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Messaging and VoIP service owned by Meta WhatsApp MessengerScreenshot Screenshot depicting WhatsApp's home screen in 2025Original author(s)Brian Acton, Jan KoumDeveloper(s)Meta Platforms, Will Cathcart (Head of WhatsApp)[1][2]Initial releaseFebruary 2009; 16 years ago (2009-02)Stable release(s) [±]iOS25.4.77[3] / February 25, 2025; 4 months ago (February 25, 2025)Android2.25.6.74[4] / March 10, 2025; 3 months ago (March 10, 2025)Windows2.2502.3.0[5] / January 20, 2025; 5 months ago (January 20, 2025)macOS25.4.77[3] / February 25, 2025; 4 months ago (February 25, 2025) Written inErlang[6]Operating systemAndroid, iOS, iPadOS, KaiOS, macOS, Windows, Windows Phone, Wear OS, Meta QuestSize183.7 MB (iOS)[7] 48.02 MB (Android)[8]Available in40 (iOS) and 60 (Android)[9] languagesTypeSocial media, instant messaging, VoIPLicenseProprietary software with EULA"European Region"[10]"others"[11]Websitewhatsapp.com This article is part of a series aboutMeta Platforms History Instagram WhatsApp Acquisitions Products and services Facebook 2021 outage Features Dating Feed Like button Reels Other products Instagram Threads Messenger Kids Meta AI Meta Portal Quest Quest 2 Quest 3 Quest 3S Quest Pro Supernatural Ray-Ban Stories WhatsApp People Executives and board members Mark Zuckerberg Sheryl Sandberg Notable employees Adam Mosseri Related organizations Oversight Board Business Criticism Privacy concerns Content management Censorship of Censorship by Cambridge Analytica data scandal 2020 ad boycotts 2021 company files leak WhatsApp security and privacy features WhatsApp snooping scandal Litigation Young v. Facebook, Inc. (2011) Fraley v. Facebook, Inc. (2016) Force v. Facebook, Inc. (2019) FTC v. Meta Platforms (ongoing) Related Facebook, Inc. IPO vte WhatsApp (officially WhatsApp Messenger) is an American social media, instant messaging (IM), and voice-over-IP (VoIP) service owned by technology conglomerate Meta.[12] It allows users to send text, voice messages and video messages,[13] make voice and video calls, and share images, documents, user locations, and other content.[14][15] WhatsApp's client application runs on mobile devices, and can be accessed from computers.[16] The service requires a cellular mobile telephone number to sign up.[17] WhatsApp was launched in February 2009. In January 2018, WhatsApp released a standalone business app called WhatsApp Business which can communicate with the standard WhatsApp client.[18][19] The service was created by WhatsApp Inc. of Mountain View, California, which was acquired by Facebook in February 2014 for approximately US$19.3 billion.[20][21] It became the world's most popular messaging application by 2015,[12][22] and had more than 2 billion users worldwide by February 2020,[23] with WhatsApp Business having approximately 200 million monthly users by 2023.[24] By 2016, it had become the primary means of Internet communication in regions including the Americas, the Indian subcontinent, and large parts of Europe and Africa.[12] For a chronological guide, see Timeline of WhatsApp. WhatsApp was founded in February 2009 by Brian Acton and Jan Koum, former employees of Yahoo! A month earlier, after Koum purchased an iPhone, he and Acton decided to create an app for the App Store. The idea started off as an app that would display statuses in a phone's Contacts menu, showing if a person was at work or on a call.[25] Their discussions often took place at the home of Koum's Russian friend Alex Fishman in West San Jose. They realized that to take the idea further, they would need an iPhone developer. Fishman visited RentACoder.com, found Russian developer Igor Solomennikov, and introduced him to Koum.[25] Koum named the app WhatsApp to sound like "what's up". On February 24, 2009, he incorporated[60] WhatsApp Inc. in California. However, when early versions of WhatsApp kept crashing, Koum considered giving up and looking for a new job. Acton encouraged him to wait for a "few more months".[25] In June 2009, when the app had been downloaded by only a handful of Fishman's Russian-speaking friends, Apple launched push notifications, allowing users to be pinged even when not using the app. Koum updated WhatsApp so that everyone in the user's network would be notified when a user's status changed. This new facility, to Koum's surprise, was used by users to ping "each other with jokey custom statuses like, 'I woke up late' or 'I'm on my way.'"[25] Fishman said, "At some point it sort of became instant messaging".[25] WhatsApp 2.0, released for iPhone in August 2009, featured a purpose-designed messaging component; the number of active users suddenly increased to 250,000. Although Acton was working on another startup idea, he decided to join the company.[25] In October 2009, Acton persuaded five former friends at Yahoo! to invest $250,000 in seed funding, and Acton became a co-founder and was given a stake. He officially joined WhatsApp on November 1.[25] Koum then hired a friend in Los Angeles, Chris Peiffer, to develop a BlackBerry version, which arrived two months later.[25] Subsequently, WhatsApp for Symbian OS was added in May 2010, and for Android OS in August 2010.[27] In 2010 Google made multiple acquisition offers for WhatsApp, which were all declined.[61] To cover the cost of sending verification texts to users, WhatsApp was changed from a free service to a paid one. In December 2009, the ability to send photos was added to the iOS version. By early 2011, WhatsApp was one of the top 20 apps in the U.S. Apple App Store.