Mac (computer)

The **Mac**, short for **Macintosh** (its official name until 1999), is a family of personal computers designed and marketed by Apple Inc. The product lineup includes the MacBook Air and MacBook Pro laptops, and the iMac, Mac Mini, Mac Studio, and Mac Pro desktops. Macs are sold with the macOS operating system.

The MacBook Air was Apple's best-selling Mac model.

Jef Raskin conceived the Macintosh project in 1979, which was usurped and redefined by Apple co-founder Steve Jobs in 1981. The Macintosh has a 9-inch monochrome monitor built into the case, and was launched in January 1984, after Apple's "1984" advertisement during Super Bowl XVIII.

In 1987, the Macintosh II brought color graphics. From 1994, Power Macintosh transitioned from Motorola 68000 series processors to PowerPC. Through most of the 1990s, the Mac was not fully competitive with commodity IBM PC compatibles.

The 1996 acquisition of NeXT returned Steve Jobs to Apple, whose focused product oversight pushed the Mac mainstream with the 1998 iMac G3, the OS X operating system (renamed to macOS in 2016), and the Mac transition to Intel processors from 2005 to 2006. High pixel density Retina displays debuted in the iPhone 4 in 2010 and the MacBook Pro in 2012. In the 2010s, the Mac was neglected under CEO Tim Cook, especially for professional users, but was reinvigorated with new high-end Macs and the transition to Apple silicon, which had originated in iOS devices.

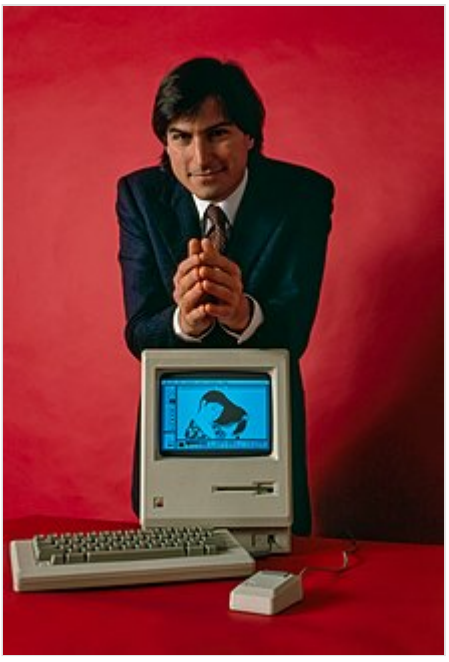
History

1979–1996: "Macintosh" era

In the late 1970s, the Apple II became one of the most popular computers, especially in education. After IBM introduced the IBM PC in 1981, its sales quickly surpassed the Apple II. In response, Apple introduced the Lisa in 1983.[1] The Lisa's graphical user interface was partially inspired by strategically licensed demonstrations of the Xerox Star. Lisa far surpassed the Star with intuitive direct manipulation, like the ability to drag and drop files, double-click to launch applications, and move or resize windows by clicking and dragging instead of going through a menu.[2][3] However, hampered by its high price of $9,995 (equivalent to $32,000 in 2022) and lack of available software, the Lisa was commercially unsuccessful.[1]

Parallel to the Lisa's development, a skunkworks team at Apple was working on the Macintosh project. Conceived in 1979 by Jef Raskin, Macintosh was envisioned as an affordable, easy-to-use computer for the masses. Raskin named the computer after his favorite type of apple, the McIntosh. The initial team consisted of Raskin, hardware engineer Burrell Smith, and Apple co-founder Steve Wozniak. In 1981, Steve Jobs

was removed from the Lisa team and joined Macintosh, and was able to gradually take control of the project due to Wozniak's temporary absence after an airplane crash. Under Jobs, the Mac grew to resemble the Lisa, with a mouse and a more intuitive graphical interface, at a quarter of the Lisa's price.[4]



Steve Jobs debuted the Macintosh in January 1984, photographed by Bernard Gotfryd. The Mac displays the shin-hanga (Japanese: 髪梳ける女; lit. 'hair combing woman') (original) by Goyō Hashiguchi.

Upon its January 1984 launch, the first Macintosh was described as revolutionary by *The New York Times*.[5] Sales initially met projections, but dropped due to the machine's low performance, single floppy disk drive requiring frequent disk swapping, and initial lack of applications. Author Douglas Adams said: "But what I (and I think everybody else who bought the machine in the early days) fell in love with was not the machine itself, which was ridiculously slow and underpowered, but a romantic idea of the machine. And that romantic idea had to sustain me through the realities of actually working on the 128K Mac."[6] Most of the original Macintosh team left Apple, and some followed Jobs to found NeXT after he was forced out by CEO John Sculley.[7] The first Macintosh nevertheless generated cult enthusiasm among buyers and some developers, who rushed to develop entirely new programs for the platform, including PageMaker, MORE, and Excel.[8] Apple soon released the Macintosh 512K with improved performance and an external floppy drive.[9] The Macintosh is credited with popularizing the graphical user interface,[10] Jobs's fascination with typography gave it an unprecedented variety of fonts and type styles like italics, bold, shadow, and outline.[11] It is the first WYSIWYG computer, and due in large part to PageMaker and Apple's LaserWriter printer, it ignited the desktop publishing market, turning the Macintosh from an early let-down into a notable success.[12] Levy called desktop publishing the Mac's "Trojan horse" in the enterprise market, as colleagues and executives tried these Macs and were seduced into requesting one for themselves. PageMaker creator Paul Brainerd said: "You would see the pattern. A large corporation would buy PageMaker and a couple of Macs to do the company newsletter. The next year you'd come back and there would be thirty Macintoshes. The year after that, three hundred."[13]

