The History of Technology From a Linux Perspective

Four Breif General Technology Events
for Each Year From

1991 to 2021

For Charlotte, Nana, Belle, Sam, Bonnie, Steven, Galen, Luna, and everyone else who has believed in me, supported me, and gave me hope in some of the toughest times in my life.

I wouldn’t have been able to make this book without you.

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Chapter 1: Introduction

Linux has been around for more than thirty years. Every year has been huge for the Linux community in one way or another.

From “just a hobby, won't be big and professional like gnu”, to a multi-billion dollar kernel behind most websites on the internet, Linux has grown from zero to hero. While not without its issues, Linux has survived thirty years.

This book will go over four events from each year, starting with 1991 to 2021 based around the Linux community, or news that affected technology at large. Whether big or

small. While directly around Linux like distribution releases or new major kernel versions, around the ecosystem like KDE and GNOME, or major related projects like FreeBSD.

Some years will have mostly or all small topics. Others will go through the biggest news Linux may ever have. This book is thirty years in the making, shrunk down to a consumable format for everyone to understand.

How this will work is that every year has a dedicated set of four subchapters listing

one event from that year. There is no real order to how these chapters are organized.

Content will include a variety of topics, not just Linux-based topics. While there is a heavy focus on Linux, there simply were not always enough topics per year to properly introduce.

These will be some of the most important events for each year with a brief overview, especially around innovative open-source technology.

Chapter 2: 1991

1991 would become the year the world of technology changed. With the release of the Linux operating system late into the year.

There was a good amount to happen in 1991 in regards to technology, with the first website on the world wide web, the first Python release, and GPL version 2.0.

Chapter 2.1: Linux is born

What an obvious place to start. In September 1991, Linus Torvalds announced and released to the world the Linux kernel, version 0.01 as the first version.

Created at the University of Helsinki, from a curiosity of operating systems and issues with the MINIX operating system – A different UNIX-like operating system which has been in development since 1987, though not open-source until 2000.

Nearly named Freax – a portmanteau of the words free, freak, and Unix. Linus Torvalds considered the name Linux as too egotistical, and its first versions had the name Freax included in various files.

Linux almost didn’t happen. Linus Torvalds, on multiple occasions, said that if

other open-source kernels like GNU Hurd, 386BSD and later descendants like FreeBSD, NetBSD, or OpenBSD existed in 1991, Linux would have likely not been created.

The first files were hosted on the FUNET FTP server – The Finnish University and Research Center's FTP server, which was to provide Finnish Universities and other research facilities internet services. Created in 1983, and managed by a state-owned corporation, and connected to the larger NORDUnet in 1988. It would be a coworker, Ari Lemmke, who would tell Linus Torvalds

that the name Freax was not a good name – in their opinion – and changed the name of the project on the server to Linux without Torvalds knowing, though he would soon accept the name.

Torvalds did have a pronunciation for Linux that he wanted used, Lih-nuhks, though many to this day get the pronunciation wrong.

Chapter 2.2: General Public License Version 2

With the first version of the General Public License (GPL) being released in 1989, GPL version 2.0 was released in 1991 by the Free Software Foundation.

The major change from 1.0 was Section 7, also known as the “The Liberty or Death” clause. This section of the license is about how a GPL version 2.0 Licensed work could only be distributed with a software if all of the license’s terms and conditions could be satisfied.

This license’s restrictions would later be an issue for various libraries that were replacement for existing or deprecated non-free or non-GPL compatible software.

A new license would be created in the same year named LGPL, or the Library General Public license, which would be renamed in 1999.

Chapter 2.3: Python

Surprisingly enough, Linux isn’t the only popular development software released in 1991. A project by Guido van Rossum – a

Dutch programmer, who was the project's BDFL (Benevolent Dictator for Live) of the project until 2018.

First conceptualized in the 1980's as a successor to the ABC programming language – which ended development a year prior to Python's final release. Van Rossum would would begin development in 1989, and worked on it for thirty five years before stepping down.

There have been multiple versions of Python, but this was the first release. While all releases of Python have been open-

source, at times it would not be GPL compatible. Python would be released under the Python CWI license, which was a BSD-like license dropped a few years later.

Chapter 2.4: The First Website & Web Browsers

Sir Tim Berners-Lee published the first website on August 6, 1991. The first website was hosted on a NeXTSTEP computer, running the CERN informational website (http://info.cern.ch).

The WorldWideWeb browser would have been created the year before to support this website, and the software would not be released to the public until August, 1991.

Sir Tim Berners-Lee would not only make the first browser, but also the second. Line Mode Browser would be released a few months before WorldWideWeb as a terminal-based web browser (as graphical operating systems were not yet mainstream, with MacOS System 1.0 releasing in 1984, and Windows in 1985). While releasing before WorldWideWeb, Berners-Lee states

that the first edition of the WorldWideWeb browser was created before Christmas 1990.

Chapter 3: 1992

Some of the biggest changes to technology happened in 1992, including the first ever distribution of Linux, the creation of the JPEG image format, the Samba network sharing tool, and the release of 386BSD.

Chapter 3.1: The Creation of JPEG

The release of the JPEG (Joint Photographic Experts Group) file standard was in September 1992. Members who run the JPEG standard would later include the names of International Business Machines,

Canon, AT&T, and Mitsubishi – an odd array of members.

The format uses lossy compression, and is specifically for digital images – primarily used in digital photography. JPEG quickly became an industry standard, and generally popular file format, and is the file format of choice for billions of images.

Chapter 3.2: MCC Interim Linux

Owen Le Blanc would create the first real distribution of Linux in February, 1992.

The system would use the Linux 0.12 kernel, and used ramdisk code by Theodore Ts’o.

Named after where it was created, Manchester Computing Centre (MCC), of the University of Manchester. MCC Interim featured a menu-driven terminal installer. The Manchester Computing Centre had Linux available only in November 1991, a month after Linux was created.

Le Blanc’s MCC Interim project were experimental, and iterative to make a usable Linux operating system. Being named

“Interim” as they were not intended to be offical, according to Le Blanc.

Le Blanc would create a lot of software for Linux, including an implementation for fdisk on Linux.

Chapter 3.3: Samba

Still active as of 2022, Samba – a multiplatform network file system – was created as a re-implementation of the SMB network protocol by the Microsoft Corporation.

Developed originally by Andrew Tridgell – an Australian computer programmer, and one of the creators of rsync, who is known for creating open-source implementations of popular protocols and algorithms that were proprietary.

Samba is available on many operating systems, especially systems like Linux, BSD, MacOS, and Windows, and would become the standard on nearly every single Linux distribution.

Samba was originally created for the Unix operating system, but had focus on

interoperability with Microsoft's LAN Manager. Samba would have its first three releases, all in January 1992.

Chapter 3.4: 386BSD

While Linux saw its first distribution this year, a similar project would be created. By William and Lynne Jolitz – a married couple, both alumni of the University of California, Berkely – 386BSD version 0.0 was released in March 1992 – a month after MCC Interim's first release.

Based on 4.3BSD and Net/2, 386BSD was a project to port AT&T BSD code to the i386 architecture. It would later be the base of which FreeBSD and NetBSD would launch from.

While a lawsuit (UNIX System Laboratories, Inc. v. Berkeley Software Design, Inc.) would bring the project some shaky issues, in the end, 386BSD and its two developers were never parties to the original or subsequent lawsuits in dispute of the software.

Chapter 4: 1993

1993 saw four major giants in operating system software appear into life. Not to mention one of the most influential browsers on the market, that would later give rise to Internet Explorer, Netscape Navigator, and later Mozilla Firefox.

This year was difficult to write the subject matter for, as one subchapter contains two important releases that are similar in nature but different enough to where both should be included.

Chapter 4.1: Mosaic Browser

NCSA Mosaic was one of first web browsers, and considered to have a massive role in popularizing the world wide web. By integrating multimedia – video, text, images, graphics – with support for FTP and Gopher protocols. It was had a mosaic of options, as one could say.

In its short lifetime, NCSA Mosaic would support AmigaOS, early versions of MacOS, Unix, and early versions of Windows. While not open-source (being released with a proprietary – though fairly open – license), it

would help start the Netscape Navigator browser, Internet Explorer, and much later Mozilla Firefox.

Created by Marc Andreessen and Eric Bina, who would later found Netscape, created NCSA Mosaic for Unix, and the X Window System. Funded by the “Gore Bill” which provided funding for the project.

Chapter 4.2: NetBSD/FreeBSD

NetBSD and FreeBSD were both created in 1993, both because of their issues of the slow development of 386BSD.

While the Berkeley Software Development, Inc. company was being sued, neither NetBSD or FreeBSD were involved in the lawsuit.

NetBSD was created by Chris Demetriou, Adam Glass, Charles Hannum, and Theo de Raadt, with FreeBSD being created by Jordan Hubbard and David Greenman.

Of the two, FreeBSD would later become the more popular option, with itself, or its source code being used by Apple, International Business Machines, Juniper,

Sony, Nintendo, Netflix, WhatsApp, and more.

