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Explore our latest gallery of Editors’ Picks.Browse Editors' Favorites When you have a ton of passwords to manage, it’s human to forget one. And we have all been through this annoying situation at some point, haven’t we? Well, if you forgot your Apple Watch password and are hunting for reliable ways to reset the Apple Watch password without losing any data, we have got you covered with this detailed guide. So without further ado, let’s dive right in to restore the passcode of your Apple Watch! Two Ways to Reset Apple Watch Passcode Before going through the steps involved, you should first take note of a few essential things. As always, you can use the table below to swiftly jump from one section to the other. How Does Resetting Apple Watch Passcode Work? Don’t worry if you have somehow forgot your Apple Watch password. Apple provides an official way to reset the passcode of the Apple Watch. Thus, you do not have to use any expensive third-party software to recover the passcode on your watchOS device. Bear in mind that it requires you to erase the existing content and settings on the Apple Watch. That means, after the reset is complete, you will need to pair your Apple Watch with your iPhone and set up the wearable all over again. As this feature has existed since the release of watchOS, you do not have to worry about incompatibility. So irrespective of whether you have the old 1st-gen Apple Watch or the all-new Apple Watch 6, you can reset the password of your smartwatch with ease. How to Back Up Apple Watch Before Erasing Data? Apple automatically backs up the Apple Watch data to iCloud using the paired iPhone. The backup happens whenever the iPhone and Apple Watch are near each other. Thus, you do not have to worry about backing up the data on your smartwatch manually. Moreover, it also ensures your data has an extra layer of safeguard against accidental loss. You can use the backed up data on your iPhone to restore your Apple Watch or even set up a brand new Apple Watch with the latest backup. That means none of your data will be lost after you reset the Apple Watch password. It’s worth pointing out that when you backup your paired iPhone to your Mac/ Windows PC, the backup includes your Apple Watch data. Hence, when you set up a new iOS device and restore it from backup, the latest data of your smartwatch is also restored. Do note that if you have set up an Apple Watch for a family member who doesn’t use an iPhone, the Apple Watch data is backed up directly to iCloud, for which you can get extra storage and other perks using the new iCloud+ subscription. Anyway, here’s all the data that Apple Watch backup includes: App layout on the Home screen App-specific data Clock face settings, including your current watch face, customizations, and order Dock settings General system settings including brightness, sound, and haptic settings Health and Fitness data including history, awards, Workout, and Activity calibration data Notification settings Playlists, albums, and mixes that you have synced to your Apple Watch Time Zone Siri Voice Feedback setting As for what the Apple Watch backup doesn’t include is listed here: The passcode of your Apple Watch Messages Bluetooth pairings Credit/ debit cards you use for Apple Pay on Apple Watch Method 1: Reset Passcode Right from Apple Watch The easiest way to reset the passcode is right from your Apple Watch. To get it done, just follow the steps below: 1. First, place your Apple Watch on its charger. Yeah, it’s a must, and you shouldn’t remove the watch from the charger until you have completed the following step. 2. Then, press and hold the Side button until you see the Power Off slider on the screen. Next, hold the Digital Crown until you see the “Erase all content and settings” option on the screen. Tap on this option. Image Courtesy: Apple 3. Then, tap on “Reset” twice to remove the password that you forgot and reset your Apple Watch. Method 2: Reset Apple Watch Password Using Watch App on iPhone You can also erase your Apple Watch using the Watch app on your paired iPhone if you have forgot your Apple Watch passcode. Follow the step-by-step process here: To get started, open the Watch app on your paired iPhone. 2. Now, ensure that the “My Watch” tab is selected (if it’s not already). Then, tap on “General“. 3. Next, scroll down to the bottom, and tap on “Reset“. 4. Next up, tap on “Erase Apple Watch Content and Settings”. Now, a pop-up will appear, warning you that it will wipe out all the media and data. Tap on “Erase All Content and Settings” to confirm your action. Once you have reset it, follow the linked guide to pair Apple Watch with your iPhone once again. Open the Watch app on your iPhone and follow the on-screen instructions on the Apple Watch and iPhone to complete the pairing process. Along the way, you will get the option to set up a new passcode. Make sure to remember this one, else you will have to wipe your smartwatch again. Image Couresy: Apple Reset Your Apple Watch Password with Ease There you go! So, that’s how you can reset the Apple Watch passcode that you forgot without losing any important data. It’s always better to have trusted official solutions, especially when dealing with an issue of such magnitude. Therefore, we should thank Apple for offering multiple ways to fix the forgot Apple Watch password problem. By the way, do you have any questions or feedback related to this topic? If yes, make sure to let us know in the comments sections below. Smartphone developed by Apple (2013–2016) iPhone 5sGold iPhone 5sDeveloperAppleTypeSmartphoneFirst releasedSeptember 20, 2013 (2013-09-20)Availability by region September 20, 2013 United StatesUnited KingdomCanadaChinaFranceGermanyIndiaAustraliaJapanHong KongSingapore October 25, 2013 AustriaBelgiumBulgariaCroatiaCzech RepublicDenmarkEstoniaFinlandFrench West IndiesGreeceHungaryIrelandItalyLatviaLiechtensteinLithuaniaLuxembourgMacauMaltaNetherlandsNew ZealandNorwayPolandPortugalReunion IslandRomaniaRussiaSlovakiaSloveniaSouth KoreaSpainSwedenSwitzerlandSouth AfricaThailand November 1, 2013 AlbaniaArmeniaBahrainBangladeshColombiaEl SalvadorGuamGuatemalaMacedoniaMalaysiaMexicoMoldovaMontenegroSaudi ArabiaTurkey November 15, 2013 Philippines[1]South AfricaVietnam January 25, 2014 Indonesia DiscontinuedMarch 21, 2016 (2016-03-21)PredecessoriPhone 5SuccessoriPhone 6 and 6 PlusRelatediPhone 5cCompatible networksGSM, CDMA, 3G, 4G, EVDO, HSPA+, LTEForm factorSlateDimensions123.8 mm (4.87 in) H58.6 mm (2.31 in) W7.6 mm (0.30 in) DWeight112 g (3.95 oz)Operating systemOriginal: iOS 7.0Last: iOS 12.5.7, released January 23, 2023[2]System-on-chipApple A7 system chipMemory1 GB LPDDR3 RAM[3]Storage16, 32, 64 GBBattery5.92 Wh (1560 mAh) Lithium-ion battery[4][5]Rear cameraCustom Sony Exmor RS[6][7][8] 8 MP back-side illuminated 1/3 " sensor,HD video (1080p) at 30 fps,Slow-motion video (720p) at 120 fps,IR filter,dual warm/cool LED flash,ƒ/2.2 aperture,30 mm focal length,face detection (stills only),image stabilization,burst modeFront camera1.2 MP, 720p HD video, Burst mode at 10 fps, f/2.4 aperture, 1.9 µm pixels, Auto HDR for photosDisplay4.0 in (100 mm) diagonal(16:9 aspect ratio),multi-touch display,LED backlit IPS TFT LCD,640×1136 pixels at 326 ppi,800:1 contrast ratio (typical),500 cd/m2 max. brightness (typical), fingerprint-resistant oleophobic coating on frontSoundMono speaker, 3.5 mm stereo audio jackConnectivity All models UMTS/HSPA+/DC-HSDPA (850, 900, 1900, 2100 MHz), GSM/EDGE (850, 900, 1800, 1900 MHz), Wi-Fi (802.11 a/b/g/n) (802.11n: 2.4 and 5 GHz), Bluetooth 4.0, GPS & GLONASS. GSM model (A1533) LTE (Bands 1, 2, 3, 4, 5, 8, 13, 17, 19, 20, 25: 2100, 1900, 1800, AWS, 850, 900, 700c, 700b, 800 MHz, 800 DD). CDMA model (A1533) UMTS/HSPA+/DC-HSDPA (1700/2100 MHz), CDMA EV-DO Rev. A and Rev. B (800, 1700/2100, 1900, 2100 MHz), (except China model:)LTE (Bands 1, 2, 3, 4, 5, 8, 13, 17, 19, 20, 25: 2100, 1900, 1800, AWS, 850, 900, 700c, 700b, 800 MHz, 800 DD). CDMA model (A1453) UMTS/HSPA+/DC-HSDPA (1700/2100 MHz), CDMA EV-DO Rev. A and Rev. B (800, 1700/2100, 1900, 2100 MHz), LTE (Bands 1, 2, 3, 4, 5, 8, 13, 17, 18, 19, 20, 25, 26: 2100, 1900, 1800, AWS, 850, 900, 700c, 700b, 800 MHz, 800 DD). GSM model (A1457) LTE (Bands 1, 2, 3, 5, 7, 8, 20: 2100, 1900, 1800, 850, 2600, 900 MHz, 800 DD). GSM model (A1518) TDD-LTE, TD-SCDMA[9] GSM model (A1528) LTE (unofficial) GSM model (A1530) LTE (Bands 1, 2, 3, 5, 7, 8, 20, 38, 39, 40: 2100, 1900, 1800, 850, 2600, 900 MHz, 800 DD, TD 2600, 1900, 2300), (with software operator version China Mobile 15.6 or above:) TD-SCDMA Data inputsMulti-touch touchscreen display,triple microphone configuration,Apple M7 motion coprocessor,3-axis gyroscope,3-axis accelerometer,digital compass,proximity sensor,ambient light sensor,Touch ID fingerprint readerHearing aid compatibilityM3, T4[10]WebsiteApple – iPhone 5s at the Wayback Machine (archived December 12, 2013) This article is part of a series on theiPhone 1st generation 3G 3GS 4 4s 5 5c 5s 6 / 6 Plus 6s / 6s Plus 7 / 7 Plus 8 / 8 Plus X XR XS / XS Max 11 11 Pro / 11 Pro Max 12 / 12 Mini 12 Pro / 12 Pro Max 13 / 13 Mini 13 Pro / 13 Pro Max 14 / 14 Plus 14 Pro / 14 Pro Max 15 / 15 Plus 15 Pro / 15 Pro Max 16 / 16 Plus 16 Pro / 16 Pro Max 16e SE 1st 2nd 3rd List of iPhone models Telephones portal The iPhone 5s is a smartphone that was developed and marketed by Apple Inc. It is the seventh generation of the iPhone, succeeding the iPhone 5, and was unveiled in September 2013 alongside the iPhone 5c.[11] The iPhone 5s has almost the same external design as well as the same 4-inch screen as its predecessor, the iPhone 5. The 5s received a new white/gold color scheme in addition to white/silver and space gray/black. The 5s features upgrades mostly in the form of internal hardware; it introduced the Apple A7 64-bit dual-core system-on-chip, the first 64-bit processor to be used on a smartphone, accompanied by the M7 "motion co-processor". A redesigned home button with Touch ID – a fingerprint recognition system which can be used to unlock the phone and authenticate App Store and iTunes Store purchases – was also introduced. The camera was updated with a larger aperture and a dual-LED flash optimized for different color temperatures. EarPods, which were introduced the year prior and had been shipping with the iPhone 5, were included in the box. The iPhone 5s originally shipped with iOS 7, which introduced a revamped visual appearance among other new features. Designed by Jony Ive, iOS 7 departed from skeuomorphic elements used in previous versions of iOS in favor of a flat, colorful design. Among new software features introduced to the iPhone 5s were AirDrop, an ad-hoc Wi-Fi sharing platform; Control Center, a control panel containing a number of commonly used functions; and iTunes Radio, an internet radio service. The 5s is the first iPhone to be supported through six major versions of iOS, from iOS 7 to iOS 12, and the second iOS device to support six major updates – the first being the iPad 2 which supported iOS versions 4 to 9. Reception towards the device was positive, with some outlets considering it to be the best smartphone available on the market due to its upgraded hardware, Touch ID, and other changes introduced by iOS 7.[12] Some criticized the iPhone 5s for keeping the design and small display of the iPhone 5,[13] and others expressed security concerns about the Touch ID system.[14] Nine million units of the iPhone 5s and iPhone 5c were sold on the weekend of their release, breaking Apple's sales record for iPhones.[15] The iPhone 5s was the best selling phone on all major U.S. carriers in September 2013.[16] The iPhone 5s was succeeded as Apple's flagship smartphone by the larger iPhone 6 in September 2014. On March 21, 2016, the iPhone 5s was discontinued following the release of the iPhone SE, which incorporated internal hardware similar to the iPhone 6s while retaining the smaller form factor and design of the 5s.[17] The iPhone 5s was announced during a keynote at 4 Infinite Loop on September 10, 2013. Before its official unveiling, media speculation primarily centered on reports that the next iPhone would include a fingerprint scanner; including Apple's 2013 acquisition of AuthenTec, a developer of mobile security products,[18] references to a fingerprint sensor on the home button in the beta release of iOS 7[19] and leaked packaging for an iPhone 5s showing that the traditional home button now had a metallic "ring" around it. Similar ring-based imagery was seen on the official invitation to Apple's iPhone press event in September 2013, where the new device was unveiled.[20] Shortly before its official unveiling, The Wall Street Journal also reported the rumor.[21][22] Apple announced the iPhone 5c and the iPhone 5s during a media event at its Cupertino headquarters on September 10, 2013.[11][23] While the iPhone 5c became available for preorder on September 13, 2013, the iPhone 5s was not available for preorder. Both devices were released on September 20, 2013.[24] While most of the promotion focused on Touch ID, the 64-bit Apple A7 processor was also a highlight during the event. This is the first-ever 64-bit processor in a phone of any kind. I don't think the other guys are even talking about it yet. Why go through all this? The benefits are huge. The A7 is up to twice as fast as the previous-generation system at CPU tasks, and up to twice as fast at graphics tasks, too.