In late 1985, Bill Atkinson, one of the few remaining employees to have been on the original Macintosh team, proposed that Apple create a Dynabook, Alan Kay's concept for a tablet computer that stores and organizes knowledge. Sculley rebuffed him, so he adapted the idea into a Mac program, HyperCard, whose cards store any information—text, image, audio, video—with the memex-like ability to semantically link cards together. HyperCard was released in 1987 and bundled with every Macintosh.[14]

In the late 1980s, Jean-Louis Gassée, a Sculley protégé who had succeeded Jobs as head of the Macintosh division, made the Mac more expandable and powerful to appeal to tech enthusiasts and enterprise customers.[15] This strategy led to the successful 1989 release of the Macintosh II, which appealed to power users and gave the lineup momentum. However, Gassée's "no-compromise" approach foiled Apple's first laptop, the Macintosh Portable, which has many uncommon power user features, but is almost as heavy as the original Macintosh at twice its price. Soon after its launch, Gassée was fired.[16]

Macintosh Portable

Since the Mac's debut, Sculley had opposed lowering the company's profit margins, and Macintoshes were priced far above entry-level MS-DOS compatible computers. Steven Levy said that though Macintoshes were superior, the cheapest Mac cost almost twice as much as the cheapest IBM PC compatible.[17] Sculley also resisted licensing the Mac OS to competing hardware vendors, who could have undercut Apple on pricing and jeopardized its hardware sales, as IBM PC compatibles had done to IBM. These early strategic steps caused the Macintosh to lose its chance at becoming the dominant personal computer platform.[18][19] Though senior management demanded high-margin products, a few employees disobeyed and set out to create a computer that would live up to the original Macintosh's slogan, "[a] computer for the rest of us", which the market clamored for. In a pattern typical of Apple's early era, of skunkworks projects like Macintosh and Macintosh II lacking adoption by upper management who were late to realize the projects' merit, this once-renegade project was actually endorsed by senior management following market pressures. In 1990 came the Macintosh LC and the more affordable Macintosh Classic, the first model under $1,000 (equivalent to $2,200 in 2022). Between 1984 and 1989, Apple had sold one million Macs, and another 10 million over the following five years.[20]


PowerBook 100

In 1991, the Macintosh Portable was replaced with the smaller and lighter PowerBook 100, the first laptop with a palm rest and trackball in front of the keyboard. The PowerBook brought $1 billion of revenue within one year, and became a status symbol.[21] By then, the Macintosh represented 10% to 15% of the personal computer market.[22] Fearing a decline in market share, Sculley co-founded the AIM alliance with IBM and Motorola to create a new standardized computing platform, which led to the creation of the PowerPC processor architecture, and the Taligent operating system.[23] In 1992, Apple introduced the Macintosh Performa line, which "grew like ivy" into a disorienting number of barely differentiated models in an attempt to gain market share. This backfired by confusing customers, but the same strategy soon afflicted the PowerBook line.[24] Michael Spindler continued this approach when he succeeded Sculley as CEO in 1993.[25] He oversaw the Mac's transition from Motorola 68000 series to PowerPC and the release of Apple's first PowerPC machine, the well-received Power Macintosh.[26]

Many new Macintoshes suffered from inventory and quality control problems. The 1995 PowerBook 5300 was plagued with quality problems, with several recalls as some units even caught fire. Pessimistic about Apple's future, Spindler repeatedly attempted to sell Apple to other companies, including IBM, Kodak, AT&T, Sun, and Philips. In a last-ditch attempt to fend off Windows, Apple yielded and started a Macintosh clone program, which allowed other manufacturers to make System 7 computers.[26] However, this only cannibalized the sales of Apple's higher-margin machines.[27] Meanwhile, Windows 95 was an instant hit with customers. Apple was struggling financially as its attempts to produce a System 7 successor had all failed with Taligent, Star Trek, and Copland, and its hardware was stagnant. The Mac was no longer competitive, and its sales entered a tailspin.[28] Corporations abandoned Macintosh in droves, replacing it with cheaper and more technically sophisticated Windows NT machines for which far more applications and peripherals existed. Even some Apple loyalists saw no future for the Macintosh.[29] Once the world's second largest computer vendor after IBM, Apple's market share declined precipitously from 9.4% in 1993 to 3.1% in 1997.[30][31] Bill Gates was ready to abandon Microsoft Office for Mac, which would have slashed any remaining business appeal the Mac had. Gil Amelio, Spindler's successor, failed to negotiate a deal with Gates.[32]