Chapter 4.3: Slackware Linux

As of 2022, Slackware Linux is the oldest active-development Linux distribution. While created over a year after MCC Interim, Slackware would be one of the first Linux distributions for the common market.

Slackware was created by Patrick Volkerding, and was originally a fork of Softlanding Linux System. Slackware would

later be the base of the first versions of SUSE.

Slackware aims to be the most Unix-like distribution of Linux, with few modifications to any software, and has an easy setup for multiple purposes, without focusing on any one idea. Slackware is a CLI-based operating system, though a graphical environment can be installed along with the operating system – best supported will be the KDE desktop.

Chapter 4.4: Debian

Debian is a close second to the oldest Linux distribution. Debian was created by Ian Murdock – who would later pass away from hanging himself in 2015 – in 1993.

Named after himself and his then girlfriend – later wife, which they would divorce – Debian was created as Softlanding Linux System was poorly maintained.

Debian, interestingly, had support through mailing lists hosted by Pixar – yes the popular animation studio.

Debian would later be the base of some of the most popular distributions of Linux, which includes the Ubuntu operating system. It was sponsored by the Free Software Foundation, but would later join Software in the Public Interest (SPI) which it is still part of as of 2022.

Chapter 5: 1994

This year would see the legitimization of the Linux operating system, with the first production ready release of Linux, as well as journalism around Linux starting. A major player in the Linux ecosystem would also first appear, alongside another, more DOS-like operating system.

Chapter 5.1: Linux 1.0.0

At the time, Linux had 176,250 Lines of code. After multiple commercial implementations, and the capability of running the X Window System, the version

would officially be named 1.0.0. The first number meaning it was a major release, second number being minor release, and the third being the revision.

This was the first version Linus Torvalds considered “production ready”, though Debian and Slackware Linux were available at the time.

Not much, other than it being production ready, is important about this release in general – other than the new versioning scheme which allowed for release candidate (RC) versions.

While not much really happened with this release, it is a small but important release of the kernel.

Chapter 5.2: Linux Journal

First releasing an issue in 1994, the Linux Journal would be owned by multiple companies, first of which being SSC, or the Specialized System Consultants, Inc. company. Later companies would be Belltown Media Inc., then Slashdot Media LLC.

Linux Journal, LLC – located in Denver, Colorado – would be founded shortly before almost becoming defunct due to debts and running out of funding. Private Internet Access, and London Trust Media, would later save the organization.

However, the Linux Journal would not continue to be stable, but rather suffering another near shutdown in 2019, only later to return in 2020 with new support from ex-owner Slashdot Group.

Chapter 5.3: FreeDOS

Created by Jim Hall, FreeDOS was a recreation of the Microsoft product MS-DOS losing support in favor of Microsoft Windows. Later Pat Villani and Tim Normal would join the project.

FreeDOS would not last long, as after the 1.0 release, it would shut down officially after the FreeDOS 1.0 release.

It would later be revived, and continues development as of 2022.

Chapter 5.4: SUSE Linux

Versions of SUSE Linux that first released were based on Slackware Linux, however, would later be based on Jurix. At this time, SUSE wasn't known as SUSE, but rather S.u.S.E, or Software und System-Entwicklung – which for non-German speakers means Software and Systems Development). The full name would never really be used, but rather the acronym was the official name.

The company would be founded Roland Dyroff, Thomas Fehr, Hubert Mantel, and

Burchard Steinbild in 1992, but the SUSE Linux distribution wouldn’t exist.

SUSE would later become an enterprise focused desktop and server operating system, with OpenSUSE being the generally supported version.

Chapter 6: 1995

From hats of the color red, an image editor, to two programming languages that shaped the internet itself for the next couple of years, 1995 was heck of a year for the technology market.

Chapter 6.1: Red Hat

Founded in Raleigh, North Carolina, by Bob Young and Marc Ewing, Red Hat is a company that currently serves services for one of the largest Linux server distributions. It all started in 1993.

In 1993. Bob Young created the ACC Corporation, to sell Unix and Linux software. It would later become Red Hat, with Marc Ewing and his Red Hat Linux distribution.

Red Hat Linux was bought by the ACC Corporation in 1995. With the purchase, the ACC Corporation became Red Hat Software, with Bob Young being the CEO.

Red Hat, once becoming an enterprise distribution of Linux would later create Fedora, and contributes to tons of software.

Chapter 6.2: GIMP

The GNU Image Manipulation Program, or as it was originally known, the General Image Manipulation Program was a college project by Spencer Kimball and Peter Mattis.

While not officially released until 1996, GIMP was in development in 1995.

GIMP is considered the biggest open-source software application competing with proprietary software Adobe Photoshop. When it was first released, it was popular.

In 1997, Kimball and Mattis met Richard Stallman on a visit to the University

of California, Berkely, and the two asked Stallman to change the application's name to the GNU Image Manipulation Program, which Stallman agreed.

Chapter 6.3: PHP

First released in 1995, PHP – known originally as Personal Home Page, and currently officially as PHP: Hypertext Preprocessor, and unofficially by the development community as PHP Hates Developers – was created as a new tool for website development.

It was created bt Rasmus Lerdorf, a Canadian programmer, to create his personal website – hence the original name personal home page.

PHP is a very controversial programming language, often being dismissed to outright aggressively spoken against by developers. Though some argue this perspective is dying off as PHP improves.

Chapter 6.4: Ruby

Created by Yukihiro Mastumoto and later popularized by the popular library Ruby on Rails is a general programming language that focuses on simplicity.

It was created due to a dislike of PERL and Python, and was designed to be a simple Lisp language with a Smalltalk-like object system.

Ruby in December 1995 was developing fast, with three releases coming out in the days before Christmas 1995.

Ruby would become primarily popular in web development, and would be rather stable in popularity for years.

Chapter 7: 1996

A penguin that was almost possibly a fox defines this chapter, along with a non-profit who’s name is based on Native American nations. To a bus to the serial universe, and even a cascade of colors and style. This chapter sees some more important staples of the world of technology itself.

Chapter 7.1: Apache

Named after a respect for Native American nations, commonly referred as the Apache. The project's history starts with Robert McCool – yes, his last name is McCool.

McCool had been employed at NCSA some time before the Apache project. While at NCSA, McCool worked on the NCSA HTTPd project in 1993, three years before the creation of Apache. NCSA HTTPd was one of the earliest web servers, among CERN httpd – a similarly named project that

ended development in 1996, after starting in December 1990.

McCool seems to have good luck with HTTP daemons, like NCSA HTTPd and Apache, as both would have – at some point – power the majority of the web. While NCSA HTTPd was the most popular for a while, the transition to Apache was quick. Apache would continue to be the most popular HTTP daemon until 2016.

Chapter 7.2: Tux the Penguin

Tux was first announced by Linus Torvalds as to be the mascot of Linux, and that the animal who wronged him – Torvalds mentioning he was bitten by a penguin at the National Zoo & Aquarium in Canberra, Australia – would be the mascot.

Tux was named by James Hughes (using the T in Torvalds' last name, and the first and last letters of Unix) – with Tux also meaning tuxedo, which is what penguins are described as looking like by the popular

media – and the first draft was provided by Larry Ewing.

As an alternative to Tux – as Linux users often can't agree on anything – Alan Mackey designed a fox girl named Xenia. While originally designed in 1996, Xenia would not get her name until her resurgence in popularity in starting in 2019.

Chapter 7.3: CSS

While Cascading Style Sheets (CSS) first found limited support by Microsoft Internet Explore 3, and even in Netscape

Navigator 4.x in the same year, CSS had its first standard released in 1996.

Designed by Håkon Wium Lie, a co-worker with Sir Tim Berners-Lee at CERN. The World Wide Web Consortium (W3C) – the organization that manages the standards of the world wide web) – and co-authored by Bert Bos.

While CSS is a common web standard, it rarely has new features, and its latest release as of 2022, was in 2016.

CSS is designed as a partner for Hypertext Markup Language, created in

1993 by the Web Hypertext Application Technology Working Group – though a topic not selected for the chapter around Linux and Linux-related technology in 1993.

Chapter 7.4: USB

It’s sometimes difficult to believe that USB (Universal Serial Bus) wasn’t a standard for all of computer history, but its existence is relatively young compared to a lot of technology people commonly used today.

First designed in January, 1996, and first found in production in May, 1996. It was an industry standard by Compaq, Digital Equipment Corporation, International Business Machines, Intel, Microsoft, NEC, and Nortel.

The standard powers many peripherals, including mouses, keyboards, microphones, headphones, and would later even support charging mobile devices.

Chapter 8: 1997

In 1997, there was a rematch between a metal box, and a chess grandmaster, in which the box wins – but not as well as many think. A news for nerds organization forms, while Internet2 and DVD first make their mark.

Chapter 8.1: Deep Blue Beats Kasparov

While the first matches happened in 1996, the International Business Machines company would have a rematch the next year in which Deep Blue would win the majority of six games.