[25] In April 2011, Sequoia Capital invested about $8 million for more than 15% of the company, after months of negotiation by Sequoia partner Jim Goetz.[62][63][64] By February 2013, WhatsApp had about 200 million active users and 50 staff members. Sequoia invested another $50 million, and WhatsApp was valued at $1.5 billion.[25] Some time in 2013[65] WhatsApp acquired Santa Clara–based startup SkyMobius, the developers of Vtok,[66] a video and voice calling app.[67] In a December 2013 blog post, WhatsApp claimed that 400 million active users used the service each month.[68] The year 2013 ended with $148 million in expenses, of which $138 million in losses.[69] On February 19, 2014, one year after a venture capital financing round at a $1.5 billion valuation,[38] Facebook, Inc. (now Meta Platforms) announced it was acquiring WhatsApp for US$19 billion, its largest acquisition to date.[21] At the time, it was the largest acquisition of a venture-capital-backed company in history.[20] Sequoia Capital received an approximate 5,000% return on its initial investment.[70] Facebook, which was advised by Allen & Co, paid $4 billion in cash, $12 billion in Facebook shares, and, advised by Morgan Stanley, an additional $3 billion in restricted stock units granted to WhatsApp's founders Koum and Acton.[71] Employee stock was scheduled to vest over four years subsequent to closing.[21] Days after the announcement, WhatsApp users experienced a loss of service, leading to anger across social media.[72] The acquisition was influenced by the data provided by Onavo, Facebook's research app for monitoring competitors and trending usage of social activities on mobile phones, as well as startups that were performing "unusually well".[73][74][75] The acquisition caused many users to try, or move to, other message services. Telegram claimed that it acquired 8 million new users.[76] and Line, 2 million.[77] At a keynote presentation at the Mobile World Congress in Barcelona in February 2014, Facebook CEO Mark Zuckerberg said that Facebook's acquisition of WhatsApp was closely related to the Internet.org vision.[78][79] A TechCrunch article said about Zuckerberg's vision:The idea, he said, is to develop a group of basic internet services that would be free of charge to use – "a 911 for the internet". These could be a social networking service like Facebook, a messaging service, maybe search and other things like weather. Providing a bundle of these free of charge to users will work like a gateway drug of sorts – users who may be able to afford data services and phones these days just don't see the point of why they would pay for those data services. This would give them some context for why they are important, and that will lead them to pay for more services like this – or so the hope goes.[78] Three days after announcing the Facebook purchase, Koum said they were working to introduce voice calls. He also said that new mobile phones would be sold in Germany with the WhatsApp brand, and that their ultimate goal was to be on all smartphones.[80] In August 2014, WhatsApp was the most popular messaging app in the world, with more than 600 million users.[81] By early January 2015, WhatsApp had 700 million monthly users and over 30 billion messages every day.[82] In April 2015, Forbes predicted that between 2012 and 2018, the telecommunications industry would lose $386 billion because of "over-the-top" services like WhatsApp and Skype.[83] That month, WhatsApp had over 800 million users.[84][85] By September 2015, it had grown to 900 million;[86] and by February 2016, one billion.[87] On November 30, 2015, the Android WhatsApp client made links to messaging service Telegram unclickable and not copyable.[88][89][90] Multiple sources confirmed that it was intentional, not a bug,[90] and that it had been implemented when the Android source code that recognized Telegram URLs had been identified.[90] (The word "telegram" appeared in WhatsApp's code.[90]) Some considered it an anti-competitive measure;[88][89][90] WhatsApp offered no explanation. On January 18, 2016, WhatsApp's co-founder Jan Koum announced that it would no longer charge users a $1 annual subscription fee, in an effort to remove a barrier faced by users without payment cards.[91][92] He also said that the app would not display any third-party ads, and that it would have new features such as the ability to communicate with businesses.[87][93] On May 18, 2017, the European Commission announced that it was fining Facebook €110 million for "providing misleading information about WhatsApp takeover" in 2014. The Commission said that in 2014 when Facebook acquired the messaging app, it "falsely claimed it was technically impossible to automatically combine user information from Facebook and WhatsApp." However, in the summer of 2016, WhatsApp had begun sharing user information with its parent company, allowing information such as phone numbers to be used for targeted Facebook advertisements. Facebook acknowledged the breach, but said the errors in their 2014 filings were "not intentional".[94] In September 2017, WhatsApp's co-founder Brian Acton left the company to start a nonprofit group,[95] later revealed as the Signal Foundation, which developed the WhatsApp competitor Signal.[96] He explained his reasons for leaving in an interview with Forbes a year later.[97] WhatsApp also announced a forthcoming business platform to enable companies to provide customer service at scale,[98] and airlines KLM and Aeroméxico announced their participation in the testing.[99][100][101][98] Both airlines had previously launched customer services on the Facebook Messenger platform. In January 2018, WhatsApp launched WhatsApp Business for small business use.