In 1996, Spindler was succeeded by Amelio, who searched for an established operating system to acquire or license for the foundation of a new Macintosh operating system. He considered BeOS, Solaris, Windows NT, and NeXT's NeXTSTEP, eventually choosing the last. Apple acquired NeXT on December 20, 1996, returning its co-founder, Steve Jobs.[28][33]

1997–2011: Steve Jobs era

NeXT had developed the mature NeXTSTEP operating system with strong multimedia and Internet capabilities.[34] NeXTSTEP was also popular among programmers, financial firms, and academia for its object-oriented programming tools for rapid application development.[35][36] In an eagerly anticipated speech at the January 1997 Macworld trade show, Steve Jobs previewed Rhapsody, a merger of NeXTSTEP and Mac OS as the foundation of Apple's new operating system strategy.[37] At the time, Jobs only served as advisor, and Amelio was released in July 1997. Jobs was formally appointed interim CEO in September, and permanent CEO in January 2000.[38] To continue turning the company around, Jobs streamlined Apple's operations and began layoffs.[39] He negotiated a deal with Bill Gates in which Microsoft committed to releasing new versions of Office for Mac for five years, investing $150 million in Apple, and settling an ongoing lawsuit in which Apple alleged that Windows had copied the Mac's interface. In exchange, Apple made Internet Explorer the default Mac browser. The deal was closed hours before Jobs announced it at the August 1997 Macworld.[40]

Jobs returned focus to Apple. The Mac lineup had been incomprehensible, with dozens of hard-to-distinguish models. He streamlined it into four quadrants, a laptop and a desktop each for consumers and professionals. Apple also discontinued several Mac accessories, including the StyleWriter printer and the Newton PDA.[41] These changes were meant to refocus Apple's engineering, marketing, and manufacturing efforts so that more care could be dedicated to each product.[42] Jobs also stopped licensing Mac OS to clone manufacturers, which had cost Apple ten times more in lost sales than it received in licensing fees.[43] Jobs made a deal with the largest computer reseller, CompUSA, to carry a "store within a store" that would better showcase Macs and their software and peripherals. According to Apple, the Mac's share of computer sales in those stores went from 3% to 14%. In November, the online Apple Store launched with built-to-order Mac configurations without a middleman.[38] When Tim Cook was hired as chief operations officer in March 1998, he closed Apple's inefficient factories and outsourced Mac production to Taiwan. Within months, he rolled out a new ERP system and implemented just-in-time manufacturing principles. This practically eliminated Apple's costly unsold inventory, and within one year, Apple had the industry's most efficient inventory turnover.[44]

The iMac G3's marketing heavily emphasizes its design and Internet capabilities for consumers.

Jobs's top priority was "to ship a great new product".[45] The first is the iMac G3, an all-in-one computer that was meant to make the Internet intuitive and easy to access. While PCs came in functional beige boxes, Jony Ive gave the iMac a radical and futuristic design, meant to make the product less intimidating. Its oblong case is made of translucent plastic in Bondi blue, later revised with many colors. Ive added a handle on the back to make the computer more approachable. Jobs declared the iMac would be "legacy-free", succeeding ADB and SCSI with an infrared port and cutting-edge USB ports. Though USB had industry backing, it was still absent from most PCs and USB 1.1 was only standardized one month after the iMac's release.[46] He also controversially removed the floppy disk drive and replaced it with a CD drive. The iMac was unveiled in May 1998, and released in August. It was an immediate commercial success and became the fastest-selling computer in Apple's history, with 800,000 units sold

before the year ended. Vindicating Jobs on the Internet's appeal to consumers, 32% of iMac buyers had never used a computer before, and 12% were switching from PCs.[47] The iMac reestablished the Mac's reputation as a trendsetter: for the next few years, translucent plastic became the dominant design trend in numerous consumer products.[48]

The Power Mac G4 Cube advanced Apple's industrial design culture and manufacturing processes.

Apple knew it had lost its chance to compete in the Windows-dominated enterprise market, so it prioritized design and ease of use to make the Mac more appealing to average consumers, and even teens. The "Apple New Product Process" was launched as a more collaborative product development process for the Mac, with concurrent engineering principles. From then, product development was no longer driven primarily by engineering and with design as an afterthought. Instead, Ive and Jobs first defined a new product's "soul", before it was jointly developed by the marketing, engineering, and operations teams.[49] The engineering team was led by the product design group, and Ive's design studio was the dominant voice throughout the development process.[50]

The next two Mac products in 1999, the Power Mac G3 (nicknamed "Blue and White") and the iBook, introduced industrial designs influenced by the iMac, incorporating colorful translucent plastic and carrying handles. The iBook introduced several innovations: a strengthened hinge instead of a mechanical latch to keep it closed, ports on the sides rather than on the back, and the first laptop with built-in Wi-Fi.[51] It became the best selling laptop in the U.S. during the fourth quarter of 1999.[52] The professional-oriented Titanium PowerBook G4 was released in 2001, becoming the lightest and thinnest laptop in its class, and the first laptop with a wide-screen display; it also debuted a magnetic latch that secures the lid elegantly.[53]

The design language of consumer Macs shifted again from colored plastics to white polycarbonate with the introduction of the 2001 Dual USB "Ice" iBook. To increase the iBook's durability, it eliminated doors and handles, and gained a more minimalistic exterior. Ive attempted to go beyond the quadrant with Power Mac G4 Cube, an innovation beyond the computer tower in a professional desktop far smaller than the Power Mac. The Cube failed in the market and was withdrawn from sale after one year. However, Ive considered it beneficial, because it helped Apple gain experience in complex machining and miniaturization.[54]

The Dual USB "Ice" iBook represents a design shift away from color, toward white polycarbonate.