—Phil Schiller, Apple keynote at 4 Infinite Loop on September 10, 2013[25] Schiller then showed demos of Infinity Blade III to demonstrate the A7's processing power and the device's camera using untouched photographs.[26] Apple also announced during the keynote that iOS 7 would be available on September 18, 2013.[26] On September 20, 2013, the iPhone 5s was released in the United States, United Kingdom, Canada, China, France, Germany, Australia, Japan, Hong Kong, and Singapore.[27] It was released in 25 additional countries on October 25, 2013, and in 12 countries on November 1, 2013. Indonesia was the last country to receive the iPhone 5s, on January 26, 2014.[28] The iPhone 5s was succeeded as Apple's flagship smartphone by the iPhone 6 and iPhone 6 Plus on September 19, 2014, but the older model remained available for purchase at a reduced price,[29] while the 64 GB version was discontinued. The gold edition of the iPhone 5s was discontinued on September 9, 2015, when Apple revealed the iPhone 6s and iPhone 6s Plus[30][31][32][33] The iPhone 5s was discontinued on March 21, 2016, and succeeded by the first-generation iPhone SE, which continues the same form factor but features vastly upgraded internals similar to the flagship iPhone 6s.[34] This was a break with Apple's product positioning trend (in North America and Western Europe), starting with iPhone 4s released in October 2011, which gave each newly released model one year as the flagship phone, then moving it to midrange for its second year of production, with the third and final year as the entry-level offering before discontinuation. While the iPhone 5s was expected to continue on sale until September 2016, replacing it and its A7 processor early meant that Apple "just reduced its long-term chip support window by a year" for iOS. In addition, a new iPhone launch was meant to stimulate demand, as sales of iPhone 6s and 6s Plus had not met expectations since their September 2015 release and the iPhone family was expected to suffer its first-ever negative growth quarter in 2016.[35][36] Design and Hardware of iPhone 5siPhone 5s's home button has a flat design and is made of scratch-resistant, laser-cut sapphire crystal surrounded by a stainless steel finger detection ring for using Touch ID.The camera has a f/2.2 aperture and has dual "True Tone" flashes.The "iPhone" wordmark on the back of an iPhone 5s is now set in a thinner version of the Myriad typeface. The iPhone 5s maintained a similar design to the iPhone 5, with a 4 in (10 cm) LCD multi-touch Retina display and a screen resolution of 640×1136 at 326 ppi.[37] Its home button has been updated with a new flat design using a laser-cut sapphire cover surrounded by a metallic ring; the button is no longer concave, nor does it contain the familiar squircle icon seen on previous models.[38] The phone itself is 0.30 in (7.6 mm) thick and weighs 112 grams (4.0 oz).[39] The phone uses an aluminum composite frame.[40] The device is available in three color finishes; "space gray" (replacing black with slate trim on the iPhone 5), white with silver trim, and white with gold trim.[11][41] The iPhone 5s was the first iPhone to be available in a gold color; this decision was influenced by the fact that gold is seen as a popular sign of a luxury product among Chinese customers.[42] iPhone 5s color options Color Name Front Antenna Space Gray Black Silver White White Gold The iPhone's nano-SIM card tray is made of aluminum. The iPhone 5s is powered by the Apple A7 system-on-chip, the first 64-bit processor ever used on a smartphone. The device's operating system and pre-loaded software were optimized to run in 64-bit mode, promising increased performance, although third-party app developers would need to optimize their apps to take advantage of these enhanced capabilities.[43] The A7 processor was designed by Apple and manufactured by Samsung.[44] The A7 processor is accompanied by the M7 "motion co-processor", a dedicated processor for processing motion data from the iPhone's accelerometer and gyroscopes without requiring the attention of the main processor, which integrates with iOS 7's new CoreMotion APIs.[45][46][47][48][49] The same A7 SoC and M7 motion co-processor are also found in the iPad Air and iPad Mini 2, both of which were released in the same quarter as the iPhone 5s. The phone includes a 1560 mAh battery, which provides 10 hours of talk time and 250 hours of standby time.[50][51][52] The home button on the iPhone 5s incorporates a fingerprint recognition system known as Touch ID, based on technology from AuthenTec, a company that Apple had acquired in 2012.[53] The sensor uses a capacitive CMOS-based sensor which can detect the "sub-epidermal layers" of fingers at 500 pixels per inch, and uses a 360-degree design that can read the print at any angle. The sensor itself is activated by a touch-sensitive metallic ring surrounding the button. Touch ID can be used for various authentication activities within the operating system, such as unlocking the device or authenticating App Store and iTunes purchases instead of an Apple ID password. The sensor can be trained to recognize the fingerprints of multiple fingers and multiple users. Fingerprint data is stored in an encrypted format within a "secure enclave" of the A7 chip itself, and is not accessible to any other apps or servers (including iCloud).[54][55][56][57] While the camera is still 8 megapixels in resolution with the image capture size of 3264 × 2448 (4:3), the lens has a larger aperture (f/2.2, compared to f/2.4 on the predecessor) and larger sized pixels in its image sensor than previous iPhone models. The flashlight has dual "True Tone" flashes, consisting of an amber LED and a white LED, which are variably used based on the color temperature of the photo to improve color balancing. The camera software includes automatic digital image stabilization, dynamic tone mapping, 10 fps burst mode and slow motion video at 120 fps.[58] Photos captured during the 1080p video recording have a resolution of 720p.[59] The iPhone 5s's camera was paired with a dual-LED flash, allowing for higher-quality nighttime photos. iOS 7 introduced a new camera app, allowing the iPhone 5s to capture fast continuous shots and record slow-motion videos with 720p at 120 frames per second and an audio track, making it the first iPhone to be able to record at any frame rate beyond 30 frames per second.[60][61] An analysis by GSM Arena suggests that the image quality of the supposedly 720p slow-motion footage resembles approximately 480p.[62] Main article: iPhone accessories Earphones known as Apple EarPods were included with the iPhone 5s.[63] According to technology commentators, the design of the earphones is aimed to improve sound quality by allowing air to travel in and out more freely.[64][65] Apple states that the design of their earphones allows it to "rival high-end headphones that cost hundreds of dollars more".[64] Reviews by Gizmodo and TechRadar reported that although the earphones sounded better than its predecessor, reviewers felt that quality of sound produced is poor.[66] TechRadar further opined that the EarPods are inferior to other earphones of a similar price.[65] Main articles: iOS, iOS 7, iOS 8, iOS 9, iOS 10, iOS 11, and iOS 12Further information: iOS version history The iPhone 5s was initially supplied with iOS 7, released on September 20, 2013.[67] Jonathan Ive, the designer of iOS 7's new elements, described the update as "bringing order to complexity", highlighting features such as refined typography, new icons, translucency, layering, physics, and gyroscope-driven parallaxing as some of the major changes to the design. The design of both iOS 7 and OS X Yosemite (version 10.10) noticeably departs from skeuomorphic elements such as green felt in Game Center, wood in Newsstand, and leather in Calendar, in favor of flat, colorful design.[68][69] iOS 7 adds AirDrop, an ad-hoc Wi-Fi sharing platform. Users can share files with the iPhone 5 onwards, the iPod Touch (5th generation), iPad (4th generation) onwards, or iPad Mini (1st generation) onwards.[68][70] The operating system also adds Control Center, a control panel accessed by swiping up from the bottom of the screen. Control Center contains a number of commonly used functions, such as volume and brightness controls, along with toggles for enabling Wi-Fi, Bluetooth, Airplane mode, and for using the rear camera's flash LED as a flashlight.[71] iTunes Radio, an Internet radio service, was also included on the iPhone 5s. It was a free, ad-supported service available to all iTunes users, featuring Siri integration on iOS. Users were able to skip tracks, customize stations, and purchase the station's songs from the iTunes Store. Users could also search through their history of previous songs.[72] Apple announced in June 2018 that the iPhone 5s would support the iOS 12 update. This made it the second longest supported iOS device, having supported six major versions of the iOS operating system, on par with the iPad 2 which supported iOS 4 through iOS 9. The iPhone 5s would also receive major speed boosts of up to 70%, according to Apple. This included the camera, keyboard and other functions.[73] The iPhone 5s did not receive iOS 13, released in September 2019.[74] During the keynote, Apple announced a case for the iPhone 5s that was made of soft microfiber on the inside and leather on the outside. This case was announced along with iPhone 5c's case, both of which were the first cases Apple had announced since the iPhone 4 Bumpers.[75] Docks for both the iPhone 5s[76] and 5c were found on the Apple online store after the announcement. Because of the casing difference between the iPhone 5s and 5c, they have separate docks, each made specifically for each respective phone.[77] Comparison between Lightning port of the iPhone 5c (top) and iPhone 5s (middle) and the 30-pin port of the iPhone 4s (bottom) The iPhone 5s received a positive reception from reviewers and commentators. Walt Mossberg of All Things Digital gave the phone a favorable review, saying that Touch ID "sounds like a gimmick, but it's a real advance, the biggest step ever in biometric authentication for everyday devices," and labeled it "the best smartphone on the market."[12] David Pogue of The New York Times praised Touch ID, but said that the innovation of the smartphone market has been saturated, and "maybe the age of annual mega-leaps is over." He focused much of his review on iOS 7, which he believed was the biggest change of the device over previous generations, praising new Siri features, Control Center, and AirDrop.[78] In an editorial, Pogue stated that iOS 7 was the biggest change in the iPhone series, citing utilitarian interface changes as the main contributor to this.[79] Scott Stein of CNET criticized the lack of design change over iPhone 5 and said that although the iPhone 5s "is not a required upgrade, but it's easily the fastest and most advanced Apple smartphone to date."[13] Although praised for its camera, 64-bit A7 chip, M7 motion-chip, and fingerprint scanning capabilities, some investors thought that the iPhone 5s, although a notable improvement over the iPhone 5, was still relatively unchanged from its predecessor, and worried that the iPhone line had become a stagnant, dull product. Apple's share price fell 5.4% after the launch to close at a month low of $467.71 on the NASDAQ.[80] Darrell Etherington of TechCrunch who praised the iPhone 5s as the best smartphone available said "looks may not be different from the iPhone 5, but the internal components have a dramatic impact on day-to-day activities normal for a smartphone user," and went into detail explaining the impact of the improved camera and specifications on the phone. Etherington suggested that the 64-bit A7 processor will not reach its full potential until developers create applications supporting it.[81] Myriam Joire of Engadget found that the iPhone 5s could benefit significantly from the A7 if developers created applications optimized for the 64-bit processor.[82] Anand Lal Shimpi of AnandTech praised the phone's A7 processor, describing it as "seriously impressive", and stated that it was the most "futureproof of any iPhone ever launched. As much as it pains me to use the word futureproof if you are one of those people who likes to hold onto their device for a while – the iPhone 5s is as good a starting point as any."[83] Scott Lowe of IGN also spoke highly of its 64-bit processor, "which has a substantial lead in processing power over the HTC One and Samsung Galaxy S4, accounting for a graphics boost of up to 32% and 38% in CPU benchmarks." The debut of Apple's 64-bit A7 processor took rival Android smartphone makers by surprise, particularly Qualcomm whose own 64-bit system-on-chip was not released until 2015.