[57] In April 2018, WhatsApp co-founder and CEO Jan Koum announced he would be leaving the company.[102] By leaving before November 2018, due to concerns about privacy, advertising, and monetization by Facebook,[103] Acton and Koum were initially believed to have given up $1.3 billion in unvested stock options,[104] however, it was later reported that Koum retained $450M worth of options via a "rest and vest" program.[105][106] Facebook later announced that Koum's replacement would be Chris Daniels.[107] On November 25, 2019, WhatsApp announced an investment of $250,000 through a partnership with Startup India to provide 500 startups with Facebook ad credits of $500 each.[108] In December 2019, WhatsApp announced that a new update would lock out any Apple users who had not updated to iOS 9 or higher and Samsung, Huawei, Sony and Google users who had not updated to version 4.0 by February 1, 2020. The company also reported that Windows Phone operating systems would no longer be supported after December 31, 2019.[109] WhatsApp was announced to be the 3rd most downloaded mobile phone app of the decade 2010–2019.[110] In March, WhatsApp partnered with the World Health Organization and UNICEF to provide messaging hotlines for people to get information on the 2019–2020 coronavirus pandemic.[111] In the same month WhatsApp began testing a feature to help users find out more information and context about information they receive to help combat misinformation.[112][113][114][115] In January 2021, WhatsApp announced a controversial new Privacy Policy allowing WhatsApp to share data with its parent company, Facebook; users who did not accept by February 8, 2021, would lose access to the app. This led many users to ditch WhatsApp and move to other services such as Signal and Telegram.[116] However, Facebook said the WhatsApp policy would not apply in the EU, since it violates the principles of GDPR.[117][118] Facing criticism, WhatsApp postponed the update to May 15, 2021,[119][120] but said they had no plans to limit functionality of users, nor nag users who did not approve the new terms.[121] On October 4, 2021, Facebook had its worst outage since 2008, which also affected other platforms owned by Facebook, such as Instagram and WhatsApp.[122][123] In August 2022, WhatsApp launched an integration with JioMart, available only to users in India. Local users can text special numbers in the app to launch an in-app shopping process, where they can order groceries.[124] In 2022, WhatsApp added the ability for users to turn off their online status.[125] In March 2024, Meta announced that WhatsApp would let third-party messaging services enable interoperability with WhatsApp, a requirement of the EU's Digital Markets Act (DMA). This allows users to send messages between other messaging apps and WhatsApp while maintaining end-to-end encryption.[126][127] This article is in list format but may read better as prose. You can help by converting this article, if appropriate. Editing help is available. (January 2025) In November 2010, a slate of improvements for the iOS version of WhatsApp were released: including the ability to search for messages in your chat history, trimming long videos to a sendable size, the ability to cancel media messages as they upload or download, and previewing photos before sending them.[128] In March 2012, WhatsApp improved its location-sharing function, allowing users to share not only their location, but also the location of places, such as restaurants or hotels.[128] In August 2013, WhatsApp added voice messages to their apps, giving users a way to send short audio recordings directly in their chats.[129][130] In January 2015, WhatsApp launched a web client that allowed users to scan a QR code with their mobile app, mirroring their chats to their browser. The web client was not standalone, and required the user's phone to stay on and connected to the internet. It was also not available for iOS users on launch, due to limitations from Apple.[131][132] Voice calls between two accounts were added to the app in March and April 2015.[133] By June 2016, the company's blog reported more than 100 million voice calls per day were being placed on WhatsApp.[134] On November 10, 2016, WhatsApp launched a beta version of two-factor authentication for Android users, which allowed them to use their email addresses for further protection.[135] Also in November 2016, Facebook ceased collecting WhatsApp data for advertising in Europe.[94] Later that month, video calls between two accounts were introduced.[136] On February 24, 2017, (WhatsApp's 8th birthday), WhatsApp launched a new Status feature similar to Snapchat and Facebook stories.[137] In July 2017, WhatsApp added support for file uploads of all file types, with a limit of 100 MB. Previously between March 2016 and May 2017, only limited file types categorised as images (JPG, PNG, GIF), videos (MP4, AVI), and documents (CSV, DOC/DOCX, PDF, PPT/PPTX, RTF, TXT, XLS/XLSX), were allowed to be shared for file attachments.[138][139] Later in September 2018, WhatsApp introduced group audio and video call features.[140][141] In October, the "Swipe to Reply" option was added to the Android beta version, 16 months after it was introduced for iOS.[142] On October 25, 2018, WhatsApp announced support for Stickers. But unlike other platforms WhatsApp requires third-party apps to add Stickers to WhatsApp.[143] In October 2019, WhatsApp officially launched a new fingerprint app-locking feature for Android users.