The development of a successor to the old Mac OS was well underway. Rhapsody had been previewed at WWDC 1997, featuring a Mach kernel and BSD foundations, a virtualization layer for old Mac OS apps (codenamed Blue Box), and an implementation of NeXTSTEP APIs called OpenStep (codenamed Yellow Box). Apple open-sourced the core of Rhapsody as the Darwin operating system. After several developer previews, Apple also introduced the Carbon API, which provided a way for developers to more easily make their apps native to Mac OS X without rewriting them in Yellow Box. Mac OS X was publicly unveiled in January 2000, introducing the modern Aqua graphical user interface, and a far more stable Unix foundation, with memory protection and preemptive multitasking. Blue Box became the Classic environment, and Yellow Box was renamed Cocoa. Following a public beta, the first version of Mac OS X, version 10.0 Cheetah, was released in March 2001.[55]

In 1999, Apple launched its new "digital lifestyle" strategy of which the Mac became a "digital hub" and centerpiece with several new applications. In October 1999, the iMac DV gained FireWire ports, allowing users to connect camcorders and easily create movies with iMovie; the iMac gained a CD burner and iTunes, allowing users to rip CDs, make playlists, and burn them to blank discs. Other applications include iPhoto for organizing and editing photos, and GarageBand for creating and mixing music and other audio. The digital lifestyle strategy entered other markets, with the iTunes Store, iPod, iPhone, iPad, and the 2007 renaming from Apple Computer Inc. to Apple Inc. By January 2007, the iPod was half of Apple's revenues.[56]

The "Sunflower" iMac G4 is an industrial design innovation.

New Macs include the white "Sunflower" iMac G4. Ive designed a display to swivel with one finger, so that it "appear[ed] to defy gravity".[57] In 2003, Apple released the aluminum 12-inch and 17-inch PowerBook G4, proclaiming the "Year of the Notebook". With the Microsoft deal expiring, Apple also replaced Internet Explorer with its new browser, Safari.[58] The first Mac Mini was intended to be assembled in the U.S., but domestic manufacturers were slow and had insufficient quality processes, leading Apple to Taiwanese manufacturer Foxconn.[59] The affordably priced Mac Mini desktop was introduced at Macworld 2005, alongside the introduction of the iWork office suite.[60]

Intel transition and "back to the Mac"

With PowerPC chips falling behind in performance, price, and efficiency, Steve Jobs announced in 2005 the Mac transition to Intel processors, because the operating system had been developed for both architectures since the beginning.[61][62] PowerPC apps run using transparent Rosetta emulation,[63] and Windows boots natively using Boot Camp.[64] This transition helped contribute to a few years of growth in Mac sales.[65]

Steve Jobs unveiled the first MacBook Air at Macworld 2008.

After the iPhone's 2007 release, Apple began a multi-year effort to bring many iPhone innovations "back to the Mac", including multi-touch gesture support, instant wake from sleep, and fast flash storage.[66][67] At Macworld 2008, Jobs introduced the first MacBook Air by taking it out of a manila envelope, touting it as the "world's thinnest notebook".[68] The MacBook Air favors wireless technologies over physical ports, and lacks FireWire, an optical drive, or a replaceable battery. The Remote Disc feature accesses discs in other networked computers.[69] A decade after its launch, journalist Tom Warren wrote that the MacBook Air had "immediately changed the future of laptops", starting the ultrabook trend.[70] OS X Lion added new software features first introduced with the iPad, such as FaceTime, full-screen apps, document autosaving and versioning, and a bundled Mac App Store to replace software install discs with online downloads. It gained support for Retina displays, which had been introduced earlier with the iPhone 4.[71] iPhone-like multi-touch technology was progressively added to all MacBook trackpads, and to desktop Macs through the Magic Mouse, and Magic Trackpad.[72][73] The 2010 MacBook Air added an iPad-inspired standby mode, "instant-on" wake from sleep, and flash memory storage.[74][75]

After criticism by Greenpeace, Apple improved the ecological performance of its products.[76] The 2008 MacBook Air is free of toxic chemicals like mercury, bromide, and PVC, and with smaller packaging.[68] The enclosures of the iMac and unibody MacBook Pro were redesigned with the more recyclable

aluminum and glass.[77][78]

On February 24, 2011, the MacBook Pro became the first computer to support Intel's new Thunderbolt connector, with two-way transfer speeds of 10Gbit/s, and backward compatibility with Mini DisplayPort.[79]

2012–present: Tim Cook era

Due to deteriorating health, Steve Jobs resigned as CEO on August 24, 2011, and Tim Cook was named as his successor.[80] Cook's first keynote address launched iCloud, moving the digital hub from the Mac to the cloud.[81][82] In 2012, the MacBook Pro was refreshed with a Retina display, and the iMac was slimmed and lost its SuperDrive.[83][84]

The 2013 Mac Pro was controversial among professional users.