In 1996, the result was four to two, in favor of Kasparov – the world champion at the time. Later in 1997 it was three and a half to two and a half in favor of Deep Blue.

While the story is often told as Deep Blue decimating Kasparov in all six matches, in reality it was still a rather even match in 1997. In the rematch, deep blue only won two of the games, with Kasparov winning one game. The other three games were draws by mutual agreement.

This historically important moment for technology, it was still a difficult match for Deep Blue.

Chapter 8.2: Slashdot

Slashdot (often branded as ***/.***) was founded in 1997, as a place for “News for Nerds. Stuff that matters,” according to its slogan, and created by Jeff Bates and Rob Malta.

Slashdot was sold to Dice Holdings International in 2012, and will eventually own the Linux Journal.

While Slashdot is important, there isn’t a lot of information of it beyond various political controversies and a quarrel with the Church of Scientology.

Chapter 8.3: Digital Video Disc (DVD)

Also known as the Digital Versatile Disc is a digital storage format developed by Sony, Panasonic, Philips, and Toshiba. With a diameter of twelve centimeters, and a capacity of between just under five gigabytes to just a little over seventeen gigabytes.

The technology for optical recording has been around since the 1960's. LaserDisc was the predecessor to DVD, created in the late 1970s in the United states.

Another predecessor, popularized for music, is the CD. While video CD's do exist, their popularity really did come in music.

Chapter 8.4: Internet2

In 1997, a non-profit organization lead by research and government agencies. Having over 500 members as of 2013,

Internet2 operates the Internet2 Network internet protocol.

When the internet was gaining popularity, universities for use in a variety of purposes. The precursor to the creation of the Internet2 Network was the vBNS, created by the National Science Foundation and NCI.

The Internet2 Network was originally established by a large group of researchers, under the name of EDUCOM – later EDUCAUSE.

Internet2 as a non-profit provides to the United State government a research and education network that high high performance that is cost-effective.

Chapter 9: 1998

A commonly known desktop environment in modern Linux forms in this year, though not without some controversial issues. An initiative from California coins the term open-source. One of the worlds biggest tech companies that somehow never got sold, to a popular three dimensional animation tool. 1998 has some of the biggest impact to the rest of the world in the following decades.

Chapter 9.1: K Desktop Environment

Releasing in 1998, from a development community founded a few years prior, the K Desktop Environment. The KDE organization was founded by Matthias Ettrich.

Due to Ettrich’s concerns with how sme aspects of the Unix desktop, including but not limited to how desktop applications being too different, too complicated, and more.

Naming it KDE, as wordplay of the existing Common Desktop Environment. Using the controversial Qt, under the Qt

Free Edition License, which did not claim to be compatible with libre software.

Though advised to use the more open-source compatible libraries like Motif or LessTif, though KDE would continue with the Qt library.

Chapter 9.2: Open Source Initiative

Formed as a campaign, the Open Source Initiative (OSI) was founded by Larry Augustin, Jon Hall, Bruce Perens, and many more. In Palo Alto, California – shortly after the open-source versions of Netscape

Navigator’s source code – was when the term open-source was coined.

The OSI adopted the Open Source Definition (OSD) for open-source, based on Debian’s free software guideline.

They tried to trademark the term open-source, however they were not successful. However, they still claim to be the steward of the OSD.

The OSI helps manages open-source licenses, and does a lot with open-source licensing in particular, doing minimal

development. The OSI actually focuses on research and education for open-source.

Chapter 9.3: Google

While the domain was registered in the years prior to the company's foundation by Sergey Brin and Larry Page in 1998, and the first developments of the Google project was back in 1996.

Both PhD students at Stanford university. Sergey Brin and Larry Page were good friends, who would make Google, and attempt to sell it to multiple companies.

There was a third “unofficial” founder, Scott Hassan.

Hassan was the original lead programmer, and wrote most of the Google search engine before Google became a company. Hassan would later found the company Willow Garage, which has been working in robotics since 2006.

Google’s original website had a simple design because Brin and Page didn’t have a lot of experience with HTML. But this would end up being a benefit for the product.

Chapter 9.4: Blender

Developed by NeoGeo Animation Studios, and Not A Number Technologies in 1998. It was originally licensed as shareware.

Blender is a popular option for developing graphics for video games and movies, and even for making visual effects, video games, and even physics simulations.

It wouldn’t be until 2002 when Blender was fully open-source. This was because NeoGeo was dissolved a few years before

then, and in 2002 Not A Number Technologies fell into bankruptcy.

In 2002, Blender became open-source through the help of Ton Roosendaal's Blender Foundation – with the goal of continuing development of Blender.

Chapter 10: 1999

A popular phone named after a fruit – no not the one that starts with a lowercase “i”. A new piece of office software to later be forked by two different organizations. A mythically named desktop environment to rival KDE. And a book, about making Linux from the source code of all the tools one needs alone.

Chapter 10.1: GNOME

The first versions of the GNOME desktop environment were built in partial protest of KDE’s use of the Qt library.

GNOME would have four major changes, two of which are mentioned in this book due to their importance on the community at large.

Image credit: Wikipedia.org

The first two releases – the second one later being forked and maintained as the MATE desktop environment – were relatively well received.

GNOME would become one of the two most popular desktop environments for Linux – alongside KDE – and uses the GTK

library to build its graphical operating system.

Chapter 10.2: OpenOffice

While stopping development in 2011, the Open Office project by Sun Microsystems – with a version being StarOffice from 1985 to 1999 having existed before then – the Open Office project was an important project in open-source history.

The Apache Software Foundation would later adopt the project in 2012, where

in 2022 is still actively developed to some extent.

Using the OpenDocument format ODF – the same used by LibreOffice, another fork of OpenOffice which will be mentioned later in this book.

Chapter 10.3: Linux From Scratch

Linux From Scratch is a book by Gerard Beekmans and a community of contributors. The book has several releases, and gets continuous updates around how to build a

Linux operating system from the source code.

The book would give birth to what would become the Gentoo operating system, as it was originally built through Linux From Scratch.

It would also later support two versions, the original format and the new Systemd version using the Systemd init system and system management daemon.

The book has over 11 editions as of 2022, and is one of the more difficult projects a user can undertake in their Linux journey.

Chapter 10.4: BlackBerry

The BlackBerry brand of smartphones was created by Canadian company BlackBerry Limited. The phones were extraordinarily popular and considered high class. These phones would be in production until a new company BB Merah Putih and TCL Corporation took over in 2016, then later the OnwardMobility company. The phones ran their own BlackBerry operating system.

Chapter 11: 2000

From the end of the world, to new beginnings. A version of HTML that looks like XML. Gigahertz hitting central processing units, and an enterprise version of Red Hat first appearing.

Chapter 11.1: Y2K

What would happen when the world is ending because of a simple software bug? The software bug would be fixed before the issue became a real issue. The Y2K bug, while it never ended the world, actually had a different outcome, financially.

The repair bill was close to one hundred billion dollars. The simple two digit issue that caused the bug was the most expensive catastrophe in peacetime.

While this wouldn’t be the only date format bug – with leap years, 2010, 2022, and 2038 having their own problems – but it was the one that would cause the most news worry and most people.

There were many different possible solutions to the issue, the problems that actually hit were minor. Another date

formatting issue is coming up with the 2038 issue which could cause a similar issue.

The 2038 issue is when 32-bit time will hit its limit, which will cause potential issues, and the only real fix is to switch to a 64-bit time system.

Chapter 11.2: 1 GHz CPUs

While Y2K was an issue, it would be in this year, for the first time, that CPUs by AMD and Intel would support one gigahertz support, which is important enough to get a mention within this list, though as of 2022

many low-end computers reach three gigahertz. The importance of the one gigahertz milestone, however, meant a lot at the time it all happened.

Chapter 11.3: XHTML

The Extensible Hypertext Markup Language (XHTML) is a mix of XML and HTML. Prior to HTML5, HTML was based around the Standard Generalized Markup Language (SGML).

XML is more restrictive than SGML, and SGML was considered “flexible”. XHTML

was made to make more extensible and interoperable with various data formats. XHTML also had more strict error handling.

The SGML specification was very complex, so by the time HTML4 came around, HTML4 and most web browsers were not fully SGML conformant.

By shifting to XML-like formatting, people hoped HTML would become more companies with common XML libraries, tools, etc.. XHTML and HTML3/4 were not too similar when it came to the Document Object Model (DOM), a tree structure that

the page uses internally. XHTML's syntax was described as being more expressive than HTML at the time.

With the similarities in HTML4 and XHTML1 lead many websites to adopt the XHTML1 recommendation by the World Wide Web Consortium.

Chapter 11.4: Red Hat Enterprise Linux (RHEL)

The first version of Red Hat Enterprise Linux – or RHEL for short – was released in February 2000, and would see only nine

releases in the nearly two and a half decades the operating system has been active.

The RHEL distribution would later rebase to a CentOS-based system, by breaking CentOS's stability as a RHEL alternative in what was a very controvercial decision.