[144] In early 2020, WhatsApp launched its "dark mode" for iPhone and Android devices – a new design consisting of a darker palette.[145] In October 2020, WhatsApp rolled out a feature allowing users to mute both individuals and group chats forever. The mute options are "8 hours", "1 week", and "Always". The "Always" option replaced the "1 year" option that was originally part of the settings.[146][147] In March 2021, WhatsApp started rolling out support for third-party animated stickers, initially in Iran, Brazil and Indonesia,[148] then worldwide.[149] In July 2021, WhatsApp announced forthcoming support for sending uncompressed images and videos in 3 options: Auto, Best Quality and Data Saver,[150] and end-to-end encryption for backups stored in Facebook's cloud.[151] The company was also testing multi-device support, allowing Computer users to run WhatsApp without an active phone session.[152] In August 2021, WhatsApp launched a feature that allows chat history to be transferred between mobile operating systems. This was implemented only on Samsung phones, with plans to expand to Android and iOS "soon".[153] WhatsApp has the facility to hide users' online status ("Last Seen"). In December 2021, WhatsApp changed the default setting from "everyone" to only people in the user's contacts or who have been conversed with ("nobody" is also an option).[154] In April 2022, WhatsApp announced undated plans to roll out a Communities feature allowing several group chats to exist in a shared space, getting unified notifications and opening up smaller discussion groups. The company also announced plans to implement reactions, the ability for administrators to delete messages in groups and voice calls up to 32 participants.[155] In May 2022, the file upload limit was raised from 100 MB to 2 GB, and maximum group size increased to 512 members.[156] In April 2023, the app rolled out a feature that would allow account access across multiple phones, in a shift that would make it more like competitors. Messages would still be end-to-end encrypted.[157] WhatsApp officially rolled out the Companion mode for Android users, allowing you to link up to five Android phones to a single account. Now, the feature is also made available to iOS users, allowing them to link up to four iPhones.[158] In May 2023, WhatsApp allowed users to edit messages, aligning itself with competitors such as Telegram and Signal which already offered this feature. According to the company, messages could be edited within a 15-minute window after being sent. Edited messages were tagged as "edited" to inform recipients that the content had been modified.[159] WhatsApp has rolled out a feature called 'Voice Status Updates', which allows users to record voice notes and share them as their status on the app.[160] In June 2023, a feature called WhatsApp Channels was launched which allows content creators, public figures and organizations to send newsletter-like broadcasts to large numbers of users. Unlike messages in groups or private chats, channels are not end-to-end encrypted.[161] Channels were initially only available to users in Colombia and Singapore, then later Egypt, Chile, Malaysia, Morocco, Ukraine, Kenya and Peru before becoming widely available in September 2023.[162][163][164][165] In July 2023, video messages were added to WhatsApp. Similar to voice messages, this feature allows users to record and send short videos directly in a chat. This lets users share videos of themselves more quickly, and without adding anything to their device's gallery. Currently, video messages are limited to 60 seconds.[166][167] In October 2023, support for logging in to multiple accounts was added, allowing users to switch between different WhatsApp accounts in the same app. They also introduced passkey support, where a user can verify their login with on-device biometrics, rather than SMS. Text formatting options like code blocks, quote blocks, and bulleted lists and became available for the first time.[168] In November 2023, WhatsApp added a "voice chat" feature for groups with more than 32 members. Unlike their 32-person group calls, starting a voice chat does not call all group members directly; they instead receive a notification to join the voice chat.[169] WhatsApp also began rolling out support for sending login codes to a linked email address, rather than via SMS.[170] In a later update on November 30, WhatsApp added a Secret Code feature, which allows those who use locked chats to enter a unique password that hides those chats from view when unlocking the app.[171][172] In December 2023, WhatsApp's "View Once" feature expanded to include voice messages. Voice messages sent this way are deleted after the recipient listens to them the first time.[173][174] In April 2024, an AI-powered "Smart Assistant" became widely available in WhatsApp, allowing users to ask it questions or have it complete tasks such as generating images. The assistant is based on the LLaMa 3 model, and is also available on other Meta platforms like Facebook and Instagram.[175][176] WhatsApp also introduced chat filters, allowing users to sort their chats by All, Unread or Groups.[177] In June 2024, improvements were made to voice and video calls, allowing up to 32 participants in video calls, adding audio to screen sharing, and introducing a new codec to increase call reliability.[178] In September 2024, WhatsApp expanded support for Meta AI, allowing users to send text and photos to Meta AI to ask questions, identify objects, translate text or edit pictures.[13][14] In October 2024, WhatsApp expanded their chat filter feature, adding the ability for users to create custom lists that contain specific chats of their choice.