During Cook's first few years as CEO, Apple fought media criticisms that it could no longer innovate without Jobs.[85] In 2013, Apple introduced a new cylindrical Mac Pro, with marketing chief Phil Schiller exclaiming "Can't innovate anymore, my ass!". The new model had a miniaturized design with a glossy dark gray cylindrical body and internal components organized around a central cooling system. Tech reviewers praised the 2013 Mac Pro for its power and futuristic design;[86][87] however, it was poorly received by professional users, who criticized its lack of upgradability and the removal of expansion slots.[88][89]

The iMac was refreshed with a 5K Retina display in 2014, making it the highest-resolution all-in-one desktop computer.[90] The MacBook was reintroduced in 2015, with a completely redesigned aluminum unibody chassis, a 12-inch Retina display, a fanless low-power Intel Core M processor, a much smaller logic board, a new Butterfly keyboard, a single USB-C port, and a solid-state Force Touch trackpad with pressure sensitivity. It was praised for its portability, but criticized for its lack of performance, the need to use adapters to use most USB peripherals, and a high starting price of $1,299 (equivalent to $1,600 in 2022).[91] In 2015, Apple started a service program to address a widespread GPU defect in the 15-inch 2011 MacBook Pro, which could cause graphical artifacts or prevent the machine from functioning entirely.[92]

Neglect of professional users

The Touch Bar MacBook Pro was released in October 2016. It was the thinnest MacBook Pro ever made, replaced all ports with four Thunderbolt 3 (USB-C) ports, gained a thinner "Butterfly" keyboard, and replaced function keys with the Touch Bar. The Touch Bar was criticized for making it harder to use the function keys by feel, as it offered no tactile feedback. Many users were also frustrated by the need to buy dongles, particularly professional users who relied on traditional USB-A devices, SD cards, and HDMI for video output.[93][94] A few months after its release, users reported a problem with stuck keys and letters being skipped or repeated. iFixit attributed this to the ingress of dust or food crumbs under the keys, jamming them. Since the Butterfly keyboard was riveted into the laptop's case, it could only be serviced at an Apple Store or authorized service center.[95][96][97] Apple settled a $50m class-action lawsuit over these

keyboards in 2022.[98][99] These same models were afflicted by "flexgate": when users closed and opened the machine, they would risk progressively damaging the cable responsible for the display backlight, which was too short. The $6 cable was soldered to the screen, requiring a $700 repair.[100][101]

The 2016 MacBook Pro with Touch Bar was criticized for its keyboard's unreliability.

Senior Vice President of Industrial Design Jony Ive continued to guide product designs towards simplicity and minimalism.[102] Critics argued that he had begun to prioritize form over function, and was excessively focused on product thinness. His role in the decisions to switch to fragile Butterfly keyboards, to make the Mac Pro non-expandable, and to remove USB-A, HDMI and the SD card slot from the MacBook Pro were criticized.[103][104][105]

The long-standing keyboard issue on MacBook Pros, Apple's abandonment of the Aperture professional photography app, and the lack of Mac Pro upgrades led to declining sales and a widespread belief that Apple was no longer committed to professional users.[106][107][108][109] After several years without any significant updates to the Mac Pro, Apple executives admitted in 2017 that the 2013 Mac Pro had not met expectations, and said that the company had designed themselves into a "thermal corner", preventing them from releasing a planned dual-GPU successor.[110] Apple also unveiled their future product roadmap for professional products, including plans for an iMac Pro as a stopgap and an expandable Mac Pro to be released later.[111][112] The iMac Pro was revealed at WWDC 2017, featuring updated Intel Xeon W processors and Radeon Pro Vega graphics.[113]

In 2018, Apple released a redesigned MacBook Air with a Retina display, Butterfly keyboard, Force Touch trackpad, and Thunderbolt 3 USB-C ports.[114][115] The Butterfly keyboard went through three revisions, incorporating silicone gaskets in the key mechanism to prevent keys from being jammed by dust or other particles. However, many users continued to experience reliability issues with these keyboards,[116] leading Apple to launch a program to repair affected keyboards free of charge.[117] Higher-end models of the 15-inch 2018 MacBook Pro faced another issue where the Core i9 processor reached unusually high temperatures, resulting in reduced CPU performance from thermal throttling. Apple issued a patch to address this issue via a macOS supplemental update, blaming a "missing digital key" in the thermal management firmware.[118]