RHEL is commonly known as one of the most popular distributions of Linux, and would eventually be purchased – along with the rest of Red Hat, Inc. – by International Business Machines. Today, RHEL is still one

of the – if not the – top Linux distributions for servers.

It is currently on version eight, with version seven also still in active development.

Chapter 12: 2001

In this year there are two operating systems – one used for mainframes and is where modern COBOL is being ran, and the other being one of the most popular releases for its brand. International Business Machines z/OS and Windows XP were two important operating system releases in their own right.

But there was also a recreation of Windows, based on Linux, Lindows. There is also the popular editor for Java programs made by the one, the only, International Business Machines.

Chapter 12.1: Windows XP

Started development in the late 1990s, under the first codename of Odyssey, then later under the codename Neptune, and even later under the codename Whistler, which was a consumer-oriented operating system based on the Windows NT kernel.

Originally planning to use the slogan “Prepare to Fly”, but quickly replaced with “Yes You Can” due to the September 11, 2001 terrorist attacks where terrorists hijacked planes and crashed them in multiple places.

Chapter 12.2: International Business Machines z/OS

Targeting enterprise mainframes on the z/Architecture based on the Complex Instruction Set Computer (CISC) architecture – as is the same with x86 architectures.

z/OS is designed to support stable mainframes for products based on CICS, COBOL IMS, REXX, CLIST, among many others.

It is proprietary software, but it is still important in the history and development of software.

Chapter 12.3: Eclipse Editor

Originally created by the company International Business Machines (International Business Machines), Eclipse is an integrated development environment (IDE) for Java, with plugins supporting Ada, ABAP, C/C++, C#, Clojure, COBOL, Fotran, JavaScript, Lua, Perl, PHP, Python, and many many others.

The Eclipse editor is licensed under the Eclipse Public License (EPL), but it was originally under the Common Public License which neither are GPL compatible.

Chapter 12.4: Lindows

Now known as Linspire, Lindows is a commercial Ubuntu-based Linux distribution by PC/OpenSystems LLC – Previously Xandros, and before Linspire, Inc.

Created by serial-entrepreneur Mitchel Robertson, as a direct replacement to Windows with the ability to run Windows software on Linux using the WINE API’s.

Chapter 13: 2002

This year has some of the most important licensing, application, hardware, and distribution releases.

Starting with information of the Firefox browser, to one of the biggest distributions of Linux – Arch. Then there is PCI Express, and finally Creative Commons.

2002 was an important year for technology as all four of these in some way are major names in their own rights.

Chapter 13.1: Firefox

Currently developed by both the Mozilla Corporation and the Mozilla Foundation with many open-source contributors.

With official ports to Windows, MacOS, Android, and iOS, and several functional unofficial ports for systems like FreeBSD, NetBSD, OpenBSD, and others. Licensed under the Mozilla Public License 2.0.

The initial members of the project included Joe Hewitt, Dave Hyatt, and Blake Ross, as a branch of the Mozilla Project – a

suite of applications by the Netscape Communications Corporation, in 1998.

The Mozilla Project, later Mozilla Application Suite. This was done as the code base for the Netscape Communicator suite – including browser, and other applications – was released publicly.

The developers – Hewit, Hyatt, and Ross – believed that commercial requirements for Netscape's feature creep, they felt they needed to make a new software, including browser.

Chapter 13.2: Arch Linux

Released in 2002 by developer Judd Vinet. Inspired by CRUX, a minimalist distribution of Linux which had its first release in the same year.

Developed for x86 32-bit computers, it wouldn’t see an x86_64 (64-bit) version until 2006.

The project would be lead by Vinet until 2007, and transferred to Aaron Griffin until 2020 when Griffin stepped down as project lead when Levente Polyak took control of the project after a vote.

The project is notorious for being difficult to install and run with, though many argue that this stigma against the operating system is undeserved. The operating system is installed manually though a terminal, though custom installer tools do exist.

Multiple distributions of Linux are based on Arch Linux, including Manjaro. Antergos, EndeavorOS, StormOS, and more.

The Arch Linux distribution uses what is called the Pacman package manager. It often has the most up-to-date versions of software.

Chapter 13.3: PCI Express

PCI Express is a serial computer expansion bus standard, also known as PCIe, or PCI-e. It’s the replacement to the PCI standard, and was made by Intel, Dell, HP, International Business Machines.

Commonly used with graphics cards, the latest version runs at 121 giabytes per second with the PCI Express version six introduced in 2022.

The standard is ever evolving with version two in 2007, three in 2013, four in 2017, and five in 2019.

Chapter 13.4: Creative Commons

Founded by Hal Abelson, Eric Eldred, and Lawrence Lessig, and with the goal of creating flexible copyright with a variety of licenses to flex copyright licensing.

This book is actually licensed under a creative commons license (for those who ignored the copyright notice) – Attribute-ShareAlike (BY-SA) which means anyone can modify this book and share it as long as they give attribution and share under a similar or same Creative Commons license,

which is because information should be open to all.

This mindset is shared by Abelson, Eldred, and Lessig who made it their goal to build an alternative to copyright with the idea of “some rights reserved.”

A book recommended to anyone interested in the value of Creative Commons is the book “*Made with Creative Commons*” by Paul Stacey and Sarah Hinchliff Pearson, licensed under CC BY-SA.

https://creativecommons.org/use-remix/made-with-cc/

Chapter 14: 2003

Chapter 14.1: Fedora

While supported by the Fedora Project, the Fedora Linux distribution is sponsored and supported by Red Hat.

Fedora uses the GNOME desktop environment, and is primarily a desktop operating system with server and cloud computing support.

Fedora Silverblue has given Fedora Linux more popularity being an immutable desktop operating system – meaning users cannot change it to their own design – which is popular for its implications for security.

Having millions of users, including Linus Torvalds himself – as of 2020 – Fedora is one of the major Linux distributions.

Fedora supports what it calls “Fedora Labs” which are variations of the mainline operating system designed for more specific purposes such as robotics, gaming, security, and science.

Fedora also support spins – similar in concept to Ubuntu flavors – which have support for KDE, XFCE, LXQt, MATE, Cinnamon, and more.

Chapter 14.2: Inkscape

First releasing in November, 2003. It was a fork of the Sodipodi application, which was a vector graphics tool that ended development in 2004 which itself was a fork of a project called Gill.

Inkscape wouldn’t see a 1.0 release until May 2020. At that time in development for sixteen years.

It has file support for various formats including import support for Adobe Illustrator, SVGZ, and Adobe Photoshop,

Chapter 14.3: Pirate Bay

While notorious for illegal activity such as software and media piracy, it is still an important piece of technological history. Created by Fedrik Neij, Peter Sunde, and Gottfrid Svartholm, the Pirate Bay is by the organization Piratbyrån – a disbanded think tank against copyright from Sweden that shut down in 2010.

The Pirate Bay calls itself the most resilient torrent site on the internet, and runs on the surface web with deep web proxies available.

Chapter 14.4: Jitsi

Created by Emil Ivov, and developed by 8x8 – an American voice over IP (VoIP) provicer – Jitsi isa VoIP, instant messaging, and video conferencing software licensed under Apache 2.0.

Previously owned by BlueJimp (founded by Emil Ivov) and Atlassian, Jitsi supports a variety of operating system and is primarily used for video conferencing after the COVID-19 pandemic hit.

Chapter 15: 2004

It is arguable that 2004 was the most important year of technology with this chapter being the longest out of any just because of the important subject matter alone.

In this there is the first release of Ubuntu, the availability of the Gmail emailing service, both MySpace and Facebook, and finally the Markdown file format.

This year alone contains four of the most game-changing and world affecting technological advances, or just are commonly used or referenced.

Chapter 15.1: Ubuntu

Ubuntu is the most popular version of Linux according to practically every Linux content creator, media source, and estimate that could be found.

Developed by Canonical Ltd., Ubuntu first released with version 4.10 (standing for the October 2004 release) in October, 2004. While originally focusing on desktop computers, Ubuntu as of late focuses on servers and internet of things (IoT) devices, as well as cloud computing with services like

Azure, AWS, Linode, and most other major cloud service providers.

Ubuntu is a fork of Debian, and contains proprietary software for some aspects of the operating system including media codecs.

Canonical Ltd. did try to launch a mobile version of Ubuntu, which will have more detail later in this book, but after the failure of a crowdfunding campaign raising only twelve million of a thirty-two million dollar goal, there was a noticable change in how Ubuntu would do things.

Multiple Ubuntu-made technological advances are mentioned in this book, including the Unity desktop environment, which was replaced with the 2016 release 16.04 LTS being the last to include it.

Ubuntu is arguably one of the most important distributions of Linux, with it even being the supporting factor to several distributions like Linux Mint, Pop!_OS, elementaryOS.