[179] In November 2024, the ability to transcribe voice messages was added, allowing users to read out what was said in a voice message, rather than listening to the audio.[180] In December 2024, WhatsApp introduced several new video calling features, including the ability to select specific participants from a group to make a call, rather than calling all group members. Visual effects also became available, adding visual filters to a user's video feed.[181] In December 2024, WhatsApp introduced a reverse image search feature, allowing users to verify image authenticity directly within the app using Google Search.[182][183] After months at beta stage, the official first release of WhatsApp for iOS launched in November 2009. In January 2010, support for BlackBerry smartphones was added; and subsequently for Symbian OS in May 2010, and for Android OS in August 2010. In August 2011, a beta for Nokia's non-smartphone OS Series 40 was added. A month later, support for Windows Phone was added, followed by BlackBerry 10 in March 2013.[184] In April 2015, support for Samsung's Tizen OS was added.[185] The oldest device capable of running WhatsApp was the Symbian-based Nokia N95 released in March 2007, but support was later discontinued. In August 2014, WhatsApp released an update, adding support for Android Wear smartwatches.[186] On January 21, 2015, WhatsApp launched WhatsApp Web, a browser-based web client that could be used by syncing with a mobile device's connection.[42] On February 26, 2016, WhatsApp announced they would cease support for BlackBerry (including BlackBerry 10), Nokia Series 40, and Symbian S60,[187][188] as well as older versions of Android (2.2), Windows Phone (7.0), and iOS (6), by the end of 2016.[189] BlackBerry, Nokia Series 40, and Symbian support was then extended to June 30, 2017.[190] In June 2017, support for BlackBerry and Series 40 was once again extended until the end of 2017, while Symbian was dropped.[191] Support for BlackBerry and older (version 8.0) Windows Phone and older (version 6) iOS devices was dropped on January 1, 2018, but was extended to December 2018 for Nokia Series 40.[192] In July 2018, it was announced that WhatsApp would soon be available for KaiOS feature phones.[193][194] WhatsApp added support for iPads and iPadOS on May 27, 2025.[195] WhatsApp's principal platforms, which are fully supported, are devices supporting mobile telephony running Android, and iPhones.[7] WhatsApp was officially made available for PCs through a web client, under the name WhatsApp Web,[196] in late January 2015 through an announcement made by Koum on his Facebook page: "Our web client is simply an extension of your phone: the web browser mirrors conversations and messages from your mobile device—this means all of your messages still live on your phone". As of January 21, 2015, the desktop version was only available to Android, BlackBerry, and Windows Phone users. Later on, it also added support for iOS, Nokia Series 40, and Nokia S60 (Symbian).[197][198] Previously the WhatsApp user's handset had to be connected to the Internet for the browser application to function but as of an update in October 2021 that is no longer the case.[199] All major desktop browsers are supported except for Internet Explorer. WhatsApp Web's user interface is based on the default Android one and can be accessed through web.whatsapp.com. Access is granted after the users scan their personal QR code through their mobile WhatsApp application. There are similar solutions for macOS, such as the open-source ChitChat, previously known as WhatsMac.[200][201][202] In January 2021, the limited Android beta version allowed users to use WhatsApp Web without having to keep the mobile app connected to the Internet. In March 2021, this beta feature was extended to iOS users.[203] However, linked devices (using WhatsApp Web, WhatsApp Desktop or Facebook Portal) will become disconnected if people do not use their phone for over 14 days.[204] The multi-device beta can only show messages for the last three months on the web version, which was not the case without the beta because the web version was syncing with the phone.[205] Since April 2022, the multi-device beta is integrated by default in WhatsApp and users cannot check old messages on the web version anymore.[206][207] On May 10, 2016, the messaging service was introduced for both Microsoft Windows and macOS operating systems. Support for video and voice calls from desktop clients was later added. Similar to the WhatsApp Web format, the app, which synchronises with a user's mobile device, is available for download on the website. It supported operating systems Windows 8 and OS X 10.10 and higher.[56][208] In 2023, WhatsApp replaced the Electron-based apps with native versions for their respective platforms.[209][210] The Windows version is based on UWP while the Mac version is a port of the iOS version using Catalyst technology. WhatsApp added support for Android Wear (now called Wear OS) in 2014.[186] WhatsApp uses a customized version of the open standard Extensible messaging and presence protocol (XMPP).[211] A 2019 document of DOJ confirms by quotes "FunXMPP" as the protocol operated by Whatsapp,[212] related to a dispute to Pegasus malware, against NSO firm.[213] Upon installation, it creates a user account using the user's phone number as the username (Jabber ID: [phone number]@s.whatsapp.net). WhatsApp software automatically compares all the phone numbers from the device's address book with its central database of WhatsApp users to automatically add contacts to the user's WhatsApp contact list. Previously the Android and Nokia Series 40 versions used an MD5-hashed, reversed-version of the phone's IMEI as password,[214] while the iOS version used the phone's Wi-Fi MAC address instead of IMEI.