The 2019 16-inch MacBook Pro and 2020 MacBook Air replaced the unreliable Butterfly keyboard with a redesigned scissor-switch Magic Keyboard. On the MacBook Pros, the Touch Bar and Touch ID were made standard, and the Esc key was detached from the Touch Bar and returned to being a physical key.[119] At WWDC 2019, Apple unveiled a new Mac Pro with a larger case design that allows for hardware expandability, and introduced a new expansion module system (MPX) for modules such as the Afterburner card for faster video encoding.[120][121] Almost every part of the new Mac Pro is user-replaceable, with iFixit praising its high user-repairability.[122] It received positive reviews, with reviewers praising its power, modularity, quiet cooling, and Apple's increased focus on professional workflows.[123][124]

Apple silicon transition

In April 2018, Bloomberg reported Apple's plan to replace Intel chips with ARM processors similar to those in its phones, causing Intel's shares to drop by 9.2%.[125] The Verge commented on the rumors, that such a decision made sense, as Intel was failing to make significant improvements to its processors, and could not compete with ARM chips on battery life.[126][127]

At WWDC 2020, Tim Cook announced that the Mac would be transitioning to Apple silicon chips, built upon an ARM architecture, over a two-year timeline.[128] The Rosetta 2 translation layer was also introduced, enabling Apple silicon Macs to run Intel apps.[129] On November 10, 2020, Apple announced their first system-on-a-chip designed for the Mac, the Apple M1, and a series of Macs that would ship with the M1: the MacBook Air, Mac Mini, and the 13-inch MacBook Pro.[130] These new Macs received highly positive reviews, with reviewers highlighting significant improvements in battery life, performance, and heat management compared to previous generations.[131][132][133]

MacBook Air M1

The iMac Pro was quietly discontinued on March 6, 2021.[134] On April 20, 2021, a new 24-inch iMac was revealed, featuring the M1 chip, seven new colors, thinner white bezels, and an enclosure made entirely from recycled aluminum.[135]

A green iMac with an M1 CPU

On October 18, 2021, Apple announced new 14-inch and 16-inch MacBook Pros, featuring the more powerful M1 Pro and M1 Max chips, a bezel-less mini-LED 120 Hz ProMotion display, and the return of MagSafe and HDMI ports, and the SD card slot.[136]

On March 8, 2022, the Mac Studio was unveiled, also featuring the M1 Max chip and the new M1 Ultra chip in a similar form factor to the Mac Mini. It drew highly positive reviews for its flexibility and wide range of available ports.[137] Its performance was deemed "impressive", beating the highest-end Mac Pro with a 28-core Intel Xeon chip, while being significantly more power efficient and compact.[138] It was introduced alongside the Studio Display, and was meant to replace the 27-inch iMac, which was discontinued on the same day.[139]

Post-Apple silicon transition

At WWDC 2022, Apple announced an updated MacBook Air based on a new M2 chip. It incorporates several changes from the 14-inch MacBook Pro, such as a flat, slab-shaped design, full-sized function keys, MagSafe charging, and a Liquid Retina display, with rounded corners and a display cutout incorporating a 1080p webcam.[140]

The Mac Studio with M2 Max and M2 Ultra chips and the Mac Pro with M2 Ultra chip was unveiled at WWDC 2023, and the Intel-based Mac Pro was discontinued on the same day, completing the Mac transition to Apple silicon chips.[141] The Mac Studio was received positively as a modest upgrade over the previous generation, albeit similarly-priced PCs could be equipped with faster GPUs.[142] However, the Apple silicon-based Mac Pro was criticized for several regressions, including memory capacity and a complete lack of CPU or GPU expansion options.[141][143]

The MacBook Pro lineup was updated on October 30, 2023 with updated M3 Pro and M3 Max chips using a 3 nm process node, along with a new base model using a standard M3 chip and only 2 USB-C ports starting at $1599. It brings performance enhancements across the board, such as a new GPU that supports hardware-accelerated ray tracing, up to a 60% faster Neural Engine compared to the M1 family, and support for AV1 decoding. Brightness for SDR content is also increased to 600 nits from 500 nits, and a new Space

Black finish replaces Space Gray as an alternative option to Silver, exclusive to the M3 Pro and M3 Max models.[144] They were received positively by reviewers who praised their performance and efficiency, but lamented the base memory configuration of 8 GB on the standard M3 model and their expensive price.[145] Other reviewers also noted the M3 Pro's prioritization on efficiency due to the balance of core types (performance and efficiency) changing, which resulted in a lower than expected performance increase over the M2 Pro.[146]

Product lineup

Overview of Mac lineup

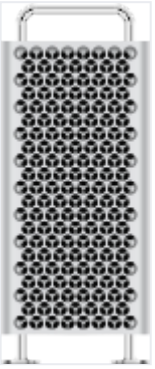
MacBook Air, entry-level lightweight laptop

MacBook Pro, high-performance workstation laptop

iMac, all-in-one desktop

Mac Mini, entry-level desktop

Mac Studio, compact workstation desktop



Mac Pro, expandable workstation tower

Mac models in production[147][148]

Release date	Model	Processor
November 10, 2020	MacBook Air (M1, 2020)	Apple M1
July 15, 2022	MacBook Air (M2, 2022)	Apple M2
January 24, 2023	Mac Mini (2023)	Apple M2 or M2 Pro
June 13, 2023	MacBook Air (15-inch, M2, 2023)	Apple M2
	Mac Studio (2023)	Apple M2 Max or M2 Ultra
	Mac Pro (2023)	Apple M2 Ultra
November 7, 2023	iMac (24-inch, 2023)	Apple M3
	MacBook Pro (14-inch, Nov 2023)	Apple M3, M3 Pro, or M3 Max
	MacBook Pro (16-inch, Nov 2023)	Apple M3 Pro or M3 Max

Marketing

The "1984" advertisement debuted during Super Bowl XVIII.