[84][85] Most reviewers recommended the iPhone 5s over the iPhone 5c which was released at the same time. The 5c retained almost the same hardware as the discontinued iPhone 5, while the iPhone 5s featured substantially improved performance/features thanks to its new 64-bit A7 processor, as well as extra storage space, all for a relatively small additional upfront cost over the iPhone 5c (US$650 versus US$550 in March 2014). This was especially the case when iOS 8 was released and both iPhone 5s and iPhone 5c were moved to the mid and low end of the iPhone range, respectively; the iPhone 5s still had 16 or 32 GB (14.9 or 29.8 GiB) storage available while the iPhone 5c had to make do with 8 GB storage with only 4.9GB available to the user after installing iOS 8. Furthermore, the 5c's polycarbonate exterior received a mixed reception and was seen as a cost-cutting downgrade compared to the iPhone 5's aluminum/glass case; the 5s retained the latter design and looked even more premium due to its additional gold finish.[86][87] As of 2015–16, there were still a significant number of customers who preferred the 4-inch screen size of iPhone 5s, which remained the second-most popular iPhone after the iPhone 6 and ahead of the iPhone 6s. Apple stated in their event that they sold 30 million 4-inch iPhones in 2015, even as that form factor was succeeded as the flagship iPhone by the redesigned larger display 4.7/5.5-inch iPhone 6 and 6 Plus back in September 2014. Furthermore, the 5/5s design was regarded as "long been the golden child of Apple phone design and a benchmark for phones in general" (with the 5s's gold finish adding a premium touch to the 5's already well-regarded look), while the succeeding 6 and 6S design was less critically acclaimed as it "felt a little bit wrong, as though you were holding a slick $650 bar of soap". The iPhone 5 was described as "elegance rooted in the way the aluminum and glass work together. It felt streamlined, yet substantial, which is different from iPhone 6, which feels substantial in size alone. Plus, unlike the ubiquitous rounded corners of the 6, iPhone 5 didn't really look like anything else on the market at the time". However, the iPhone 5/5s design was not suited to scaling up, in contrast to the iPhone 6/6S which could better accommodate the growing consumer trend towards larger screen sizes and indeed spawned the 6/6S Plus phablet models. When Apple discontinued the iPhone 5s, it was replaced by the first-generation iPhone SE which outwardly appears almost identical to the 5s even as the SE's internal hardware has been upgraded significantly.[35][36] The iPhone 5s and 5c sold over nine million units in the first three days, setting a record for first weekend smartphone sales,[15] with the 5s selling three times more units than the 5c. After the first day of release, 1% of all iPhones in the US were iPhone 5Ss, while 0.3% were iPhone 5Cs.[88] Gene Munster of Piper Jaffray reported that the line at the Fifth Avenue Apple Store contained 1,417 people on release day, compared to 1,300 for the iPhone 4 in 2010, and 549 for the iPhone 3G in 2008 on their respective release days.[89] This was the first time that Apple launched two models simultaneously. The first-day release in China also contributed to the record sales result.[90] On launch day, major in-stock shortages were reported in most stores, across all countries where the iPhone 5s initially went on sale.[91] A great many customers in line outside Apple Stores worldwide were left disappointed due to severe shortages across all 5s models, with the gold model in particular being in highly limited supply.[92] While this situation eased in the US in the days following the launch, other countries reported receiving few restocks.[93] Some commentators questioned how Apple handled the initial release, as online pre-orders were not offered for the iPhone 5s, meaning large numbers of people queuing outside physical stores, with most in line not receiving a unit.[94] In the US, Apple offered an online reservation system, so customers could keep checking for units available at their local Apple Stores, and order for pickup.[95] Online orders were also in short supply on launch day, with the shipping date across all model sizes and colors changing from "7-10 working days" to "October" in all countries, within hours of online orders being taken.[96][97] The iPhone 5s was the best selling phone on AT&T, Sprint, Verizon, and T-Mobile in September 2013 in the United States, outselling the iPhone 5c and Samsung Galaxy S4.[16] According to Consumer Intelligence Research Partners, the iPhone 5s outsold the 5c by a two-to-one margin during its September release, confirming Apple CEO Tim Cook's view that the high-end smartphone market was not reaching a point of market saturation.[98] While commentators viewed the 5c as a flop because of supply chain cuts signifying a decline in demand, the 5s was viewed as a massive success. Apple admitted that it had failed to anticipate the sales ratio, leading to an overstocking of the 5c and shortages of the 5s.[87][99] Six months after the release of the iPhone 5s, on March 25, 2014, Apple announced that sales of the iPhone brand had exceeded 500 million units.[100] By May 2014, despite having been on the market for eight months, the iPhone 5s reportedly outsold the newly released Samsung Galaxy S5 by 40%, with 7 million iPhone 5s units versus 5 million Galaxy S5 units. The Galaxy S5's failure to oust the iPhone 5s from the top-selling spot was a major setback for Samsung Mobile, as the preceding Samsung Galaxy SIII and Samsung Galaxy S4, in the first quarter of their releases, had outsold the iPhone 4s and iPhone 5 respectively.[101] See also: Touch ID § Impact A number of technology writers, including Adrian Kingsley-Hughes of ZDNet[102] and Kevin Roose of New York believed that the fingerprint scanning functionality of the iPhone 5s could help spur the adoption of the technology as an alternative to passwords by mainstream users (especially in "bring your own device" scenarios), as fingerprint-based authentication systems have only enjoyed wider usage in enterprise environments. However, citing research by biometrics engineer Geppy Parziale,[103] Roose suggested that the CMOS-based sensor could become inaccurate and wear out over time unless Apple had designed the sensor to prevent this from occurring.[104] Brent Kennedy, a researcher of the United States Computer Emergency Readiness Team, recommended that users not immediately rely on the technology, citing the uncertainty over whether the system could properly reject a spoofed fingerprint.[105] Following the release of the iPhone 5s, the German Chaos Computer Club announced, on September 21, 2013, that they had bypassed Apple's new Touch ID fingerprint sensor by using "easy everyday means". The group explained that the security system had been defeated by photographing a fingerprint from a glass surface and using that captured image to make a latex model thumb which was then pressed against the sensor to gain access. The spokesman for the group stated, "We hope that this finally puts to rest the illusions people have about fingerprint biometrics. It is plain stupid to use something that you can't change and that you leave everywhere every day as a security token."[14][54] However, in 2013, 39% of American smartphone users used no security measures at all to protect their smartphone.[106] Others have also tried Chaos Computer Club's method, but concluded that it is not an easy process in either time or effort, given that the user has to use a high resolution photocopy of a complete fingerprint, special chemicals and expensive equipment, and because the spoofing process takes some time to achieve.[107] Several problems were experienced with the iPhone 5s's hardware after its release. The most widely reported issue is that the angle reported by the phone's level sensor had drifted by several degrees, which caused the gyroscope, compass, and accelerometer to become inaccurate. Reports suggested that this is a hardware-induced problem.[108][109] Some encountered other problems such as crashing with a blue screen and then restarting, the power button making a rattling noise when the phone was shaken, overheating, the microphone not working, and Touch ID not working for iTunes purchases. Some of these issues have since been fixed by software updates.[110] List of iPhone models History of iPhone Comparison of smartphones Timeline of iPhone models

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Wikimedia Commons has media related to iPhone 5S. iPhone 5s – official site Preceded byiPhone 5 iPhone 5c / iPhone 5s 7th generation Succeeded byiPhone 6 / 6 PlusiPhone SE (1st generation) Retrieved from " 2Smartphone developed by Apple (2013–2016) iPhone 5sGold iPhone 5sDeveloperAppleTypeSmartphoneFirst releasedSeptember 20, 2013 (2013-09-20)Availability by region September 20, 2013 United StatesUnited KingdomCanadaChinaFranceGermanyIndiaAustraliaJapanHong KongSingapore October 25, 2013 AustriaBelgiumBulgariaCroatiaCzech RepublicDenmarkEstoniaFinlandFrench West

IndiesGreeceHungaryIrelandItalyLatviaLiechtensteinLithuaniaLuxembourgMacauMaltaNetherlandsNew ZealandNorwayPolandPortugalReunion IslandRomaniaRussiaSlovakiaSloveniaSouth KoreaSpainSwedenSwitzerlandSouth AfricaThailand November 1, 2013 AlbaniaArmeniaBahrainBangladeshColombiaEl SalvadorGuamGuatemalaMacedoniaMalaysiaMexicoMoldovaMontenegroSaudi ArabiaTurkey November 15, 2013 Philippines[1]South AfricaVietnam January 25, 2014 Indonesia DiscontinuedMarch 21, 2016 (2016-03-21)PredecessoriPhone 5SuccessoriPhone 6 and 6 PlusRelatediPhone 5cCompatible networksGSM, CDMA, 3G, 4G, EVDO, HSPA+, LTEForm factorSlateDimensions123.8 mm (4.87 in) H58.6 mm (2.31 in) W7.6 mm (0.30 in) DWeight112 g (3.95 oz)Operating systemOriginal: iOS 7.0Last: iOS 12.5.7, released January 23, 2023[2]System-on-chipApple A7 system chipMemory1 GB LPDDR3 RAM[3]Storage16, 32, 64 GBBattery5.92 Wh (1560 mAh) Lithium-ion battery[4][5]Rear cameraCustom Sony Exmor RS[6][7][8] 8 MP back-side illuminated 1/3 " sensor,HD video (1080p) at 30 fps,Slow-motion video (720p) at 120 fps,IR filter,dual warm/cool LED flash,ƒ/2.2 aperture,30 mm focal length,face detection (stills only),image stabilization,burst modeFront camera1.2 MP, 720p HD video, Burst mode at 10 fps, f/2.4 aperture, 1.9 µm pixels, Auto HDR for photosDisplay4.0 in (100 mm) diagonal(16:9 aspect ratio),multi-touch display,LED backlit IPS TFT LCD,640×1136 pixels at 326 ppi,800:1 contrast ratio (typical),500 cd/m2 max. brightness (typical), fingerprint-resistant oleophobic coating on frontSoundMono speaker, 3.5 mm stereo audio jackConnectivity All models UMTS/HSPA+/DC-HSDPA (850, 900, 1900, 2100 MHz), GSM/EDGE (850, 900, 1800, 1900 MHz), Wi-Fi (802.11 a/b/g/n) (802.11n: 2.4 and 5 GHz), Bluetooth 4.0, GPS & GLONASS. GSM model (A1533) LTE (Bands 1, 2, 3, 4, 5, 8, 13, 17, 19, 20, 25: 2100, 1900, 1800, AWS, 850, 900, 700c, 700b, 800 MHz, 800 DD). CDMA model (A1533) UMTS/HSPA+/DC-HSDPA (1700/2100 MHz), CDMA EV-DO Rev. A and Rev. B (800, 1700/2100, 1900, 2100 MHz), (except China model:)LTE (Bands 1, 2, 3, 4, 5, 8, 13, 17, 19, 20, 25: 2100, 1900, 1800, AWS, 850, 900, 700c, 700b, 800 MHz, 800 DD). CDMA model (A1453) UMTS/HSPA+/DC-HSDPA (1700/2100 MHz), CDMA EV-DO Rev. A and Rev. B (800, 1700/2100, 1900, 2100 MHz), LTE (Bands 1, 2, 3, 4, 5, 8, 13, 17, 18, 19, 20, 25, 26: 2100, 1900, 1800, AWS, 850, 900, 700c, 700b, 800 MHz, 800 DD). GSM model (A1457) LTE (Bands 1, 2, 3, 5, 7, 8, 20: 2100, 1900, 1800, 850, 2600, 900 MHz, 800 DD). GSM model (A1518) TDD-LTE, TD-SCDMA[9] GSM model (A1528) LTE (unofficial) GSM model (A1530) LTE (Bands 1, 2, 3, 5, 7, 8, 20, 38, 39, 40: 2100, 1900, 1800, 850, 2600, 900 MHz, 800 DD, TD 2600, 1900, 2300), (with software operator version China Mobile 15.6 or above:) TD-SCDMA Data inputsMulti-touch touchscreen display,triple microphone configuration,Apple M7 motion coprocessor,3-axis gyroscope,3-axis accelerometer,digital compass,proximity sensor,ambient light sensor,Touch ID fingerprint readerHearing aid compatibilityM3, T4[10]WebsiteApple – iPhone 5s at the Wayback Machine (archived December 12, 2013) This article is part of a series on theiPhone 1st generation 3G 3GS 4 4s 5 5c 5s 6 / 6 Plus 6s / 6s Plus 7 / 7 Plus 8 / 8 Plus X XR XS / XS Max 11 11 Pro / 11 Pro Max 12 / 12 Mini 12 Pro / 12 Pro Max 13 / 13 Mini 13 Pro / 13 Pro Max 14 / 14 Plus 14 Pro / 14 Pro Max 15 / 15 Plus 15 Pro / 15 Pro Max 16 / 16 Plus 16 Pro / 16 Pro Max 16e SE 1st 2nd 3rd List of iPhone models Telephones portal The iPhone 5s is a smartphone that was developed and marketed by Apple Inc. It is the seventh generation of the iPhone, succeeding the iPhone 5, and was unveiled in September 2013 alongside the iPhone 5c.