[215][216] A 2012 update implemented generation of a random password on the server side.[217] Alternatively a user can send to any contact in the WhatsApp database through the url number] where [phone number] is the number of the contact including the country code. Some devices using dual SIMs may not be compatible with WhatsApp, though there are unofficial workarounds to install the app.[218] In February 2015, WhatsApp implemented voice calling, which helped WhatsApp to attract a different segment of the user population.[219][220] WhatsApp's voice codec is Opus,[221][222][223] which uses the modified discrete cosine transform (MDCT) and linear predictive coding (LPC) audio compression algorithms.[224] WhatsApp uses Opus at 8–16 kHz sampling rates.[221][223] On November 14, 2016, WhatsApp video calling for users using Android, iPhone, and Windows Phone devices.[225][226] In November 2017, WhatsApp implemented a feature giving users seven minutes to delete messages sent by mistake.[227] Multimedia messages are sent by uploading the image, audio or video to be sent to an HTTP server and then sending a link to the content along with its Base64 encoded thumbnail, if applicable.[228] WhatsApp uses a "store and forward" mechanism for exchanging messages between two users. When a user sends a message, it is stored on a WhatsApp server, which tries to forward it to the addressee, and repeatedly requests acknowledgement of receipt. When the message is acknowledged, the server deletes it; if undelivered after 30 days, it is also deleted.[229][self-published source?] On November 18, 2014, Open Whisper Systems announced a partnership with WhatsApp to provide end-to-end encryption by incorporating the encryption protocol used in Signal into each WhatsApp client platform.[230] Open Whisper Systems said that they had already incorporated the protocol into the latest WhatsApp client for Android, and that support for other clients, group/media messages, and key verification would be coming soon after.[231] WhatsApp confirmed the partnership to reporters, but there was no announcement or documentation about the encryption feature on the official website, and further requests for comment were declined.[232] In April 2015, German magazine Heise security used ARP spoofing to confirm that the protocol had been implemented for Android-to-Android messages, and that WhatsApp messages from or to iPhones running iOS were still not end-to-end encrypted.[233] They expressed the concern that regular WhatsApp users still could not tell the difference between end-to-end encrypted messages and regular messages.[233] On April 5, 2016, WhatsApp and Open Whisper Systems announced that they had finished adding end-to-end encryption to "every form of communication" on WhatsApp, and that users could now verify each other's keys.[53][54] Users were also given the option to enable a trust on first use mechanism to be notified if a correspondent's key changes.[234] According to a white paper that was released along with the announcement, WhatsApp messages are encrypted with the Signal Protocol.[235] WhatsApp calls are encrypted with SRTP, and all client-server communications are "layered within a separate encrypted channel".[235] On October 14, 2021, WhatsApp rolled out end-to-end encryption for backups on Android and iOS. The feature has to be turned on by the user and provides the option to encrypt the backup either with a password or a 64-digit encryption key.[236] The application can store encrypted copies of the chat messages onto the SD card, but chat messages are also stored unencrypted in the SQLite database file "msgstore.db".[237] WhatsApp Payments (marketed as WhatsApp Pay) is a peer-to-peer money transfer feature. The service became generally available in India and Brazil, and in Singapore for WhatsApp Business transactions only.[238][239] In July 2017, WhatsApp received permission from the National Payments Corporation of India (NPCI) to enter into partnership with multiple Indian banks,[240] for transactions over Unified Payments Interface (UPI),[241] which relies on mobile phone numbers to make account-to-account transfers.[242] In November 2020, UPI payments via WhatsApp were initially restricted to 20 million users,[243] and to 100 million users in April 2022,[244] and became generally available to everyone in August 2022.[245] See also: Diem (digital currency) On February 28, 2019, The New York Times reported that Facebook was "hoping to succeed where Bitcoin failed" by developing an in-house cryptocurrency that would be incorporated into WhatsApp. The project reportedly involved more than 50 engineers under the direction of former PayPal president David A. Marcus. This "Facebook coin" would reportedly be a stablecoin pegged to the value of a basket of different foreign currencies.[246] In June 2019, Facebook said that the project would be named Libra, and that a digital wallet named "Calibra" was to be integrated into Facebook and WhatsApp.[247] After financial regulators in many regions raised concerns, Facebook stated that the currency, renamed Diem since December 2020, would require a government-issued ID for verification, and the wallet app would have fraud protection. Calibra was rebranded to Novi in May 2020.[248][249][250] Meta (formerly Facebook) ended its Novi project on September 1, 2022.