Ubuntu supports what it calls flavors, which are like Fedora Spins, in which they don’t change the core of Ubuntu but rather

support a specific purpose or desktop environment. Ubuntu currently supports seven official flavors. Kubuntu: which aims to support the KDE Plasma workspace on Ubuntu, Lubuntu: which aims to support a lightweight LXQt desktop, Ubuntu Budgie: which aims to support an elegant and simplistic experience based around the Budgie desktop, Ubuntu Kylin: which aims to support Chinese users of Ubuntu with a more Chinese user experience, Ubuntu MATE: which aims to support the MATE desktop environment (which is the continuation of the GNOME 2.x desktop

environment, which used to be default on Ubuntu), Ubuntu Studio: which aims to support multimedia creation, and Xubuntu: which aims to support a lightweight system based on the XFCE desktop environment.

Outside of flavors, there are unofficial remixes which have their own history. Almost all flavors start as remixes. The most popular remix – of which this book was actually written on (not to be mistaken as an endorsement) – is the Ubuntu Cinnamon Remix which features Linux Mint's Cinnamon desktop environment. There is also the UbuntuDDE Remix which aims to

support the Deepin desktop environment, and the Ubuntu Unity remix which aims to support Ubuntu's abandoned desktop environment, Unity.

Ubuntu would introduce their own software packaging format, named Snaps. Snaps are particularly disliked by most of the Linux community.

Since Ubuntu is so important to the Linux ecosystem – being one of the "big three" (Ubuntu, Red Hat, Arch Linux), a list of Linux distributions who's changes make the most impact – Canonical Ltd. is a multi-

million dollar corporation working with major corporations such as Microsoft and Amazon – including the controversial Amazon shopping application and integration with the Unity desktop environment.

Chapter 15.2: Gmail

Gmail is the largest email provider, with over a billion active users as of 2022. Gmail is a free, web-based email client, created by Paul Buchheit. Gmail supports seventy-two languages over a hundred virtual keyboards, handwriting inputs.

Gmail is available as a website, mobile application for iOS and Android, and other internal technologies such as sending emails through non-Gmail email addresses, phishing protection attacks, spam filtering.

In 2014 was the announcement for Inbox, an application designed to support Gmail users with its intention aiming to solve issues such as distraction, difficulty finding important information, and more.

Inbox would shut down as of September, 2018. However, Gmail still is an industry standard for email services.

Chapter 15.3: MySpace/Facebook

Both being founded in 2004, and Facebook originally having the name Thefacebook, both of these similar services made their fair share of important changes to the world of technology, though with Facebook being the one to make the most innovations, and as of 2022 has a much larger userbase compared to MySpace.

MySpace was technically founded in late 2003, but due to its comparisons and close age to Facebook – and since it is a

shorter section, it is included in the 2004 chapter.

Created by Tom Anderson, Chris DeWolfe, and Hon Hart, MySpace would be a similar service to Facebook, but would not win the social media wars. While still active as of 2022, and as a multi-million dollar business, MySpace would become the most visited website in 2006 – even beating Google and Yahoo!. MySpace would start declining in popularity in 2009 in favor to Facebook.

Facebook on the other hand is a multi-billion dollar company. Founded by Eduardo Saverin and Mark Zuckerberg, Facebook was originally only a social media platform restricted to college students with a *.edu* email address being required for registration. Facebook was open to the public in 2006, and would reach one billion users as of October 2012.

Facebook would come into controversy with the Cambridge Analytica data scandal, political manipulation, mass surveillance, psychological affects, user privacy, hate speech, copyright infringement, fake news

and false information, hate speech and hate groups, treatment of employees, copying competition, avoiding taxes, terms of service issues, environmental issues, fake accounts, and so many others that while doing the research for this book Wikipedia had an issue with the length of the article “Criticism of Facebook” which itself is the length of a small book.

Facebook, while popular, has a strong issue with supporting itself long term with how controversial the company is, but with technologies like Portal – a home device suite by Facebook – as well as other

applications it controls such as Instagram, WhatsApp, Messanger, and others.

With Facebook being such a major corporation, but with so many branding issues with its controversial history, it only made sense for them to rebrand, however, it would not be well received. Facebook is now known as Meta, and is trying to create what it calls the Metaverse.

It will be interesting to see the next several years of Facebook’s future history. With how controversial it is, and with multiple politicians fighting against the platform, its

future looks grim. Facebook is losing many of its users with the “#DeleteFacebook” movement.

Chapter 15.4: Markdown

Created by John Gruber and Aaron Swartz – who’s history alone includes Reddit, Faker.JS, Web.py, Really Simple Syndication (RSS), and more – in March 2004, and would end development of 1.0.1 in the same year, Markdown is still used with open-source projects, with a common file to find with most open-source projects being

README.md. While Markdown is inactive, it is still used as one of the top known markup languages best known for its simplicity.

It is an easy to read, and easy to write format designed to still be readable in a plain-text format. This is unlike other options, like HTML, XML, reStructuredText, and others who’s syntax is more difficult to read.

Chapter 16: 2005

The year 2005 is an immediate more tame year from its predecessor. While there were some innovative technologies, this year was not a major year – at least for any technologies I could find.

Chapter 16.1: Reddit

Founded by Steve boring year for Huffman, Alexis Ohanian, and Aaron Swartz, Reddit is a social media platform for news aggregation and discussion platform.

Reddit is known for its repetition and “reposting” concerns by users, and is also

the home of r/WallStreetBets who were responsible for the rise of GameStop and AMC Theaters stock prices.

Reddit gained popularity after its competitor DIGG released a terrible update causing a DIGG exodus

Chapter 16.2: YouTube

Launching in February, 2005, Youtube is an online video distribution platform created originally as a dating site. Founded by Steve Chen, Chat Hurley, and Jawed Karim – who would upload the first video

“Me at the zoo” – and would be bought by Google in 2006. It would be the second largest search engine behind only Google alone.

YouTube would serve many organizations and individual YouTube channels.

Chapter 16.3: Megaupload

Megaupload was founded by a man named Kim Dotcom – yes, that is his last name. Accused for being a Pirate Bay-like service, the United States Department of

Justice had the domains closed and seized it assets.

It would serve file hosting again with Mega Ltd. which was founded by Dotcom, in 2013, this time based in Auckland, New Zealand.

Chapter 16.4: Git

Git is a software control management (SCM) software created by Linus Torvalds, and is currently maintained by Junio Haramano, along with a large list of

contributors, it is the most used tool for software control.

Many platforms were created to support public repositories of Linux such as GitHub and GitLab. The Linux source code is has its source hosted on the GitHub repository git@github.com:torvalds/Linux along with the git.kernel.org repository.

Chapter 17: 2006

2006 was a mildly boring year, but still not without its game changing technologies. With jQueary, Twitter, Blu-Ray, and Amazon Web Services for Cloud Computing releasing in this year.

Chapter 17.1: jQuery

Created in August, 2006, by John Resig, jQueary is a JavaScript library to make the HTML DOM easier to modify. Jqueary us used by the vast majority of the most popular websites.

jQueary is MIT and GPL dual license, and maintained by the jQueary Foundation. The projects motto is “write less, do more”, and it takes common tasks that usually take several lines of code to run to only a small handful or even one line functions.

Chapter 17.2: Blu-Ray

Shortly after the creation of DVD was the creation of Blu-Ray discs, which are higher density discs that can range from 25 GB to 128 GB, which is far higher than DVD’s maximum 17.08 GB on DVD.

It was designed to supersede the DVD format, with Blu-Ray being popular in gaming technologies and most movies as of 2022 have a Blu-Ray release at some point in its history.

Chapter 17.3: Twitter

Twitter is a popular social media network released in 2006, but originally known as Twttr.

Founded by Jack Dorsey, Noah Glass, Biz Stone, and Evan Williams, and was inspired by the Flickr application. Twitter was

created after a day of brainstorming by the podcasting company Odeo.

They decided to use the American SMS short code 40404 as it was easy to remember.

Chapter 17.4: AWS Cloud Computing

Amazon Web Services (AWS) is an Amazon-owned cloud computing and web hosting.

AWS is one of the, if not the most popular – if not the most popular as of 2022 – was created for web services hosting in

2002, but had its very important cloud computing business created in 2006.

Chapter 18: 2007

In 2007, we saw some of the most game changing devices on the planet. With the iPhone and the first looks into Android, and the VirtualBox virtual machine manager, and Clojure programming language being the highlights of this year.

While certainly some of these technologies were bigger than others, none of these distributions were any small deal of any form.

Chapter 18.1: iPhone

Released in 2007, the Apple iPhone was the first touch screen phone, and has a long and difficult history with two teams competing to build a smart phone – one delivering the product we got, and the other working on a more iPod-like device.

The letter “i” in iPhone means internet, and the iPhone would sell billions of units of the smartphone.

Chapter 18.2: Clojure

Clojure is a Lisp-like programming language creared by Rich Hickey, and is developed by a community of maintainers. Clojure is licensed under the Eclipse Public License, and advocates immutability in data, and aims to focus on immutable (unchangeable) variables by default.

Immutability is an important structure design, and more programming languages should support an immutable system just like Clojure.