[11] The iPhone 5s has almost the same external design as well as the same 4-inch screen as its predecessor, the iPhone 5. The 5s received a new white/gold color scheme in addition to white/silver and space gray/black. The 5s features upgrades mostly in the form of internal hardware; it introduced the Apple A7 64-bit dual-core system-on-chip, the first 64-bit processor to be used on a smartphone, accompanied by the M7 "motion co-processor". A redesigned home button with Touch ID – a fingerprint recognition system which can be used to unlock the phone and authenticate App Store and iTunes Store purchases – was also introduced. The camera was updated with a larger aperture and a dual-LED flash optimized for different color temperatures. EarPods, which were introduced the year prior and had been shipping with the iPhone 5, were included in the box. The iPhone 5s originally shipped with iOS 7, which introduced a revamped visual appearance among other new features. Designed by Jony Ive, iOS 7 departed from skeuomorphic elements used in previous versions of iOS in favor of a flat, colorful design. Among new software features introduced to the iPhone 5s were AirDrop, an ad-hoc Wi-Fi sharing platform; Control Center, a control panel containing a number of commonly used functions; and iTunes Radio, an internet radio service. The 5s is the first iPhone to be supported through six major versions of iOS, from iOS 7 to iOS 12, and the second iOS device to support six major updates – the first being the iPad 2 which supported iOS versions 4 to 9. Reception towards the device was positive, with some outlets considering it to be the best smartphone available on the market due to its upgraded hardware, Touch ID, and other changes introduced by iOS 7.[12] Some criticized the iPhone 5s for keeping the design and small display of the iPhone 5,[13] and others expressed security concerns about the Touch ID system.[14] Nine million units of the iPhone 5s and iPhone 5c were sold on the weekend of their release, breaking Apple's sales record for iPhones.[15] The iPhone 5s was the best selling phone on all major U.S. carriers in September 2013.[16] The iPhone 5s was succeeded as Apple's flagship smartphone by the larger iPhone 6 in September 2014. On March 21, 2016, the iPhone 5s was discontinued following the release of the iPhone SE, which incorporated internal hardware similar to the iPhone 6s while retaining the smaller form factor and design of the 5s.[17] The iPhone 5s was announced during a keynote at 4 Infinite Loop on September 10, 2013. Before its official unveiling, media speculation primarily centered on reports that the next iPhone would include a fingerprint scanner; including Apple's 2013 acquisition of AuthenTec, a developer of mobile security products,[18] references to a fingerprint sensor on the home button in the beta release of iOS 7[19] and leaked packaging for an iPhone 5s showing that the traditional home button now had a metallic "ring" around it. Similar ring-based imagery was seen on the official invitation to Apple's iPhone press event in September 2013, where the new device was unveiled.[20] Shortly before its official unveiling, The Wall Street Journal also reported the rumor.[21][22] Apple announced the iPhone 5c and the iPhone 5s during a media event at its Cupertino headquarters on September 10, 2013.[11][23] While the iPhone 5c became available for preorder on September 13, 2013, the iPhone 5s was not available for preorder. Both devices were released on September 20, 2013.[24] While most of the promotion focused on Touch ID, the 64-bit Apple A7 processor was also a highlight during the event. This is the first-ever 64-bit processor in a phone of any kind. I don't think the other guys are even talking about it yet. Why go through all this? The benefits are huge. The A7 is up to twice as fast as the previous-generation system at CPU tasks, and up to twice as fast at graphics tasks, too.—Phil Schiller, Apple keynote at 4 Infinite Loop on September 10, 2013[25] Schiller then showed demos of Infinity Blade III to demonstrate the A7's processing power and the device's camera using untouched photographs.[26] Apple also announced during the keynote that iOS 7 would be available on September 18, 2013.[26] On September 20, 2013, the iPhone 5s was released in the United States, United Kingdom, Canada, China, France, Germany, Australia, Japan, Hong Kong, and Singapore.[27] It was released in 25 additional countries on October 25, 2013, and in 12 countries on November 1, 2013. Indonesia was the last country to receive the iPhone 5s, on January 26, 2014.[28] The iPhone 5s was succeeded as Apple's flagship smartphone by the iPhone 6 and iPhone 6 Plus on September 19, 2014, but the older model remained available for purchase at a reduced price,[29] while the 64 GB version was discontinued. The gold edition of the iPhone 5s was discontinued on September 9, 2015, when Apple revealed the iPhone 6s and iPhone 6s Plus[30][31][32][33] The iPhone 5s was discontinued on March 21, 2016, and succeeded by the first-generation iPhone SE, which continues the same form factor but features vastly upgraded internals similar to the flagship iPhone 6s.[34] This was a break with Apple's product positioning trend (in North America and Western Europe), starting with iPhone 4s released in October 2011, which gave each newly released model one year as the flagship phone, then moving it to midrange for its second year of production, with the third and final year as the entry-level offering before discontinuation. While the iPhone 5s was expected to continue on sale until September 2016, replacing it and its A7 processor early meant that Apple "just reduced its long-term chip support window by a year" for iOS. In addition, a new iPhone launch was meant to stimulate demand, as sales of iPhone 6s and 6s Plus had not met expectations since their September 2015 release and the iPhone family was expected to suffer its first-ever negative growth quarter in 2016.[35][36] Design and Hardware of iPhone 5siPhone 5s's home button has a flat design and is made of scratch-resistant, laser-cut sapphire crystal surrounded by a stainless steel finger detection ring for using Touch ID.The camera has a f/2.2 aperture and has dual "True Tone" flashes.The "iPhone" wordmark on the back of an iPhone 5s is now set in a thinner version of the Myriad typeface. The iPhone 5s maintained a similar design to the iPhone 5, with a 4 in (10 cm) LCD multi-touch Retina display and a screen resolution of 640×1136 at 326 ppi.[37] Its home button has been updated with a new flat design using a laser-cut sapphire cover surrounded by a metallic ring; the button is no longer concave, nor does it contain the familiar squircle icon seen on previous models.[38] The phone itself is 0.30 in (7.6 mm) thick and weighs 112 grams (4.0 oz).[39] The phone uses an aluminum composite frame.[40] The device is available in three color finishes; "space gray" (replacing black with slate trim on the iPhone 5), white with silver trim, and white with gold trim.[11][41] The iPhone 5s was the first iPhone to be available in a gold color; this decision was influenced by the fact that gold is seen as a popular sign of a luxury product among Chinese customers.[42] iPhone 5s color options Color Name Front Antenna Space Gray Black Silver White White Gold The iPhone's nano-SIM card tray is made of aluminum. The iPhone 5s is powered by the Apple A7 system-on-chip, the first 64-bit processor ever used on a smartphone. The device's operating system and pre-loaded software were optimized to run in 64-bit mode, promising increased performance, although third-party app developers would need to optimize their apps to take advantage of these enhanced capabilities.[43] The A7 processor was designed by Apple and manufactured by Samsung.[44] The A7 processor is accompanied by the M7 "motion co-processor", a dedicated processor for processing motion data from the iPhone's accelerometer and gyroscopes without requiring the attention of the main processor, which integrates with iOS 7's new CoreMotion APIs.[45][46][47][48][49] The same A7 SoC and M7 motion co-processor are also found in the iPad Air and iPad Mini 2, both of which were released in the same quarter as the iPhone 5s. The phone includes a 1560 mAh battery, which provides 10 hours of talk time and 250 hours of standby time.[50][51][52] The home button on the iPhone 5s incorporates a fingerprint recognition system known as Touch ID, based on technology from AuthenTec, a company that Apple had acquired in 2012.[53] The sensor uses a capacitive CMOS-based sensor which can detect the "sub-epidermal layers" of fingers at 500 pixels per inch, and uses a 360-degree design that can read the print at any angle. The sensor itself is activated by a touch-sensitive metallic ring surrounding the button. Touch ID can be used for various authentication activities within the operating system, such as unlocking the device or authenticating App Store and iTunes purchases instead of an Apple ID password. The sensor can be trained to recognize the fingerprints of multiple fingers and multiple users. Fingerprint data is stored in an encrypted format within a "secure enclave" of the A7 chip itself, and is not accessible to any other apps or servers (including iCloud).[54][55][56][57] While the camera is still 8 megapixels in resolution with the image capture size of 3264 × 2448 (4:3), the lens has a larger aperture (f/2.2, compared to f/2.4 on the predecessor) and larger sized pixels in its image sensor than previous iPhone models. The flashlight has dual "True Tone" flashes, consisting of an amber LED and a white LED, which are variably used based on the color temperature of the photo to improve color balancing. The camera software includes automatic digital image stabilization, dynamic tone mapping, 10 fps burst mode and slow motion video at 120 fps.[58] Photos captured during the 1080p video recording have a resolution of 720p.[59] The iPhone 5s's camera was paired with a dual-LED flash, allowing for higher-quality nighttime photos. iOS 7 introduced a new camera app, allowing the iPhone 5s to capture fast continuous shots and record slow-motion videos with 720p at 120 frames per second and an audio track, making it the first iPhone to be able to record at any frame rate beyond 30 frames per second.[60][61] An analysis by GSM Arena suggests that the image quality of the supposedly 720p slow-motion footage resembles approximately 480p.[62] Main article: iPhone accessories Earphones known as Apple EarPods were included with the iPhone 5s.[63] According to technology commentators, the design of the earphones is aimed to improve sound quality by allowing air to travel in and out more freely.[64][65] Apple states that the design of their earphones allows it to "rival high-end headphones that cost hundreds of dollars more".[64]

Reviews by Gizmodo and TechRadar reported that although the earphones sounded better than its predecessor, reviewers felt that quality of sound produced is poor.[66] TechRadar further opined that the EarPods are inferior to other earphones of a similar price.[65] Main articles: iOS, iOS 7, iOS 8, iOS 9, iOS 10, iOS 11, and iOS 12Further information: iOS version history The iPhone 5s was initially supplied with iOS 7, released on September 20, 2013.[67] Jonathan Ive, the designer of iOS 7's new elements, described the update as "bringing order to complexity", highlighting features such as refined typography, new icons, translucency, layering, physics, and gyroscope-driven parallaxing as some of the major changes to the design. The design of both iOS 7 and OS X Yosemite (version 10.10) noticeably departs from skeuomorphic elements such as green felt in Game Center, wood in Newsstand, and leather in Calendar, in favor of flat, colorful design.[68][69] iOS 7 adds AirDrop, an ad-hoc Wi-Fi sharing platform. Users can share files with the iPhone 5 onwards, the iPod Touch (5th generation), iPad (4th generation) onwards, or iPad Mini (1st generation) onwards.[68][70] The operating system also adds Control Center, a control panel accessed by swiping up from the bottom of the screen. Control Center contains a number of commonly used functions, such as volume and brightness controls, along with toggles for enabling Wi-Fi, Bluetooth, Airplane mode, and for using the rear camera's flash LED as a flashlight.[71] iTunes Radio, an Internet radio service, was also included on the iPhone 5s. It was a free, ad-supported service available to all iTunes users, featuring Siri integration on iOS. Users were able to skip tracks, customize stations, and purchase the station's songs from the iTunes Store. Users could also search through their history of previous songs.[72] Apple announced in June 2018 that the iPhone 5s would support the iOS 12 update. This made it the second longest supported iOS device, having supported six major versions of the iOS operating system, on par with the iPad 2 which supported iOS 4 through iOS 9. The iPhone 5s would also receive major speed boosts of up to 70%, according to Apple. This included the camera, keyboard and other functions.[73] The iPhone 5s did not receive iOS 13, released in September 2019.[74] During the keynote, Apple announced a case for the iPhone 5s that was made of soft microfiber on the inside and leather on the outside. This case was announced along with iPhone 5c's case, both of which were the first cases Apple had announced since the iPhone 4 Bumpers.[75] Docks for both the iPhone 5s[76] and 5c were found on the Apple online store after the announcement. Because of the casing difference between the iPhone 5s and 5c, they have separate docks, each made specifically for each respective phone.[77] Comparison between Lightning port of the iPhone 5c (top) and iPhone 5s (middle) and the 30-pin port of the iPhone 4s (bottom) The iPhone 5s received a positive reception from reviewers and commentators. Walt Mossberg of All Things Digital gave the phone a favorable review, saying that Touch ID "sounds like a gimmick, but it's a real advance, the biggest step ever in biometric authentication for everyday devices," and labeled it "the best smartphone on the market."