The original Macintosh was marketed at Super Bowl XVIII with the highly acclaimed "1984" ad, directed by Ridley Scott. The ad alluded to George Orwell's novel *Nineteen Eighty-Four,* and symbolized Apple's desire to "rescue" humanity from the conformity of computer industry giant IBM.[149][150][151] The ad is now considered a "watershed event" and a "masterpiece."[152][153] Before the Macintosh, high-tech marketing catered to industry insiders rather than consumers, so journalists covered technology like the "steel or automobiles" industries, with articles written for a highly technical audience.[154][155] The Macintosh launch event pioneered event marketing techniques that have since become "widely emulated" in Silicon Valley, by creating a mystique about the product and giving an inside look into its creation.[156] Apple took a new "multiple exclusives" approach regarding the press, giving "over one hundred interviews to journalists that lasted over six hours apiece", and introduced a new "Test Drive a Macintosh" campaign.[157][158]

Apple's brand, which established a "heartfelt connection with consumers", is cited as one of the keys to the Mac's success.[159] After Steve Jobs's return to the company, he launched the Think different ad campaign, positioning the Mac as the best computer for "creative people who believe that one person can change the world".[160] The campaign featured black-and-white photographs of luminaries like Albert Einstein, Gandhi, and Martin Luther King Jr., with Jobs saying: "if they ever used a computer, it would have been a Mac".[161][162] The ad campaign was critically acclaimed and won several awards, including a Primetime Emmy.[163] In the 2000s, Apple continued to use successful marketing campaigns to promote the Mac line, including the Switch and Get a Mac campaigns.[164][165]

Apple's focus on design and build quality has helped establish the Mac as a high-end, premium brand. The company's emphasis on creating iconic and visually appealing designs for its computers has given them a "human face" and made them stand out in a crowded market.[166] Apple has long made product placements

in high-profile movies and television shows to showcase Mac computers, like *Mission: Impossible*, *Legally Blonde*, and *Sex and the City*.[167] Apple is known for not allowing producers to show villains using Apple products.[168] Its own shows produced for the Apple TV+ streaming service feature prominent use of MacBooks.[169]

The Mac is known for its highly loyal customer base. In 2022, the American Customer Satisfaction Index gave the Mac the highest customer satisfaction score of any personal computer, at 82 out of 100.[170] In that year, Apple was the fourth largest vendor of personal computers, with a market share of 8.9%.[171]

Hardware

The Mac Pro from 2019 is used for color grading.

Apple outsources the production of its hardware to Asian manufacturers like Foxconn and Pegatron.[172][173] As a highly vertically integrated company developing its own operating system and chips, it has tight control over all aspects of its products and deep integration between hardware and software.[174]

All Macs in production use ARM-based Apple silicon processors and have been praised for their performance and power efficiency.[175] They can run Intel apps through the Rosetta 2 translation layer, and iOS and iPadOS apps distributed via the App Store.[176] These Mac models come equipped with high-speed Thunderbolt 4 or USB 4 connectivity, with speeds up to 40Gbit/s.[177][178] Apple silicon Macs have custom integrated graphics rather than graphics cards.[179] MacBooks are recharged with either USB-C or MagSafe connectors, depending on the model.[180]

Apple sells accessories for the Mac, including the Studio Display and Pro Display XDR external monitors,[181] the AirPods line of wireless headphones,[182] and keyboards and mice such as the Magic Keyboard, Magic Trackpad, and Magic Mouse.[183]

Software

macOS Sonoma was released in 2023.

Macs run the macOS operating system, which is the second most widely used desktop OS according to StatCounter.[184] Macs can also run Windows, Linux, or other operating systems through virtualization, emulation, or multi-booting.[185][186][187]

macOS is the successor of the classic Mac OS, which had nine releases between 1984 and 1999. The last version of classic Mac OS, Mac OS 9, was introduced in 1999. Mac OS 9 was succeeded by Mac OS X in 2001.[188] Over the years, Mac OS X was rebranded first to OS X and later to macOS.[189]