[251][252] WhatsApp has repeatedly imposed limits on message forwarding in response to the spread of misinformation in countries including India and Australia. The measure, first introduced in 2018 to combat spam, was expanded and remained active in 2021. WhatsApp stated that the forwarding limits had helped to curb the spread of misinformation regarding COVID-19.[253][254][255] Main article: Indian WhatsApp lynchings See also: WhatsApp University In India, WhatsApp encouraged people to report messages that were fraudulent or incited violence after lynch mobs in India murdered innocent people because of malicious WhatsApp messages falsely accusing the victims of intending to abduct children.[256] There were a series of incidents between 2017 and 2020, after which WhatsApp announced changes for Indian users of the platform that labels forwarded messages as such.[257] In an investigation on the use of social media in politics, it was found that WhatsApp was being abused for the spread of fake news in the 2018 presidential elections in Brazil.[258] It was reported that US$3 million was spent in illegal concealed contributions related to this practice.[259] Researchers and journalists called on WhatsApp's parent company, Facebook, to adopt measures similar to those adopted in India and restrict the spread of hoaxes and fake news.[258] Main article: Reception and criticism of WhatsApp security and privacy features WhatsApp was initially criticized for its lack of encryption, sending information as plaintext.[260] Encryption was first added in May 2012.[261][262][263] End-to-end encryption was only fully implemented in April 2016 after a two-year process. As of September 2021[update], it is known that WhatsApp makes extensive use of outside contractors and artificial intelligence systems to examine certain user messages, images and videos (those that have been flagged by users as possibly abusive); and turns over to law enforcement metadata including critical account and location information.[264] In 2016, WhatsApp was widely praised for the addition of end-to-end encryption and earned a 6 out of 7 points on the Electronic Frontier Foundation's "Secure Messaging Scorecard".[265] WhatsApp was criticized by security researchers and the Electronic Frontier Foundation for using backups that are not covered by end-to-end encryption and allow messages to be accessed by third-parties.[266][267] In May 2019, a security vulnerability in WhatsApp was found and fixed that allowed a remote person to install spyware by making a call which did not need to be answered.[268][269] In September 2019, WhatsApp was criticized for its implementation of a 'delete for everyone' feature. iOS users can elect to save media to their camera roll automatically. When a user deletes media for everyone, WhatsApp does not delete images saved in the iOS camera roll and so those users are able to keep the images. WhatsApp released a statement saying that "the feature is working properly", and that images stored in the camera roll cannot be deleted due to Apple's security layers.[270] In November 2019, WhatsApp released a new privacy feature that let users decide who can add them to groups.[271] In December 2019, WhatsApp confirmed a security flaw that would allow hackers to use a malicious GIF image file to gain access to the recipient's data. When the recipient opened the gallery within WhatsApp, even if not sending the malicious image, the hack is triggered and the device and its contents become vulnerable. The flaw was patched and users were encouraged to update WhatsApp.[272][273][274] On December 17, 2019, WhatsApp fixed a security flaw that allowed cyber attackers to repeatedly crash the messaging application for all members of group chat, which could only be fixed by forcing the complete uninstall and reinstall of the app.[275] The bug was discovered by Check Point in August 2019 and reported to WhatsApp. It was fixed in version 2.19.246 onwards.[276][277] For security purposes, since February 1, 2020, WhatsApp has been made unavailable on smartphones using legacy operating systems like Android 2.3.7 or older and iPhone iOS 8 or older that are no longer updated by their providers.[278] In April 2020, the NSO Group held its governmental clients accountable for the allegation of human rights abuses by WhatsApp. In its revelation via documents received from court, the group claimed that the lawsuit brought against the company by WhatsApp threatened to infringe on its clients' "national security and foreign policy concerns". However, the company did not reveal names of the end users, which according to a research by Citizen Lab include, Saudi Arabia, Bahrain, Kazakhstan, Morocco, Mexico and the United Arab Emirates.[279] On December 16, 2020, a claim that WhatsApp gave Google access to private messages was included in the anti-trust case against the latter. As the complaint was heavily redacted due to being an ongoing case, it did not disclose whether this was alleged tampering with the app's end-to-end encryption, or Google accessing user backups.[clarification needed][280] In January 2021, WhatsApp announced an update to their Privacy Policy which stated that WhatsApp would share user data with Facebook and its "family of companies" beginning February 2021. Previously, users could opt-out of such data sharing, but the new policy removed this option. The new Privacy Policy would not apply within the EU, as it is illegal under the GDPR. Facebook and WhatsApp were widely criticized for this move.[117][118][281] The enforcement of the privacy policy was postponed from February 8 to May 15, 2021,[119][282] WhatsApp announced they had no plans to limit the functionality of the app for those who did not approve the new terms.