[12] David Pogue of The New York Times praised Touch ID, but said that the innovation of the smartphone market has been saturated, and "maybe the age of annual mega-leaps is over." He focused much of his review on iOS 7, which he believed was the biggest change of the device over previous generations, praising new Siri features, Control Center, and AirDrop.[78] In an editorial, Pogue stated that iOS 7 was the biggest change in the iPhone series, citing utilitarian interface changes as the main contributor to this.[79] Scott Stein of CNET criticized the lack of design change over iPhone 5 and said that although the iPhone 5s "is not a required upgrade, but it's easily the fastest and most advanced Apple smartphone to date."[13] Although praised for its camera, 64-bit A7 chip, M7 motion-chip, and fingerprint scanning capabilities, some investors thought that the iPhone 5s, although a notable improvement over the iPhone 5, was still relatively unchanged from its predecessor, and worried that the iPhone line had become a stagnant, dull product. Apple's share price fell 5.4% after the launch to close at a month low of $467.71 on the NASDAQ.[80] Darrell Etherington of TechCrunch who praised the iPhone 5s as the best smartphone available said "looks may not be different from the iPhone 5, but the internal components have a dramatic impact on day-to-day activities normal for a smartphone user," and went into detail explaining the impact of the improved camera and specifications on the phone. Etherington suggested that the 64-bit A7 processor will not reach its full potential until developers create applications supporting it.[81] Myriam Joire of Engadget found that the iPhone 5s could benefit significantly from the A7 if developers created applications optimized for the 64-bit processor.[82] Anand Lal Shimpi of AnandTech praised the phone's A7 processor, describing it as "seriously impressive", and stated that it was the most "futureproof of any iPhone ever launched. As much as it pains me to use the word futureproof if you are one of those people who likes to hold onto their device for a while – the iPhone 5s is as good a starting point as any."[83] Scott Lowe of IGN also spoke highly of its 64-bit processor, "which has a substantial lead in processing power over the HTC One and Samsung Galaxy S4, accounting for a graphics boost of up to 32% and 38% in CPU benchmarks." The debut of Apple's 64-bit A7 processor took rival Android smartphone makers by surprise, particularly Qualcomm whose own 64-bit system-on-chip was not released until 2015.[84][85] Most reviewers recommended the iPhone 5s over the iPhone 5c which was released at the same time. The 5c retained almost the same hardware as the discontinued iPhone 5, while the iPhone 5s featured substantially improved performance/features thanks to its new 64-bit A7 processor, as well as extra storage space, all for a relatively small additional upfront cost over the iPhone 5c (US$650 versus US$550 in March 2014). This was especially the case when iOS 8 was released and both iPhone 5s and iPhone 5c were moved to the mid and low end of the iPhone range, respectively; the iPhone 5s still had 16 or 32 GB (14.9 or 29.8 GiB) storage available while the iPhone 5c had to make do with 8 GB storage with only 4.9GB available to the user after installing iOS 8. Furthermore, the 5c's polycarbonate exterior received a mixed reception and was seen as a cost-cutting downgrade compared to the iPhone 5's aluminum/glass case; the 5s retained the latter design and looked even more premium due to its additional gold finish.[86][87] As of 2015–16, there were still a significant number of customers who preferred the 4-inch screen size of iPhone 5s, which remained the second-most popular iPhone after the iPhone 6 and ahead of the iPhone 6s. Apple stated in their event that they sold 30 million 4-inch iPhones in 2015, even as that form factor was succeeded as the flagship iPhone by the redesigned larger display 4.7/5.5-inch iPhone 6 and 6 Plus back in September 2014. Furthermore, the 5/5s design was regarded as "long been the golden child of Apple phone design and a benchmark for phones in general" (with the 5s's gold finish adding a premium touch to the 5's already well-regarded look), while the succeeding 6 and 6S design was less critically acclaimed as it "felt a little bit wrong, as though you were holding a slick $650 bar of soap". The iPhone 5 was described as "elegance rooted in the way the aluminum and glass work together. It felt streamlined, yet substantial, which is different from iPhone 6, which feels substantial in size alone. Plus, unlike the ubiquitous rounded corners of the 6, iPhone 5 didn't really look like anything else on the market at the time". However, the iPhone 5/5s design was not suited to scaling up, in contrast to the iPhone 6/6S which could better accommodate the growing consumer trend towards larger screen sizes and indeed spawned the 6/6S Plus phablet models. When Apple discontinued the iPhone 5s, it was replaced by the first-generation iPhone SE which outwardly appears almost identical to the 5s even as the SE's internal hardware has been upgraded significantly.[35][36] The iPhone 5s and 5c sold over nine million units in the first three days, setting a record for first weekend smartphone sales,[15] with the 5s selling three times more units than the 5c. After the first day of release, 1% of all iPhones in the US were iPhone 5Ss, while 0.3% were iPhone 5Cs.[88] Gene Munster of Piper Jaffray reported that the line at the Fifth Avenue Apple Store contained 1,417 people on release day, compared to 1,300 for the iPhone 4 in 2010, and 549 for the iPhone 3G in 2008 on their respective release days.[89] This was the first time that Apple launched two models simultaneously. The first-day release in China also contributed to the record sales result.[90] On launch day, major in-stock shortages were reported in most stores, across all countries where the iPhone 5s initially went on sale.[91] A great many customers in line outside Apple Stores worldwide were left disappointed due to severe shortages across all 5s models, with the gold model in particular being in highly limited supply.[92] While this situation eased in the US in the days following the launch, other countries reported receiving few restocks.[93] Some commentators questioned how Apple handled the initial release, as online pre-orders were not offered for the iPhone 5s, meaning large numbers of people queuing outside physical stores, with most in line not receiving a unit.[94] In the US, Apple offered an online reservation system, so customers could keep checking for units available at their local Apple Stores, and order for pickup.[95] Online orders were also in short supply on launch day, with the shipping date across all model sizes and colors changing from "7-10 working days" to "October" in all countries, within hours of online orders being taken.[96][97] The iPhone 5s was the best selling phone on AT&T, Sprint, Verizon, and T-Mobile in September 2013 in the United States, outselling the iPhone 5c and Samsung Galaxy S4.[16] According to Consumer Intelligence Research Partners, the iPhone 5s outsold the 5c by a two-to-one margin during its September release, confirming Apple CEO Tim Cook's view that the high-end smartphone market was not reaching a point of market saturation.[98] While commentators viewed the 5c as a flop because of supply chain cuts signifying a decline in demand, the 5s was viewed as a massive success. Apple admitted that it had failed to anticipate the sales ratio, leading to an overstocking of the 5c and shortages of the 5s.[87][99] Six months after the release of the iPhone 5s, on March 25, 2014, Apple announced that sales of the iPhone brand had exceeded 500 million units.[100] By May 2014, despite having been on the market for eight months, the iPhone 5s reportedly outsold the newly released Samsung Galaxy S5 by 40%, with 7 million iPhone 5s units versus 5 million Galaxy S5 units. The Galaxy S5's failure to oust the iPhone 5s from the top-selling spot was a major setback for Samsung Mobile, as the preceding Samsung Galaxy SIII and Samsung Galaxy S4, in the first quarter of their releases, had outsold the iPhone 4s and iPhone 5 respectively.[101] See also: Touch ID § Impact A number of technology writers, including Adrian Kingsley-Hughes of ZDNet[102] and Kevin Roose of New York believed that the fingerprint scanning functionality of the iPhone 5s could help spur the adoption of the technology as an alternative to passwords by mainstream users (especially in "bring your own device" scenarios), as fingerprint-based authentication systems have only enjoyed wider usage in enterprise environments. However, citing research by biometrics engineer Geppy Parziale,[103] Roose suggested that the CMOS-based sensor could become inaccurate and wear out over time unless Apple had designed the sensor to prevent this from occurring.[104] Brent Kennedy, a researcher of the United States Computer Emergency Readiness Team, recommended that users not immediately rely on the technology, citing the uncertainty over whether the system could properly reject a spoofed fingerprint.[105] Following the release of the iPhone 5s, the German Chaos Computer Club announced, on September 21, 2013, that they had bypassed Apple's new Touch ID fingerprint sensor by using "easy everyday means". The group explained that the security system had been defeated by photographing a fingerprint from a glass surface and using that captured image to make a latex model thumb which was then pressed against the sensor to gain access. The spokesman for the group stated, "We hope that this finally puts to rest the illusions people have about fingerprint biometrics. It is plain stupid to use something that you can't change and that you leave everywhere every day as a security token."[14][54] However, in 2013, 39% of American smartphone users used no security measures at all to protect their smartphone.[106] Others have also tried Chaos Computer Club's method, but concluded that it is not an easy process in either time or effort, given that the user has to use a high resolution photocopy of a complete fingerprint, special chemicals and expensive equipment, and because the spoofing process takes some time to achieve.[107] Several problems were experienced with the iPhone 5s's hardware after its release. The most widely reported issue is that the angle reported by the phone's level sensor had drifted by several degrees, which caused the gyroscope, compass, and accelerometer to become inaccurate. Reports suggested that this is a hardware-induced problem.[108][109] Some encountered other problems such as crashing with a blue screen and then restarting, the power button making a rattling noise when the phone was shaken, overheating, the microphone not working, and Touch ID not working for iTunes purchases. Some of these issues have since been fixed by software updates.[110] List of iPhone models History of iPhone Comparison of smartphones Timeline of iPhone models

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Wikimedia Commons has media related to iPhone 5S. iPhone 5s – official site Preceded byiPhone 5 iPhone 5c / iPhone 5s 7th generation Succeeded byiPhone 6 / 6 PlusiPhone SE (1st generation) Retrieved from " 3Third generation of wireless mobile telecommunications technology For other uses, see 3G (disambiguation). This article needs to be updated. Please help update this article to reflect recent events or newly available information. (April 2021) A USB modem for 3G plugged into a laptop. Part of a series on theWireless network technologies Analog 0G1G (1.5G) Digital 2G (2.5G, 2.75G, 2.9G)3G (3.5G, 3.75G, 3.9G/3.95G)4G (4G/4.5G, 4.5G, 4.9G)5G (5.5G)6G Mobile telecommunicationsvte 3G refers to the third-generation of cellular network technology. These networks were rolled out beginning in the early 2000s and represented a significant advancement over the second-generation (2G), particularly in terms of data transfer speeds and mobile internet capabilities. The major 3G standards are UMTS (developed by 3GPP, succeeding GSM) and CDMA2000 (developed by Qualcomm, succeeding cdmaOne);[1][2] both of these are based on the IMT-2000 specifications established by the International Telecommunication Union (ITU). While 2G networks such as GPRS and EDGE supported limited data services, 3G introduced significantly higher-speed mobile internet and enhanced multimedia capabilities, in addition to improved voice quality.[3] It provided moderate internet speeds suitable for general web browsing and multimedia content including video calling and mobile TV,[3] supporting services that provide an information transfer rate of at least 144 kbit/s.[4][5] Later 3G releases, often referred to as 3.5G (HSPA) and 3.75G (HSPA+) as well as EV-DO, introduced important improvements, enabling 3G networks to offer mobile broadband access with speeds ranging from several Mbit/s up to 42 Mbit/s.[6] These updates improved the reliability and speed of internet browsing, video streaming, and online gaming, enhancing the overall user experience for smartphones and mobile modems in comparison to earlier 3G technologies. 