Chapter 18.3: VirtualBox

Originally created by Innotek in 2007, VirtualBox is a multi-platform virtual machine tool which allows users to create virtual machines of their favorite software. VirtualBox is open-source under the GPL version 2 license, and is currently supported by Oracle.

Innotek was originally an independent company that would be bought out by Sun Microsystems which was bought by oracle a few years later.

Chapter 18.4: Android

Android is Google’s competition to Apple’s iOS for the recently released iPhone. Android is – as of 2022 – the most used operating system (even beating Microsoft Windows in overall market share).

First unveiled in November 2007, the first phone with Android – the HTC Dream – wouldn’t release until late the next year in 2008.

Android uses a modified Linux kernel, with most of the system being open-source sotware.

Chapter 19: 2008

2008 was an important year for the development of major technologies found commonly in 2022. Over a decade of after this year, the technology of this year fuels the world of today.

This includes major open-source supportive company GitHub, the decentralized stock-like “computer currency” BitCoin, the Google Chrome browser which is used by most people and even fuels most browsers, and the Google Cloud Platform.

Chapter 19.1: Google Cloud Platform

Created in 2008 by Google, the Google Cloud platform is aa suite of cloud computing services, and even a service Google has been using internally for their own search engine, Gmail emailing service, and cloud hosting platform.

There are over a hundred products and key services including cloud artificial intelligence, data science,databases, computational engines, information of things, and more.

Chapter 19.2: Chrome

Chrome is a web browser developed by Google, and released on multiple platforms like ChromeOS, Windows, MacOS, Android, Linux, and iOS.

The Chrome browser is built on top of the open-source Chromium engine which supports projects and products like Vivaldi, Opera, Brave, and even the Microsoft Edge browser.

Google is the most used browser and is nearing version 100 in 2022.

Chapter 19.3: Bitcoin

Created by the mysterious Satoshi Nakamoto – which it is even unknown whether Nakamoto is a single person or an organization. Releasing in 2009, it would be built on a new technology called the blockchain, and was invented and published in 2008.

The technology had merit, however, it does have its critics in economic and technological spheres.

Chapter 19.4: GitHub

GitHub is an internet software development and version control scheme built using the Git tool. Founded in February, 2008, it is home to over two hundred million projects, and seventy three million developers, as of 2021.

GitHub would be acquired by Microsoft in 2018, but alternatives like BitBucket by Atlassian, GitLab, and SourceForge would become bigger players as the acquisition would cause major concerns for many developers.

Chapter 20: 2009

2009 was an interesting year for technology. While not the biggest year of the decade by far, it still had its fair share of important technological experiences, and one from a legendary computer engineer in his own right.

The Go programming language being created, Cloudflare being founded,VMWare being developed, and the Bing search engine being released.

Chapter 20.1: Go Language

Created by Robert Griesemer, Rob Pike, and Ken Thompson – who worked on the B programming language (the predecessor to the C programming language), and worked with Dennis Ritchie on the Unix operating system – Go (often known as Golang) claims to be a fast and reliable programming language that is easy to learn, and has many projects using the language for its tooling.

Chapter 20.2: Cloudflare

Cloudflare is an internet and cloud computing company founded in 2009, with its most popular products being its DDoS protection and mitigation, and content delivery network (CDN).

Created by Lee Holloway, Matthew Prince, and Michelle Zatlyn, whom have worked on multiple projects together. The service was promoted with the TechCrunnch Disrpt conference in 2010.

Chapter 20.3: VMWare

VMWare is a cloud computing and computer software company who is known for their virtual machine software VMWare Workstation, which is found in many organizations and even by individuals.

Founded by Edouard Bugnion, Scott Devine, Diane Green, Mendel Rosenblum, and Ellen Wang in Palo Alto, California where thee company is still headquartered to this day. VMWare is a multi-billion dollar corporation as of 2021.

Chapter 20.4: Bing

Bing is Microsoft’s alternative to the Google Search search engine. Using Microsoft’s own advertising platform, and is included in multiple Windows applications.

It was enveiled by Steve Basllmer in 2009, and has come under heavy criticism such as software integration with the Edge browser, and Windows operating system.

Chapter 21: 2010

The year 2010 was an important one for the open-source market, seeing the largest desktop BSD outside of the main three – GhostBSD – and the Unity desktop environment in preparation for the GNOME 3.x release, the creation of the LibreOffice project, and the Illumos project which is a fork of the OpenSolaris operating system that many love.

This year is big, but not quite the biggest.

Chapter 21.1: LibreOffice

LibreOffice is a fork of the Open Office project, and is ran by The Document Foundation. The LibreOffice suite is actually the office software used to manage and even write this book.

Available on most operating systems in either official or unoffical capacity – including an Android version, and version for ChromeOS – LibreOffice is the biggest competition for Microsoft Office as of 2022.

Chapter 21.2: Unity Desktop

The project released in June 2010, and originally created by Canonical Ltd. for the Ubuntu Linux distribution.

It is currently maintained under the name Lomiri by the UBPorts team for desktop and mobile environments for Linux systems running on systems like the Pinephone and other devices.

It is also supported on the Ubuntu Unity remix of Ubuntu, created by Rudra Saraswat.

Chapter 21.3: GhostBSD

GhostBSD is an operating system based on FreeBSD with the MATE desktop environment at default. Created by Eric Turgeon, and available for x86_64 platforms only, with no ARM versions.

For a period of time, the operating system was based on the TrueOS operating system – another derivative of the FreeBSD operating system which is now discontinued.

Eric Turgeon works with a small group of contributors to make the operating system.

Chapter 21.4: Illumos

Developed by the Illumos Foundation, and first released sometime in 2010, Illumos is based directly on the Unix fork known as OpenSolaris, which was itself a derivative of System V Release 4 (SVR4), and the original Berkeley Software Distribution, it is the most Unix-like operating system still in development.

Chapter 22: 2011

The year of 2011 was a surprisingly important year. With two important different desktop environments, one born out of frustration of the other. Also, one of the biggest competition to PayPal, and the first Linux-based desktop operating system to make it big in the market.

Chapter 22.1: GNOME 3.x

GNOME 3.x was a controversial release of the GNOME desktop environment due to its instability and especially its unconventional design.

Released in April 2011, the desktop environment – aiming to declutter the desktop environment – ended up being arguably too minimalist, with the remove of minimize and maximize buttons. People found that the visual clues were confusing.

Quite a few projects would fork the GNOME desktop environment, or heavily modify it.

The release would later regain popularity and be the default on Ubuntu after abandoning Unity.

Chapter 22.2: Dart Programming Language

The Dart programming language was created by Google for client-side application development such as website and mobile applications.

Designed by Lars Bak and Kasper Lund in October, 2001, and was influenced by languages like C/C++. Java, JavaScript, Ruby, among others.

It was first unveiled in Aarhus, Denmark, and with its 1.0 release in November, 2013. While originally having

many criticizers, in 2022 it is one of the more popular programming languages.

There is also the TC52 committee in The Ecma International non-profit to standardize Dart. Flutter, a graphical toolkit, would also be created for the programming language.

Chapter 22.3:Manjaro

Manjaro is an operating system built on top of Arch Linux, maintained by Manjaro GmbH & Co. KG, and was built alongside Antergos as a similar but different project. The project was created to stabilize and

make the Arch Linux distribution easier to use, and even includes its own mobile version of its software. By default, the desktop environment options for Manjaro are XFCE, KDE Plasma 5, and GNOME, with Phosh and Plasma Mobile being the mobile environments for Manjaro's mobile versions.

Chapter 22.4: ChromeOS

ChromeOS is Google's desktop operating system based on Gentoo Linux. The project is primarily web-based as well as having support for Android applications.

ChromeOS’s hardware origins can be found in 2010, with a Cr-48 Chromebook being released in a specialized program.

Chapter 23: 2012

2012 was a moderately boring year, which is a trend which will increase as years increase due to the fact that selecting what technological advances were most important are becoming more and more difficult to write for,

In this year we have the inclusion of the Julia programming language, the Raspbian operating system for Raspberry Pi devices, the Cinnamon desktop environment, and the NordVPN virtual private network service.

Chapter 23.1: Julia Programming Language

Primarily used as a data and numerical analysis program in computational sciences. It supports “foreign function interfaces” for C/C++, Fortran, Python, R, and more – which means Julial can interface with other programming languages to its will.

Julia is made by Jeff Bezanson, Alan Edelman, Stefan Karpinski, and Viral Shah, and first released sometime in 2012.

Chapter 23.2: Raspbian

Now known as Raspberry Pi OS, Raspbian is an operating system for the Raspberry Pi series of devices, and is based on the Debian Linux distribution.

It is made by the Raspberry Pi Foundation as an official operating system for desktop use with the Raspberry Pi, which is also made by the same foundation.

The user interface is based on LXDE, and is known as PIXEL, to look similar to MacOS and Windows .

Chapter 23.3: Cinnamon Desktop

Developed as a fork of GNOME 3.x, but is designed to follow a traditional (Windows-like) operating system. Cinnamon is developed by the Linux Mint distribution of Linux.

