz expanded their assets under management to over $18.8 billion as of the time of writing, making Andreessen one of the most successful venture capitalists in history.

When examining Andreessen's incredible journey, from the dingy basement in the University of Illinois to one of the most notable software developers and business leaders in history, it becomes evident that few have so profoundly impacted the way that we interact with computers, the technology sector, and society than Marc Andreessen. The way that we interact with the web has been defined almost entirely by Andreessen and his proteges at Netscape, with the adoption of JavaScript, free consumer browsers, and the mainstreaming of the World Wide Web standard for internet communication. The browser, because of the efforts and ingenuity of Marc Andreessen, is one of the cornerstones of modern computers and is perhaps one of the most important applications on any consumer computer.

Though Andreessen is one of the most innovative software engineers forming the rare ranks of those who defined the computing world, perhaps even fewer can develop and lead not just one but two revolutionary multi-billion-dollar companies on the cutting edge of computing. Maybe even fewer could then seek out those same qualities in the most notable technology companies in the world. Andreessen has been at the forefront of many of the most significant technology companies in recent history, and will undoubtedly be involved in many more to come. Through it all, we can see that Marc Andreessen is not only a titan of the internet age but one of the greatest software engineers of all time.