3G was later succeeded by 4G technology, which provided even higher data transfer rates and introduced advancements in network performance. A new generation of cellular standards has emerged roughly every decade since the introduction of 1G systems in 1979. Each generation is defined by the introduction of new frequency bands, higher data rates, and transmission technologies that are not backward-compatible due to the need for significant changes in network architecture and infrastructure. Several telecommunications companies marketed wireless mobile Internet services as 3G, indicating that the advertised service was provided over a 3G wireless network. However, 3G services have largely been supplanted in marketing by 4G and 5G services in most areas of the world. Services advertised as 3G are required to meet IMT-2000 technical standards, including standards for reliability and speed (data transfer rates). To meet the IMT-2000 standards, Third-generation mobile networks, or 3G, must maintain minimum consistent Internet speeds of 144 Kbps.[5] However, many services advertised as 3G provide higher speed than the minimum technical requirements for a 3G service.[7] Subsequent 3G releases, denoted 3.5G and 3.75G, provided mobile broadband access of several Mbit/s for smartphones and mobile modems in laptop computers.[8] 3G branded standards: The UMTS (Universal Mobile Telecommunications System) system, standardized by 3GPP in 2001, was used in Europe, Japan, China (with a different radio interface) and other regions predominated by GSM (Global Systems for Mobile Communications) 2G system infrastructure. The cell phones are typically UMTS and GSM hybrids. Several radio interfaces are offered, sharing the same infrastructure: The original and most widespread radio interface is called W-CDMA (Wideband Code Division Multiple Access). The TD-SCDMA radio interface was commercialized in 2009 and only offered in China. The latest UMTS release, HSPA+, can provide peak data rates up to 56 Mbit/s in the downlink in theory (28 Mbit/s in existing services) and 22 Mbit/s in the uplink. The CDMA2000 system, first offered in 2002, standardized by 3GPP2, used especially in North America and South Korea, sharing infrastructure with the IS-95 2G standard. The cell phones are typically CDMA2000 and IS-95 hybrids. The latest release EVDO Rev. B offers peak rates of 14.7 Mbit/s downstream. The 3G systems and radio interfaces are based on spread spectrum radio transmission technology. While the GSM EDGE standard ("2.9G"), DECT cordless phones and Mobile WiMAX standards formally also fulfill the IMT-2000 requirements and are approved as 3G standards by ITU, these are typically not branded as 3G and are based on completely different technologies. The common standards complying with the IMT2000/3G standard are: EDGE, a revision by the 3GPP organization to the older 2G GSM based transmission methods, which utilizes the same switching nodes, base station sites, and frequencies as GPRS, but includes a new base station and cellphone RF circuits. It is based on the three times as efficient 8PSK modulation scheme as a supplement to the original GMSK modulation scheme. EDGE is still used extensively due to its ease of upgrade from existing 2G GSM infrastructure and cell phones. EDGE combined with the GPRS 2.5G technology is called EGPRS, and allows peak data rates in the order of 200 kbit/s, just like the original UMTS WCDMA versions and thus formally fulfill the IMT2000 requirements on 3G systems. However, in practice, EDGE is seldom marketed as a 3G system, but a 2.9G system. EDGE shows slightly better system spectral efficiency than the original UMTS and CDMA2000 systems, but it is difficult to reach much higher peak data rates due to the limited GSM spectral bandwidth of 200 kHz, and it is thus a dead end. EDGE was also a mode in the IS-136 TDMA system, no longer used. Evolved EDGE, the latest revision, has peaks of 1 Mbit/s downstream and 400 kbit/s upstream but is not commercially used. The Universal Mobile Telecommunications System, created and revised by the 3GPP. The family is a full revision from GSM in terms of encoding methods and hardware, although some GSM sites can be retrofitted to broadcast in the UMTS/W-CDMA format. W-CDMA is the most common deployment, commonly operated on the 2,100 MHz band. A few others use the 850, 900, and 1,900 MHz bands. HSPA is an amalgamation of several upgrades to the original W-CDMA standard and offers speeds of 14.4 Mbit/s down and 5.76 Mbit/s up. HSPA is backward-compatible and uses the same frequencies as W-CDMA. HSPA+, a further revision and upgrade of HSPA, can provide theoretical peak data rates up to 168 Mbit/s in the downlink and 22 Mbit/s in the uplink, using a combination of air interface improvements as well as multi-carrier HSPA and MIMO. Technically though, MIMO and DC-HSPA can be used without the "+" enhancements of HSPA+. The CDMA2000 system, or IS-2000, including CDMA2000 1x and CDMA2000 High Rate Packet Data (or EVDO), standardized by 3GPP2 (differing from the 3GPP), evolving from the original IS-95 CDMA system, is used especially in North America, China, India, Pakistan, Japan, South Korea, Southeast Asia, Europe, and Africa. CDMA2000 1x Rev. E has an increased voice capacity (by three times the original amount) compared to Rev. 0 EVDO Rev. B offers downstream peak rates of 14.7 Mbit/s while Rev. C enhanced existing and new terminal user experience. While DECT cordless phones and Mobile WiMAX standards formally also fulfill the IMT-2000 requirements, they are not usually considered due to their rarity and unsuitability for usage with mobile phones.[9] The 3G (UMTS and CDMA2000) research and development projects started in 1992. In 1999, ITU approved five radio interfaces for IMT-2000 as a part of the ITU-R M.1457 Recommendation; WiMAX was added in 2007.[10] There are evolutionary standards (EDGE and CDMA) that are backward-compatible extensions to pre-existing 2G networks as well as revolutionary standards that require all-new network hardware and frequency allocations. The cell phones use UMTS in combination with 2G GSM standards and bandwidths, but do not support EDGE. The latter group is the UMTS family, which consists of standards developed for IMT-2000, as well as the independently developed standards DECT and WiMAX, which were included because they fit the IMT-2000 definition. While EDGE fulfills the 3G specifications, most GSM/UMTS phones report EDGE ("2.75G") and UMTS ("3G") functionality.[11] Cellular network standards and generation timeline. 3G technology was the result of research and development work carried out by the International Telecommunication Union (ITU) in the early 1980s. 3G specifications and standards were developed in fifteen years. The technical specifications were made available to the public under the name IMT-2000. The communication spectrum between 400 MHz to 3 GHz was allocated for 3G. Both the government and communication companies approved the 3G standard. The first pre-commercial 3G network was launched by NTT DoCoMo in Japan in 1998,[12] branded as FOMA. It was first available in May 2001 as a pre-release (test) of W-CDMA technology. The first commercial launch of 3G was also by NTT DoCoMo in Japan on 1 October 2001, although it was initially somewhat limited in scope;[13][14] broader availability of the system was delayed by apparent concerns over its reliability.[15][16][17][18][19] The first European pre-commercial network was an UMTS network on the Isle of Man by Manx Telecom, the operator then owned by British Telecom, and the first commercial network (also UMTS based W-CDMA) in Europe was opened for business by Telenor in December 2001 with no commercial handsets and thus no paying customers. The first network to go commercially live was by SK Telecom in South Korea on the CDMA-based 1xEV-DO technology in January 2002. By May 2002, the second South Korean 3G network was by KT on EV-DO and thus the South Koreans were the first to see competition among 3G operators. The first commercial United States 3G network was by Monet Mobile Networks, on CDMA2000 1x EV-DO technology, but the network provider later shut down operations. The second 3G network operator in the US was Verizon Wireless in July 2002, also on CDMA2000 1x EV-DO. AT&T Mobility was also a true 3G UMTS network, having completed its upgrade of the 3G network to HSUPA. The first commercial United Kingdom 3G network was started by Hutchison Telecom which was originally behind Orange S.A.[20] In 2003, it announced first commercial third generation or 3G mobile phone network in the UK. The first pre-commercial demonstration network in the southern hemisphere was built in Adelaide, South Australia, by m.Net Corporation in February 2002 using UMTS on 2100 MHz. This was a demonstration network for the 2002 IT World Congress. The first commercial 3G network was launched by Hutchison Telecommunications branded as Three or "3" in June 2003.[21] In India, on 11 December 2008, the first 3G mobile and internet services were launched by a state-owned company, Mahanagar Telecom Nigam Limited (MTNL), within the metropolitan cities of Delhi and Mumbai. After MTNL, another state-owned company, Bharat Sanchar Nigam Limited (BSNL), began deploying the 3G networks country-wide. Emtel launched the first 3G network in Africa.[22] Videotelephony through cellular networks were made possible using 3G technologies Japan was one of the first countries to adopt 3G, the reason being the process of 3G spectrum allocation, which in Japan was awarded without much upfront cost. The frequency spectrum was allocated in the US and Europe based on auctioning, thereby requiring a huge initial investment for any company wishing to provide 3G services. European companies collectively paid over 100 billion dollars in their spectrum auctions.[23] Nepal Telecom adopted 3G Service for the first time in southern Asia. However, its 3G was relatively slow to be adopted in Nepal. In some instances, 3G networks do not use the same radio frequencies as 2G, so mobile operators must build entirely new networks and license entirely new frequencies, especially to achieve high data transmission rates. Other countries' delays were due to the expenses of upgrading transmission hardware, especially for UMTS, whose deployment required the replacement of most broadcast towers. Due to these issues and difficulties with deployment, many carriers could not or delayed the acquisition of these updated capabilities. In December 2007, 190 3G networks were operating in 40 countries and 154 HSDPA networks were operating in 71 countries, according to the Global Mobile Suppliers Association (GSA). In Asia, Europe, Canada, and the US, telecommunication companies use W-CDMA technology with the support of around 100 terminal designs to operate 3G mobile networks. The roll-out of 3G networks was delayed by the enormous costs of additional spectrum licensing fees in some countries. The license fees in some European countries were particularly high, bolstered by government auctions of a limited number of licenses and sealed bid auctions, and initial excitement over 3G's potential. This led to a telecoms crash that ran concurrently with similar crashes in the fibre-optic and dot.com fields. The 3G standard is perhaps well known because of a massive expansion of the mobile communications market post-2G and advances of the consumer mobile phone. An especially notable development during this time is the smartphone (for example, the iPhone, and the Android family), combining the abilities of a PDA with a mobile phone, leading to widespread demand for mobile internet connectivity. 3G has also introduced the term "mobile broadband" because its speed and capability made it a viable alternative for internet browsing, and USB Modems connecting to 3G networks, and now 4G became increasingly common. By June 2007, the 200 millionth 3G subscriber had been connected of which 10 million were in Nepal and 8.2 million in India. This 200 millionth is only 6.7% of the 3 billion mobile phone subscriptions worldwide. (When counting CDMA2000 1x RTT customers—max bitrate 72% of the 200 kbit/s which defines 3G—the total size of the nearly-3G subscriber base was 475 million as of June 2007, which was 15.8% of all subscribers worldwide.) In the countries where 3G was launched first – Japan and South Korea – 3G penetration is over 70%.[24] In Europe the leading country[when?] for 3G penetration is Italy with a third of its subscribers migrated to 3G. Other leading countries[when?] for 3G use include Nepal, UK, Austria, Australia and Singapore at the 32% migration level. According to ITU estimates,[25] as of Q4 2012 there were 2096 million active mobile-broadband[vague] subscribers worldwide out of a total of 6835 million subscribers—this is just over 30%. About half the mobile-broadband subscriptions are for subscribers in developed nations, 934 million out of 1600 million total, well over 50%. Note however that there is a distinction between a phone with mobile-broadband connectivity and a smart phone with a large display and so on—although according[26] to the ITU and informatandm.com the US has 321 million mobile subscriptions, including 256 million that are 3G or 4G, which is both 80% of the subscriber base and 80% of the US population, according[25] to ComScore just a year earlier in Q4 2011 only about 42% of people surveyed in the US reported they owned a smart phone. In Japan, 3G penetration was similar at about 81%, but smart phone ownership was lower at about 17%.