The desktop was designed because of the dissatisfaction with the GNOME Foundation’s changes with the then-new GNOME 3.x release and redesign.

Chapter 23.4: NordVPN

First released in February, 2012 and developed by a company named Nord Security, a cybersecurity business.

NordVPN runs in the jurisdiction of Panama, which the country has no data retention laws and does not work with the fourteen eyes – a list of countries who have laws that remove the privacy of its citizens online.

Chapter 24: 2013

2013, like 2012, was a moderately boring year, but with some good things to come.

There is the OnePlus phone company, Chromecast, OpenZFS, and the first representations of the Ubuntu Touch project.

While an interesting year with some important creations, the year is full of other projects and news such as the shut down of the Silk Road – an illicit goods distribution service.

Chapter 24.1: Chromecast

Chromecast is a digital media player made by Google to connect to services like YouTube, Netflix, and other media distribution platforms, and would connect to devices directly, and display them on televisions through HDMI.

There are many iterations of the Chromecast, the latest one releasing in 2020, and the first releasing its first generation in 2013.

Chapter 24.2: OnePlus

OnePlus is a Chinese phone company founded by Pete Lau and Carl Pei in December 2013.

Selling to a worldwide audience, and primarily known for their phones, they also sell other products like two modifications to the Android operating system called OxygenOS and HydrogenOS, and they also sell phone cases, headphones and earbuds, power bank devices, and more.

Chapter 24.3: OpenZFS

OpenZFS is an open-source CDDL licensed storage system that is extensible.

ZFS is well known and used primarily on the FreeBSD platform, as other file systems beat ZFS in popularity.

Created sometime in 2013 by the Software in the Public Interest (SPI) which also hosts the Debian Linux distribution.

Chapter 24.4: Ubuntu Touch

Ubuntu Touch was created by Canonical Ltd. in 2013 to support the company’s mobile endeavors.

Due to “lack of interest”, in 2017 the project would be shut down by Canonical Ltd. where the community and community nonprofits like UBPorts would come take on the project.

The predecessor to the Ubuntu Touch project was the Ubuntu for Android project which was an Ubuntu-made mobile environment on top of the Android mobile

operating system. No longer supported by anyone as of 2014, a change in direction would make the Ubuntu Mobile operating system, later renamed to Ubuntu Touch.

Ubuntu Touch does run on some hardware, with the developments by the UBPorts team making it available on several phone devices.

Ubuntu Touch, while abandoned by Canonical, did carve out a niche in the mobile space – as predicted by Adrian Covert for CNN in January 2013.

Chapter 25: 2014

The year of 2014 was full of honorable mentions, but few topics that would be important enough for an independent chapter.

Some of the things to happen this year was Twitch being purchased by Amazon, the announcement for Windows 10, Gamergate, and the shutdown of Silk Road 2.0, as some of the topics not mentioned.

Of the topics written about there was the Shellshock vulnerability, HTML5. Amazon Echo releasing, and the creation of Vue.JS.

Chapter 25.1: Shellshock Vulnerability

The shellshock vulnerability, also known as bashdoor, was a security vulnerability in the Bourne Again Shell (BASH) program, and was disclosed in 2014, though existing before that. It would be patched only two weeks after its disclosure.

Shellshock had the ability to give a hacker unauthorized access to many different aspects of the operating system. It was discovered by Stéphane Chazelas.

Chapter 25.2: HTML5

HTML5, while initially created in 2008, would not have a World Wide Web Consortium (W3C) recommendation until 2018.

HTML5 would have three releases with recommendation. The Web Hypertext Application Technology Working Group (WHATWG) would have disagreements with the differences in standard from the W3C.

Today HTML5 powers the vast majority of the web – though some prior versions of HTML are still used.

Chapter 25.3: Amazon Echo

While using the Amazon FireOS technology, the Amazon Echo is a smart speaker that uses voice input technology similar to how Google Assistant and Siri function.

The name of the assistant is Alexa, but users may change the name to one of a few options like Echo, Amazon, and simply just Computer – which is actually more funny than interesting.

Chapter 25.4: VueJS

Created in 2014 by Evan You, Vue.JS is a JavaScript framework for building user interfaces, and is an alternative to Facebook’s React framework, and Google’s Angular framework.

Written in TypeScript, it uses its own markup language-like system for development to later be translated into HTML.

Chapter 26: 2015

The year of 2015 was a relatively boring year, with some cool things releasing such as the 1.0.0 release of the Rust programming language, the Steam Machine – Valve’s first console.

Chapter 26.1: Rust 1.0.0

Rust appeared in 2010, and was designed by Graydon Hoare, and is developed by the Rust Foundation.

Similar to C++, but with a memory-safe design, Rust is a popular programming language.

Chapter 26.2: Steam Machine

While Steam Machine was not considered a “game changer” – pun fully intended – the Steam Machine released in 2015.

The machine cost anywhere from $400 to $6000, with the controller and Steam Link cost $50 each.

The device sold less than half a million units, but ran the first versions of SteamOS which would later be seen in Valve’s new console, the Steam Deck, announced in 2019.

Chapter 26.3: Kubernetes

Kubernetes (also known as K8s) was originally created by Google, but would later get its own non-profit dedicated to its development named the Cloud Native Computing Foundation.

Licensed under the Apache License 2.0, and written in the Go programming language, Kubernetes is a type of software known as cluster management software.

Chapter 26.4: WebAssembly

WebAssembly, or WASM is a portable, binary code format made by the World Wide Web Consortium, and supported by Mozilla, Microsoft, Google, Apple, and open-source contributors, WebAssembly began development in 2015, and would be released in 2017.

The project is a way to enable web applications to be higher performance. It has the ability to compile programming languages for web development.

Chapter 27: 2016

2016 was not just important for recent American history – being one of the most controversial election years in American history – but also one with some fascinating technologies.

There was the creation of the Ethereum block-chain based cryptocurrency which would later give rise to the idea of Web 3.0. There was the Vivaldi web browser. The Kotlin programming language fully released in this year, and the Google Fuschia project was also in big news this year.

Chapter 27.1: Ethereum

Originally developed by Vitalik Buterin and Gavin Wood, Ethereum is a cryptocurrency platform built on top of the same blockchain used by Bitcoin.

Currently Ethereum is developed by the Etherum Foundation, OpenEthereum, EthereumJS, Hyperledger, and Nethermind.

It would be Ethereum co0founder Gavin Wood who would create the buzzword Web 3.0, a cryptocurrency and blockchain based internet.

Chapter 27.2: Kotlin

Kotlin is a programming language by the JetBrains company which is known for their integrated development environments. It first began development in 2011, but launched in 2016.

Currently Kotlin is gaining popularity in the development of Android applications, especially with the compatibility of the Java Virtual Machine.

In 2019, Google would announce that Kotlin is the preferred programming

language for Android applications, making it even more popular.

Unlike Java (for the most part) Kotlin is fully open-source using the Apache License 2.0, and is available on many platforms.

Chapter 27.3: Vivaldi

Vivaldi is a web-browser created by the Vivaldi Technologies company, and is a free but not open-source web browser.

Vivaldi was founded by Jon Stephenson von Tetzchner, and Tatsuki

Tomita, and released their browser in April 2016.

Jon Stephenson Von Tetzchnet was the CEO of Opera Software, which after an acquisition by what many considered being a sketchy corporation.

While Vivaldi is popular on Linux, it is proprietary freeware using the open-source browser engine named Chromium, which is the same engine behind Google Chrome, and others.

Chapter 27.4: Fuchsia

Google Fuchsia is an operating system developed by Google as an alternative to their Linux-based offerings for Android and ChromeOS.

Google Fuchsia would first replace Google’s Cast OS operating system for Nest Hub devices.

Google Fuchsia is licensed under multiple permissive open-source licenses, including BSD, MIT, and Apache License 2.0.

Chapter 28: 2017

2017 was one heck of a year for computer operating systems. ChromeOS now has Google made hardware called the Pixelbook. The FirefoxOS project gave rise to the KaiOS project. System76, a computer manufacturing company for Linux, created their own Linux-based operating system called Pop!_OS, and Nintendo launched the Nintendo Switch, running a modified version of the FreeBSD operating system.

These projects are big news for all who see them, and even though they are not that old, they are still world changing.

Chapter 26.1: KaiOS

KaiOS – not to be mistaken with the author of this book Kai Lyons – is an operating system is an operating system launched in 2017 for small feature phones.

It contains some proprietary software, though with a modified Linux kernel, and its base Firefox OS – which is now discontinued – being licensed under the Mozilla public license.

Maintained by KaiOS Technologies, a Hong Kong based company with TCL being its

Chapter 26.2: Pop!_OS

Pop!_OS is an open-source Linux distribution by the System76 company. In recent editions it has been using its a modified GNOME 3.x and 4X desktop environment but the company is developing their own named COSMIC.