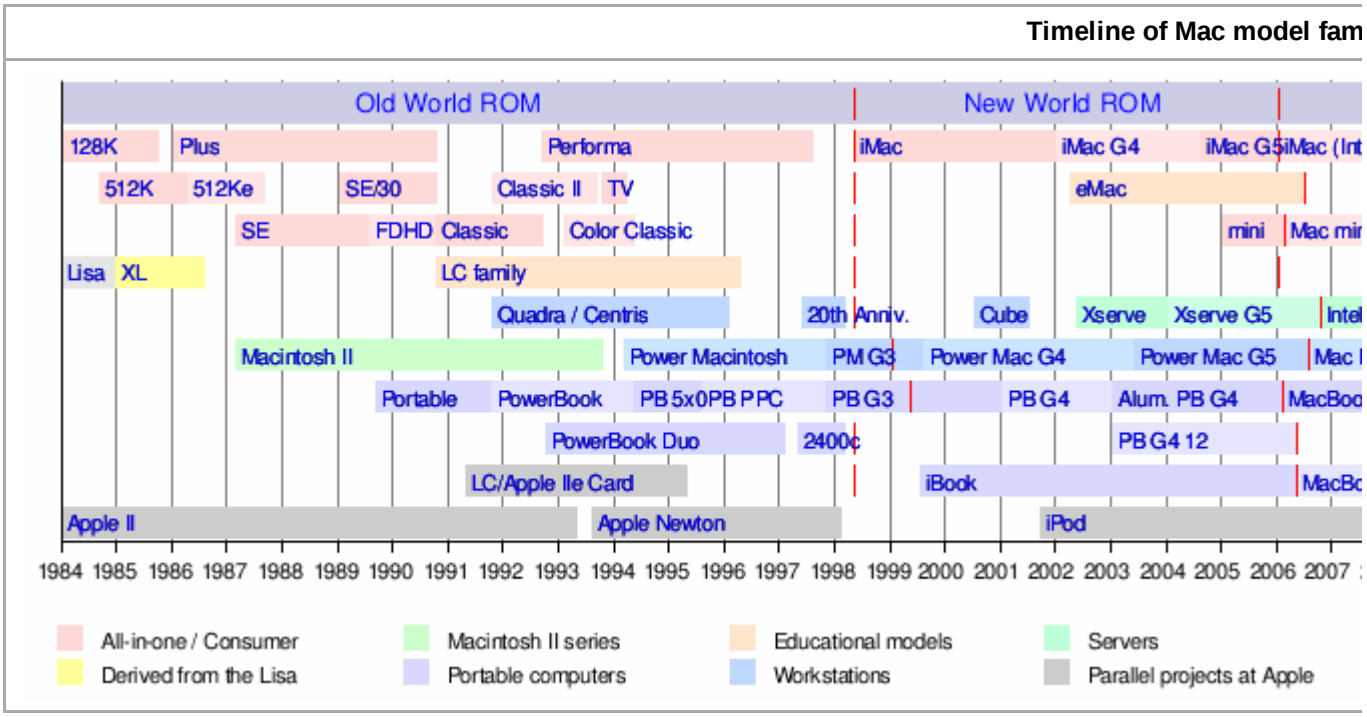
macOS is a derivative of NextSTEP and FreeBSD. It uses the XNU kernel, and the core of macOS has been open-sourced as the Darwin operating system.[190] macOS features the Aqua user interface, the Cocoa set of frameworks, and the Objective-C and Swift programming languages.[191] Macs are deeply integrated with other Apple devices, including the iPhone and iPad, through Continuity features like Handoff, Sidecar, Universal Control, and Universal Clipboard.[192]

The first version of Mac OS X, version 10.0, was released in March 2001.[193] Subsequent releases introduced major changes and features to the operating system. 10.4 Tiger added Spotlight search;[194] 10.6 Snow Leopard brought refinements, stability, and full 64-bit support;[195] 10.7 Lion introduced many iPad-inspired features;[63] 10.10 Yosemite introduced a complete user interface revamp, replacing skeuomorphic designs with iOS 7-esque flat designs;[196] 10.12 Sierra added the Siri voice assistant and Apple File System (APFS) support;[197] 10.14 Mojave added a dark user interface mode;[198] 10.15 Catalina dropped support for 32-bit apps;[199] 11 Big Sur introduced an iOS-inspired redesign of the user interface,[200] 12 Monterey added the Shortcuts app, Low Power Mode, and AirPlay to Mac;[201] and 13 Ventura added Stage Manager, Continuity Camera, and passkeys.[202]

The Mac has a variety of apps available, including cross-platform apps like Google Chrome, Microsoft Office, Adobe Creative Cloud, Mathematica, Visual Studio Code, Ableton Live, and Cinema 4D.[203] Apple has also developed several apps for the Mac, including Final Cut Pro, Logic Pro, iWork, GarageBand, and iMovie.[204] A large amount of open-source software applications run natively on macOS, such as LibreOffice, VLC, and GIMP,[205] and command-line programs, which can be installed through Macports and Homebrew.[206] Many applications for Linux or BSD also run on macOS, often using X11.[207] Apple's official integrated development environment (IDE) is Xcode, allowing developers to create apps for the Mac and other Apple platforms.[208]

The latest release of macOS is macOS 14 Sonoma, released on September 26, 2023.[209]

Timeline



Source: Glen Sanford, Apple History (https://apple-history.com/), apple-history.com

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External links

- Official website (https://apple.com/mac/)