[25] In China, there were 486.5 million 3G subscribers in June 2014,[27] in a population of 1,385,566,537 (2013 UN estimate). Since the increasing adoption of 4G networks across the globe, 3G use has been in decline. Several operators around the world have already or are in the process of shutting down their 3G networks (see table below). In several places, 3G is being shut down while its older predecessor 2G is being kept in operation; Vodafone UK is doing this, citing 2G's usefulness as a low-power fallback.[28] EE in the UK, plans to switch off their 3G networks in early 2024.[29] In the US, Verizon shutdown their 3G services on 31 December 2022,[30] T-Mobile shut down Sprint's networks on 31 March 2022 and shutdown their main networks on 1 July 2022,[31] and AT&T has done so on 22 February 2022.[32] Currently 3G around the world is declining in availability and support. Technology that depends on 3G for usage are becoming inoperable in many places. For example, the European Union plans to ensure that member countries maintain 2G networks as a fallback[citation needed], so 3G devices that are backwards compatible with 2G frequencies can continue to be used. However, in countries that plan to decommission 2G networks or have already done so as well, such as the United States and Singapore, devices supporting only 3G and backwards compatible with 2G are becoming inoperable.[33] As of February 2022, less than 1% of cell phone customers in the United States used 3G; AT&T offered free replacement devices to some customers in the run-up to its shutdown.[34] It has been estimated that there are almost 8,000 patents declared essential (FRAND) related to the 483 technical specifications which form the 3GPP and 3GPP2 standards.[35][36] Twelve companies accounted in 2004 for 90% of the patents (Qualcomm, Ericsson, Nokia, Motorola, Philips, NTT DoCoMo, Siemens, Mitsubishi, Fujitsu, Hitachi, InterDigital, and Matsushita). Even then, some patents essential to 3G might not have been declared by their patent holders. It is believed that Nortel and Lucent have undisclosed patents essential to these standards.[36] Furthermore, the existing 3G Patent Platform Partnership Patent pool has little impact on FRAND protection because it excludes the four largest patent owners for 3G.[37][38] ITU has not provided a clear[39][vague] definition of the data rate that users can expect from 3G equipment or providers. Thus users sold 3G service may not be able to point to a standard and say that the rates it specifies are not being met. While stating in commentary that "it is expected that IMT-2000 will provide higher transmission rates: a minimum data rate of 2 Mbit/s for stationary or walking users, and 348 kbit/s in a moving vehicle,"[40] the ITU does not actually clearly specify minimum required rates, nor required average rates, nor what modes[clarification needed] of the interfaces qualify as 3G, so various[vague] data rates are sold as '3G' in the market. In a market implementation, 3G downlink data speeds defined by telecom service providers vary depending on the underlying technology deployed; up to 384 kbit/s for UMTS (WCDMA), up to 7.2 Mbit/sec for HSPA, and a theoretical maximum of 21.1 Mbit/s for HSPA+ and 42.2 Mbit/s for DC-HSPA+ (technically 3.5G, but usually clubbed under the tradename of 3G).[citation needed] See also: Mobile security § Attacks based on the GSM networks 3G networks offer greater security than their 2G predecessors. By allowing the UE (User Equipment) to authenticate the network it is attaching to, the user can be sure the network is the intended one and not an impersonator.[41] 3G networks use the KASUMI block cipher instead of the older A5/1 stream cipher. However, a number of serious weaknesses in the KASUMI cipher have been identified. In addition to the 3G network infrastructure security, end-to-end security is offered when application frameworks such as IMS are accessed, although this is not strictly a 3G property. The bandwidth and location capabilities introduced by 3G networks enabled a wide range of applications that were previously impractical or unavailable on 2G networks. Among the most significant advancements was the ability to perform data-intensive tasks, such as browsing the internet seamlessly while on the move, as well as engaging in other activities that benefited from faster data speeds and enhanced reliability. Beyond personal communication, 3G networks supported applications in various fields, including medical devices, fire alarms, and ankle monitors. This versatility marked a significant milestone in cellular communications, as 3G became the first network to enable such a broad range of use cases.[42] By expanding its functionality beyond traditional mobile phone usage, 3G set the stage for the integration of cellular networks into a wide array of technologies and services, paving the way for further advancements with subsequent generations of mobile networks. Both 3GPP and 3GPP2 are working on the extensions to 3G standards that are based on an all-IP network infrastructure and using advanced wireless technologies such as MIMO. These specifications already display features characteristic for IMT-Advanced (4G), the successor of 3G. However, falling short of the bandwidth requirements for 4G (which is 1 Gbit/s for stationary and 100 Mbit/s for mobile operation), these standards are classified as 3.9G or Pre-4G. 3GPP plans to meet the 4G goals with LTE Advanced, whereas Qualcomm has halted UMB development in favour of the LTE family.[43] On 14 December 2009, TeliaSonera announced in an official press release that "We are very proud to be the first operator in the world to offer our customers 4G services."[44] With the launch of their LTE network, initially they are offering pre-4G (or beyond 3G) services in Stockholm, Sweden and Oslo, Norway. Country Status Network Shutdown date Standard References Notes Argentina Personal TBD UMTS [45] Local shutdowns commenced in Q1 2023. Australia No Service Optus 2024-10-28 UMTS [46][47] Telstra 2024-10-28 UMTS [48][49][47] 2100 MHz band shutdown on 25 Mar 2019. TPG / Vodafone 2023-12-15 UMTS [50][51] Austria Magenta Telekom 2024 (est.) 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The participating associations were ARIB/TTC (Japan), China Communications Standards Association, Telecommunications Industry Association (North America) and Telecommunications Technology Association (South Korea). The agreement was established in December 1998. Ultra Mobile Broadband (UMB) was a 3GPP2 project to develop a fourth-generation successor to CDMA2000. In November 2008, Qualcomm, UMB's lead sponsor, announced it was ending development of the technology, favoring LTE instead.[1] 3GPP2 should not be confused with 3GPP; 3GPP is the standard body behind the Universal Mobile Telecommunications System (UMTS) that is the 3G upgrade to GSM networks, while 3GPP2 was the standard body behind the competing 3G standard CDMA2000 that is the 3G upgrade to cdmaOne networks that was used mostly in the United States (and to some extent also in Japan, China, Canada, South Korea and India). GSM/UMTS were the most widespread 2G/3G wireless standards worldwide. Most countries used only the GSM family. A few countries, including China, the United States, Canada, Ukraine, Trinidad and Tobago, India, South Korea and Japan, used both standards. 3GPP2 had its last activity in 2013,[2] and the group has been dormant ever since. The 3GPP2 website was taken offline in 2023, primarily due to CDMA carriers deploying 3GPP's LTE instead of UMB the decade prior and later shutting down CDMA networks making the 3GPP2 redundant and unneeded. However, as of 2024 the 3GPP2 website has since come back online. ^ Qualcomm halts UMB project, Reuters, 13 November 2008 ^ "3GPP2 Technology Webinar". 3GPP2. 3GPP2 Official Web site About 3GPP2 TIA – U.S. 3GPP2 Standards Developer This article about wireless technology is a stub. You can help Wikipedia by expanding it.vte Retrieved from " 5Mobile telecommunications standards body 3rd Generation Partnership ProjectAbbreviation3GPPFormation1998; 27 years ago (1998)TypeStandards organizationRegion served WorldwideWebsitewww.3gpp.org The 3rd Generation Partnership Project (3GPP) is an umbrella term for a number of standards organizations which develop protocols for mobile telecommunications. Its best known work is the development and maintenance of:[1] GSM and related 2G and 2.5G standards, including GPRS and EDGE UMTS and related 3G standards, including HSPA and HSPA+ LTE and related 4G standards, including LTE Advanced and LTE Advanced Pro 5G NR and related 5G standards, including 5G-Advanced An evolved IP Multimedia Subsystem (IMS) developed in an access independent manner 3GPP is a consortium with seven national or regional telecommunication standards organizations as primary members ("organizational partners") and a variety of other organizations as associate members ("market representation partners"). The 3GPP organizes its work into three different streams: Radio Access Networks, Services and Systems Aspects, and Core Network and Terminals.[2] The project was established in December 1998 with the goal of developing a specification for a 3G mobile phone system based on the 2G GSM system, within the scope of the International Telecommunication Union's International Mobile Telecommunications-2000, hence the name 3GPP.[3] It should not be confused with 3rd Generation Partnership Project 2 (3GPP2), which developed a competing 3G system, CDMA2000.[4] The 3GPP administrative support team (known as the "Mobile Competence Centre") is located at the European Telecommunications Standards Institute headquarters in the Sophia Antipolis technology park in France.[5] The seven 3GPP Organizational Partners are from Asia, Europe and North America. Their aim is to determine the general policy and strategy of 3GPP and perform the following tasks: The approval and maintenance of the 3GPP scope; The maintenance of the Partnership Project Description; Take the decision to create or cease a Technical Specification Groups, and approve their scope and terms of reference; The approval of Organizational Partner funding requirements; The allocation of human and financial resources provided by the Organizational Partners to the Project Co-ordination Group; Act as a body of appeal on procedural matters referred to them. Together with the Market Representation Partners (MRPs) perform the following tasks: The maintenance of the Partnership Project Agreement; The approval of applications for 3GPP partnership; Take the decision against a possible dissolution of 3GPP. The Organizational Partners are:[6] Organizational Partners Organization Country/region Website Association of Radio Industries and Businesses (ARIB) Japan ARIB Alliance for Telecommunications Industry Solutions (ATIS) USA ATIS China Communications Standards Association (CCSA) China CCSA European Telecommunications Standards Institute (ETSI) Europe ETSI Telecommunications Standards Development Society (TSDSI) India TSDSI Telecommunications Technology Association (TTA) South Korea TTA Telecommunication Technology Committee (TTC) Japan TTC The 3GPP Organizational Partners can invite a Market Representation Partner to take part in 3GPP, which: Has the ability to offer market advice to 3GPP and to bring into 3GPP a consensus view of market requirements (e.g., services, features and functionality) falling within the 3GPP scope; Does not have the capability and authority to define, publish and set standards within the 3GPP scope, nationally or regionally; Has committed itself to all or part of the 3GPP scope; Has signed the Partnership Project Agreement. As of January 2025[update], the Market Representation Partners are:[6] Market Representation Partners Organization Website 5G-ACIA 5G Automotive Association 5G Americas Deterministic Networking Alliance (5GDNA) 6G Smart Network and Services Industry Association (6G-IA) 5G Slicing Association (5GSA) 5G Media Action Group (5G-MAG) Automotive Edge Computing Consortium (AECC) Broadband India Forum Cellular Operators Association of India (COAI) China Society of Automotive Engineers (CSAE) CTIA Global Satellite Operators Association (GSOA) Global Certification Forum (GCF) Global mobile Suppliers Association (GSA) GSMA IPV6 Forum Next Generation Mobile Networks (NGMN) Public Safety Communication Europe (PSCE) Forum Small Cell Forum TCCA TD Industry Alliance Wireless Broadband Alliance 3GPP standards are structured as Releases. Discussion of 3GPP thus frequently refers to the functionality in one release or another. Version[7] Released[8] Info Phase 1 1992 GSM Features Phase 2 1995 GSM Features, EFR Codec, Release 96 1997 Q1 GSM Features, 14.4 kbit/s User Data Rate, Release 97 1998 Q1 GSM Features, GPRS Release 98 1999 Q1 GSM Features, AMR codec, EDGE, GPRS for PCS1900 Release 99 2000 Q1 Specified the first UMTS 3G networks, incorporating a CDMA air interface[9] Release 4 2001 Q2 Originally called the Release 2000 – added features including an all-IP Core Network[10] Release 5 2002 Q1 Introduced IMS and HSDPA[11] Release 6 2004 Q4 Integrated operation with Wireless LAN networks and adds HSUPA, MBMS, enhancements to IMS such as Push to Talk over Cellular (PoC), GAN[12] Release 7 2007 Q4 Focuses on decreasing latency, improvements to QoS and real-time applications such as VoIP.