Pop!_OS is a popular choice for Linux gaming, and general work. Being made by a hardware manufacturing company based in Denver, CO, Pop!_OS is also popular for novice Linux users who even don’t know

how to install an operating system through USB flash drive.

PopOS is built on top of Ubuntu, and uses the Flatpak package manager. It is available to download, along with actual first-party hardware.

Chapter 26.3: Nintendo Switch

The Nintendo Switch is a popular gaming console created by Nintendo. It uses a modified version of FreeBSD mixed with the 3DS system software, and with

components from Linux, and with mostly proprietary software added.

Chapter 26.4: Pixelbook

The Pixelbook is a laptop-tablet hybrid computer made by Google, running the ChromeOS operating system in the Google Pixel family of devices – though a type of Chromebook.

It had a moderately negative response because of the price, but otherwise fair response for its build quality

Chapter 29: 2018

2018 was the single most difficult year to write for as the year was very empty in terms of technological history.

That doesn’t mean nothing big happened. There was the Cambridge Analytica situation, and the Facebook Portal device – both mistakes on behalf of Facebook.

There was also the introduction of the 5G networks and Google Pay service for paying people with your phone.

Chapter 27.1: Cambridge Analytica

Over fifty million Facebook user profiles were used in the election of Donal Trump and the Brexit vote.

The millions of accounts worth of data were questionably attained, and it would cause the company Facebook to have a mass exodus of users it would not fully recover from – at least as of 2022.

It would be an anonymous whistleblower who would report the issue to the Observer – a news company.

Chapter 27.2: Facebook Portal

Developed by Facebook – now known as the Meta Platforms company, or simply Meta – in 2018, Portal, also known as Facebook Portal, is a smart device based around a smart display for communications and access to the internet.

The series of devices are integrated deeply with the Amazon personal assistant named Alexa.

Chapter 27.3: 5G

Developed by the Third Generation Partnership Project (3GPP), the 5G standard was announced in 2016, and would first be implemented in 2018.

The 5G standard would meet unwarranted controversies based around various conspiracy theories like 5G being believed by some to have caused and spread the COVID-19 pandemic of 2020.

The 6G standard is in development, but 5G is the newest standard with proper implementation.

Chapter 27.4: Google Pay

Previously known as Android Pay – a service released in 2011 – the Google Pay service is an application by Google to allow people to use their mobile devices to make payments.

Available on both iOS and Android, Google Pay is a popular service that is gaining more and more support with payment devices, and allows for more people to accept payments.

Chapter 30: 2019

2019 was an interesting year for technology. With the first production ready version of Nim, 1.0, to the Disney+ media streaming service, and the foundation of the Framework company, and ending the chapter with the interesting Motorola Razr phone.

The year is still rather boring as what technologies would be more important in thirty years is only knowable in thirty years.

Chapter 30.1: Nim 1.0

After 11 years of development, and being publicly available, the first production ready version of the Nim programming language was released in 2019.

Originally appearing in 2008, and created by Andreas Rumpf, the programming language is a cross-platform, MIT licensed programming language to be as extensible as Lisp, as fast as C, and as simple and expressive as the Python programming language.

Chapter 30.2: Disney+

As competition to Netflix, and being Disney's second major offering for online streaming – with Disney also owning Hulu – the platform is known for its content hosting the nearly a century worth of movies from Disney, and subsidiaries like Pixar and Lucas Films who are known for their Star Wars franchise, and Marvel.

While the service is popular, it is arguable that the service is a huge part in the rise in media piracy.

Chapter 30.3: The Framework Computer

Framework is a computer company founded by Nirav Patel in California, the company makes what is known as the Framework Laptop.

The company was founded based on the philosophy of right to repair – which is the idea that computers (and the environment) would be better off if consumers had the ability to repair their own devices.

Their laptop is fully modular, with replacement parts available to everyone.

Chapter 30.4: Motorola Razr

The Motorola Razr is a flip-phone series with its latest version being made available in 2019. The 2019 version, however, is was the first in a series of releases from many companies based around the foldable phone fad – where smartphones can fold their screen to change their size.

Chapter 31: 2020

The year of 2020 was, for Linux, a huge time for the mobile sphere. While Linux mobile has been around for a long time – Android being popularly known to run on top of the Linux kernel – but for the community itself two non-Android Linux phones have released in this year.

There is also the game-changing technology that is the M1 Mac. As well as the biggest release of Linux – kernel version 5.8.

Chapter 31.1: Pinephone

Created by the Pine64, and first releasing the Braveheart edition in January, 2020. Pine64 would partner with other developers like UBPorts (who maintain the Ubuntu Touch project), KDE (Who have their own mobile environment, Plasma Mobile) Manjaro (who have their own mobile version of their operating system), and many others.

Pine64 was founded by Johnson Jeng and TL Lim, and is headquartered in Hong Kong, and made one of the worlds cheapest laptops (at $99) as their token to fame.

Chapter 31.2: Librem 5

Releasing in November, 2020 by Purism, and based on the PureOS operating system using the Phosh mobile environment, the Librem 5 is the first of its series – despite the use of the number five. Starting development through a crowdfunding campaign in 2017, the Librem 5 phone aimed to run on a platform of free and open-source software, and privacy friendly controls with hardware switches to enable and disable various features on the phone as the user desires.

Chapter 31.3: Apple M1

Apple, known for their premium-grade hardware for their premium-grade price – with some of their computers being more expensive than many cars – decided to make a future-changing move in making their desktops and laptops built on the ARM architecture.

The M1 changed the future of computing in general. Though Apple abandoned PowerPC to Intel in the past, this was because of a business partners.

With the M1 being a chipset using the ARM architecture, an architecture based on the Reduced Instruction Set Computer (RISC), meaning it is more minimalist than the Complex Instruction Set Computing (CISC) architectures like x86_64, which many are saying will be nearly or completely dead in the next few decades.

Chapter 31.4: Linux 5.8

While nothing stands out with this release beyond the normal driver support, security improvements, and optimizations, it

was Linus Torvalds to made this release surprisingly large releases.

Torvalds described as “up there with the best despite not having any single thing that stands out.” This release included support for a few Qualcomm Adreno GPUs, better AMD Radeon support, and new ARM SoCs support.

This kernel version was included because of its importance according to Torvalds, but that doesn’t mean it’s not an important release that doesn’t need some form of mention.

Chapter 32: 2021

Chapter 32.1: GNOME 40

GNOME 40 first released in March 2021. Strangely adopting a new versioning scheme that is only beaten by the Bethesda game Fallout going from four to seventy-six - though not as strange as the XBOX versioning scheme which is all over the place – GNOME 40 is in many ways similar to the GNOME 3.x releases, but with a horizontal design

Chapter 32.2: Steam Deck

While releasing in 2022, for a price of $400 for the base model, a lot of the news around the device came out in late 2021.

The Steam Deck runs on top of a custom distribution of Linux based on Arch Linux called SteamOS 3.0. Previously, on the Steam Machine, SteamOS was built on top of Debian. The Steam Deck also has a KDE Plasma 5 desktop for desktop gaming support.

The Steam Desk is being sold in direct competition with Nintendo for the hybrid

console gaming market. Though while they look similar, Valve – the developer of the Steam Deck – claims that they did not consider the Nintendo Switch (Nintendo's hybrid console).

However, the Steam Deck isn't without it's fair criticism. The battery life is considered by many as pretty bad. Other criticisms include it feeling incomplete, having too few games, an online-first design, major bugs and flaws in the software, and more.

Chapter 32.3: Google Pixel 6

Released in October, 2021, and being the sixth edition of the Google Pixel phone line up, the Pixel 6 launched with the Android 12 operating system.

It uses its own chips named Google Tensor – a custom CPU chip similar to the concept of the Apple M1 chip.

The phone advertises many new technologies involving the camera, and would have new AI-supported camera.

Chapter 32.4: Log4J Vulnerability

Developed by the Apache Software Foundation in 2001, it is a Java logging utility. Originally developed by Ceki Gülcü before being ran by the Apache Software Foundation, Log4J is one of many but was one of the more poplar ones.

In 2021, there was the Log4Shell vulnerability which affected many important and popular technologies like Minecraft Java Edition, Steam, QQ, Twitter, Cloudflare, and even the recent Mars rover launch as it was included in one of the devices launched.

It was discovered by Alibaba in November, 2021, and published to the masses in a Twitter post in December. The issue was called a “zero-day” exploit – an exploit that was not known and could have been found before hackers could exploit it. It was given the highest severity score on the common vulnerability scoring system by Apache due to how many people could have been affected by the disaster.

Chapter 33: Conclusion

I want to give a special thanks to the website Computer Hope

https://www.computerhope.com

as they were a massive resource in providing a limited amount of information related to the history of technology. Primarily, their year-by-year computer history. Without their work this book would not have been possible.

Thank you for reading my mess of a book. It evolved a lot in development, and it was a lot to create, but I enjoyed making it.

If you have any corrections or updates, or improved information, please go to the following GitHub repository:

https://github.com/loralighte/books