[13] This specification also focus on HSPA+ (High Speed Packet Access Evolution), SIM high-speed protocol and contactless front-end interface (Near Field Communication enabling operators to deliver contactless services like Mobile Payments), EDGE Evolution. Release 8 2008 Q4 First LTE release. All-IP Network (SAE). New OFDMA, FDE and MIMO based radio interface, not backwards compatible with previous CDMA interfaces. Dual-Cell HSDPA. UMTS HNB. Release 9 2009 Q4 SAES Enhancements, WiMAX and LTE/UMTS Interoperability. Dual-Cell HSDPA with MIMO, Dual-Cell HSUPA. LTE HeNB. Evolved multimedia broadcast and multicast service (eMBMS). Release 10 2011 Q1 LTE Advanced fulfilling IMT Advanced 4G requirements. Backwards compatible with release 8 (LTE). Multi-Cell HSDPA (4 carriers). Release 11 2012 Q3 Advanced IP Interconnection of Services. Service layer interconnection between national operators/carriers as well as third-party application providers. Heterogeneous networks (HetNet) improvements, Coordinated Multi-Point operation (CoMP). In-device Co-existence (IDC). Release 12 2015 Q1 Enhanced Small Cells (higher order modulation, dual connectivity, cell discovery, self configuration), Carrier aggregation (2 uplink carriers, 3 downlink carriers, FDD/TDD carrier aggregation), MIMO (3D channel modeling, elevation beamforming, massive MIMO), New and Enhanced Services (cost and range of MTC, D2D communication, eMBMS enhancements)[14] Release 13 2016 Q1 LTE-Advanced Pro. LTE in unlicensed, LTE enhancements for Machine-Type Communication. Elevation Beamforming / Full-Dimension MIMO, Indoor positioning.[15] Release 14 2017 Q2 Energy Efficiency, Location Services (LCS), Mission Critical Data over LTE, Mission Critical Video over LTE, Flexible Mobile Service Steering (FMSS), Multimedia Broadcast Supplement for Public Warning System (MBSP), enhancement for TV services over eMBMS, massive Internet of Things, Cell Broadcast Service (CBS)[16] Release 15 2018 Q2 First 5G NR ("New Radio") release. Support for 5G Vehicle-to-x service, IP Multimedia Core Network Subsystem (IMS), Future Railway Mobile Communication System[17] Release 16 2020 Q3 The 5G System – Phase 2: 5G enhancements, NR-based access to unlicensed spectrum (NR-U), Satellite access[18] Release 17 2022 Q1 TSG RAN: Several features that continue to be important for overall efficiency and performance of 5G NR: MIMO, Spectrum Sharing enhancements, UE Power Saving and Coverage Enhancements. RAN1 will also undertake the necessary study and specification work to enhance the physical layer to support frequency bands up to 71 GHz. TSG SA groups focused on further enhancements to the 5G system and enablers for new features and services: Enhanced support of: non-public networks, industrial Internet of Things, low complexity NR devices, edge computing in 5GC, access traffic steering, switch and splitting support, network automation for 5G, network slicing, advanced V2X service, multiple USIM support, proximity-based services in 5GS, 5G multicast broadcast services, Unmanned Aerial Systems (UAS), satellite access in 5G, 5GC location services, Multimedia Priority Service...[19] Release 18 2023 Q4 5G-Advanced. Introducing further machine-learning based techniques at different levels of the wireless network. Edge computing, Evolution of IMS Multimedia Telephony Service, Smart Energy and Infrastructure, Vehicle-Mounted Relays, Low Power High Accuracy Positioning for industrial IoT scenarios, Enhanced Access to and Support of Network slicing, Satellite backhaul in 5G...[20][21][19] Release 19 [22] 2025 Q4 5G-Advanced. Each release incorporates hundreds of individual Technical Specification and Technical Report documents, each of which may have been through many revisions. Current 3GPP standards incorporate the latest revision of the GSM standards. The documents are made available without charge on 3GPP's web site. The Technical Specifications cover not only the radio part ("Air Interface") and Core Network, but also billing information and speech coding down to source code level. Cryptographic aspects (such as authentication, confidentiality) are also specified. The 3GPP specification work is done in Technical Specification Groups (TSGs) and Working Groups (WGs).[23] There are three Technical Specifications Groups, each of which consists of multiple WGs: RAN (Radio Access Network): RAN specifies the UTRAN and the E-UTRAN. It is composed of six working groups. WG Shorthand Scope Specifications RAN WG1 RAN1 Radio Layer 1 (Physical layer) List of specs RAN WG2 RAN2 Radio Layer 2 and Radio Layer 3 Radio Resource Control List of specs RAN WG3 RAN3 UTRAN, E-UTRAN, NG-RAN architecture and related network interfaces List of specs RAN WG4 RAN4 Radio performance and protocol aspects List of specs RAN WG5 RAN5 Mobile terminal conformance testing List of specs SA (Service and System Aspects): SA specifies the service requirements and the overall architecture of the 3GPP system. It is also responsible for the coordination of the project. SA is composed of six working groups. WG Shorthand Scope Specifications SA WG1 SA1 Services List of specs SA WG2 SA2 Architecture List of specs SA WG3 SA3 Security List of specs SA WG4 SA4 Codec List of specs SA WG5 SA5 Management, Orchestration and Charging List of specs SA WG6 SA6 Application Enablement and Critical Communication Applications List of specs CT (Core Network and Terminals): CT specifies the core network and terminal parts of 3GPP. It includes the core network – terminal layer 3 protocols. It is composed of five working groups. WG Shorthand Scope Specifications CT WG1 CT1 User Equipment – Core Network protocols List of specs CT WG2 CT2 closed CT WG3 CT3 Interworking with external networks List of specs CT WG4 CT4 Core Network Protocols List of specs CT WG5 CT5 closed CT WG6 CT6 Smart Card Application Aspects List of specs GERAN (GSM/EDGE Radio Access Network): The closure of GERAN was announced in January 2016.[24] The specification work on legacy GSM/EDGE system was transferred to RAN WG, RAN6. RAN6 was closed in July 2020 (. The 3GPP structure also includes a Project Coordination Group, which is the highest decision-making body. Its missions include the management of overall timeframe and work progress. 3GPP standardization work is contribution-driven. Companies ("individual members") participate through their membership to a 3GPP Organizational Partner. As of December 2020, 3GPP is composed of 719 individual members.[25] Specification work is done at WG and at TSG level:[26] the 3GPP WGs hold several meetings a year. They prepare and discuss change requests against 3GPP specifications. A change request accepted at WG level is called "agreed". the 3GPP TSGs hold plenary meetings quarterly. The TSGs can "approve" the change requests that were agreed at WG level. Some specifications are under the direct responsibility of TSGs and therefore, change requests can also be handled at TSG level. The approved change requests are subsequently incorporated in 3GPP specifications. 3GPP follows a three-stage methodology as defined in ITU-T Recommendation I.130:[27] stage 1 specifications define the service requirements from the user point of view. stage 2 specifications define an architecture to support the service requirements. stage 3 specifications define an implementation of the architecture by specifying protocols in details. Test specifications are sometimes defined as stage 4, as they follow stage 3. Specifications are grouped into releases. A release consists of a set of internally consistent set of features and specifications. Timeframes are defined for each release by specifying freezing dates. Once a release is frozen, only essential corrections are allowed (i.e. addition and modifications of functions are forbidden). Freezing dates are defined for each stage. The 3GPP specifications are transposed into deliverables by the Organizational Partners. List of mobile phone generations Universal Mobile Telecommunications System (UMTS) 3GPP Long Term Evolution Evolution to 3G IP Multimedia Subsystem 3GP 3GPP2 – The 3GPP's counterpart in the CDMA2000 sphere. GSM services LoRaWAN Telecoms & Internet converged Services & Protocols for Advanced Networks (TISPAN) Open Mobile Alliance Service data adaptation protocol Service layer European Telecommunications Standards Institute ^ 3GPP Scope and Objectives, 31 August 2007 ^ "About 3GPP". 3GPP. Retrieved 10 March 2019. ^ "3GPP Background". 7 June 2000. Archived from the original on 6 July 2000. ^ "3rd Generation Partnership Project 2". Archived from the original on 23 January 2004. Retrieved 25 November 2012. ^ "Mobile Competence Centre". 3GPP. Retrieved 10 March 2019. ^ a b "Partners". 3GPP. Retrieved 1 January 2025. ^ Releases ^ "3GPP Specifications – Releases (and phases and stages)". Retrieved 16 September 2010. ^ Overview of 3GPP Release 99, Summary of all Release 99 Features. ETSI Mobile Competence Centre, Version xx/07/04 ^ Overview of 3GPP Release 4, Summary of all Release 4 Features, v.1.1.0 (draft) ETSI Mobile Competence Centre 2004 ^ Summary of all Release 5 Features, ETSI Mobile Competence Centre, Version 9 September 2003 ^ Overview of 3GPP Release 6, Summary of all Release 6 Features, Version TSG #33, ETSI Mobile Competence Centre 2006 ^ Review of the Work Plan at Plenaries #31, 3GPP, SP-060232 3GPP TSG SA#31 Sanya, 13–16 March 2006 ^ "Highlights of 3GPP Release 12". Retrieved 20 November 2014. ^ "Release 13 priorities". Retrieved 20 November 2014. ^ "3GPP Portal > Specifications". portal.3gpp.org. Retrieved 27 October 2016. ^ "3GPP Portal > Specifications". portal.3gpp.org. Retrieved 27 October 2016. ^ "3GPP Portal > Specifications". portal.3gpp.org. Retrieved 14 July 2020. ^ a b "5G evolution toward 5G advanced: An overview of 3GPP releases 17 and 18". Ericsson. Retrieved 25 August 2022. ^ "Release 18". 3gpp.org. 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Retrieved 11 April 2011. ^ closure of GERAN ^ 3GPP membership ^ 3GPP TR 21.900 Technical Specification Group working methods ^ ITU-T Recommendation I.130 3GPP website 3GPP Standards List of Acronyms & Terminology 3GPP freely published, detailed technical specifications 3GPP releases descriptions ETSI GSM UMTS 3GPP Numbering Cross Reference TS/TR specification numbering Tool for visualizing multiple inter-related 3gpp standards Tool for visualizing, decoding, encoding network protocol messages defined by 3gpp LTE-3GPP.info: online 3GPP messages decoder fully supporting Rel.15 Retrieved from " 6Multimedia file format families 3GPFilename extension .3gp, .3gppInternet media type video/3gpp, audio/3gppUniform Type Identifier (UTI)public.3gppDeveloped by3GPPInitial release4 April 2003; 22 years ago (2003-04-04)[1]Latest release17.0.0[1]7 April 2022; 3 years ago (2022-04-07) Type of formatContainer formatContainer foraudio, video, textExtended fromMPEG-4 Part 12Open format?YesFree format?No 3G2Filename extension .3g2, .3gp2, .3gpp2Internet media type video/3gpp2, audio/3gpp2Uniform Type Identifier (UTI)public.3gpp2Developed by3GPP2Initial releaseJanuary 2004; 21 years ago (2004-01)[2]Latest releaseC.S0050-B v1.0[2]September 2024; 8 months ago (2024-09) Type of formatContainer formatContainer foraudio, video, textExtended fromMPEG-4 Part 12Open format?YesFree format?yes 3GP (3GPP file format) is a digital multimedia container format defined by the Third Generation Partnership Project (3GPP) for 3G UMTS multimedia services, largely based on MPEG-4 Part 12. 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View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500)Au file format (links | edit) Data compression (links | edit) GIF (links | edit) H.263 (links | edit) ITU-T (links | edit) JPEG (links | edit) JPEG Network Graphics (links | edit) MP3 (links | edit) Moving Picture Experts Group (links | edit) MPEG-1 (links | edit) MPEG-2 (links | edit) MPEG-4 (links | edit) Multiple-image Network Graphics (links | edit) Ogg (links | edit) PNG (links | edit) QuickTime (links | edit) Run-length encoding (links | edit) Vorbis (links | edit) WAV (links | edit) Windows Media Audio (links | edit) Audio Video Interleave (links | edit) M-law algorithm (links | edit) ATRAC (links | edit) Image compression (links | edit) RealMedia (links | edit) Video codec (links | edit) RealAudio (links | edit) Discrete cosine transform (links | edit) JPEG 2000 (links | edit) Shorten (codec) (links | edit) Interchange File Format (links | edit) Audio Interchange File Format (links | edit) DivX (links | edit) FLAC (links | edit) Dolby Digital (links | edit) G.723.1 (links | edit) G.711 (links | edit) Resource Interchange File Format (links | edit) TIFF (links | edit) Material Exchange Format (links | edit) MPEG-1 Audio Layer II (links | edit) Theora (links | edit) Dirac (video compression format) (links | edit) Monkey's Audio (links | edit) Motion JPEG (links | edit) MPEG-7 (links | edit) MPEG-21 (links | edit) Xvid (links | edit) FFmpeg (links | edit) Advanced Audio Coding (links | edit) View (previous 50 | next 50) (20 | 50 | 100 | 250 | 500) Retrieved from " WhatLinksHere/3GP_and_3G2"