[121] On October 15, 2021, WhatsApp announced that it would begin offering an end-to-end encryption service for chat backups, meaning no third party (including both WhatsApp and the cloud storage vendor) would have access to a user's information. This new encryption feature added an additional layer of protection to chat backups stored either on Apple iCloud or Google Drive.[283] On November 29, 2021, an FBI document was uncovered by Rolling Stone, revealing that WhatsApp responds to warrants and subpoenas from law enforcement within minutes, providing user metadata to the authorities. The metadata includes the user's contact information and address book.[284] In January 2022, an unsealed surveillance application revealed that WhatsApp started tracking seven users from China and Macau in November 2021, based on a request from US DEA investigators. The app collected data on who the users contacted and how often, and when and how they were using the app. This is reportedly not an isolated occurrence, as federal agencies can use the Electronic Communications Privacy Act to covertly track users without submitting any probable cause or linking a user's number to their identity.[285] At the beginning of 2022, it was revealed that San Diego–based startup Boldend had developed tools to hack WhatsApp's encryption, gaining access to user data, at some point since the startup's inception in 2017. The vulnerability was reportedly patched in January 2021. Boldend is financed, in part, by Peter Thiel, a notable investor in Facebook.[286] In September 2022, a critical security issue in WhatsApp's Android video call feature was reported. An integer overflow bug allowed a malicious user to take full control of the victim's application once a video call between two WhatsApp users was established. The issue was patched on the day it was officially reported.[287] In 2025, WhatsApp alerted 90 journalists and other members of civil society that they had been targeted by spyware used by the Israeli technology company Paragon Solutions.[288] As of 2023[update], WhatsApp is widely used by government institutions in the UK, although such use is viewed as problematical since it hinders the public, including journalists, from obtaining accurate government records when making freedom of information requests.[289] The information commissioner has said that the use of WhatsApp posed risks to transparency since members of Parliament, government ministers, and officials who wished to avoid scrutiny might use WhatsApp despite there being official channels.[290] Transparency campaigners have challenged the practice in court.[291] Notably, during the COVID-19 pandemic, the UK government routinely used WhatsApp to make decisions on managing the crisis, including on personal rather than government-issued devices. When the official inquiry into the pandemic began seeking evidence in May 2023, this presented issues for its ability to gather the material it sought. A personal device of the former Prime Minister, Boris Johnson, had been compromised by a security breach, and it was claimed that it could not be switched on to recover messages.[292] Further, the Cabinet Office had claimed that since many messages were not relevant to the inquiry, it only needed to hand over material it had selected as being relevant. The High Court, in a judicial review sought by the Cabinet Office, declared that all documents sought by the inquiry were to be handed over unredacted.[293] In 2018, it was reported that around 500,000 National Health Service (NHS) staff used WhatsApp and other instant messaging systems at work and around 29,000 had faced disciplinary action for doing so. Higher usage was reported by frontline clinical staff to keep up with care needs, even though NHS trust policies do not permit their use.[294] In March 2019, WhatsApp released a guide for users who had installed unofficial modified versions of WhatsApp and warned that it may ban those using unofficial clients.[295] Main article: WhatsApp snooping scandal In May 2019, WhatsApp was attacked by hackers who installed spyware on a number of victims' smartphones.[296] The hack, allegedly developed by Israeli surveillance technology firm NSO Group, injected malware onto WhatsApp users' phones via a remote-exploit bug in the app's Voice over IP calling functions. A Wired report noted the attack was able to inject malware via calls to the targeted phone, even if the user did not answer the call.[297] In October 2019, WhatsApp filed a lawsuit against NSO Group in a San Francisco court, claiming that the alleged cyberattack violated US laws including the Computer Fraud and Abuse Act (CFAA).[298] According to WhatsApp, the exploit "targeted at least 100 human-rights defenders, journalists and other members of civil society" among a total of 1,400 users in 20 countries.[299][300][2] In April 2020, the NSO Group held its governmental clients accountable for the allegation of human rights abuses by WhatsApp. In its revelation via documents received via court, the group claimed that the lawsuit brought against the company by WhatsApp threatened to infringe on its clients' "national security and foreign policy concerns". However, the company did not reveal the names of the end users, which according to research by Citizen Lab include, Saudi Arabia, Bahrain, Kazakhstan, Morocco, Mexico and the United Arab Emirates.[279] In July 2020, a US federal judge ruled that the lawsuit against NSO group could proceed. NSO Group filed a motion to have the lawsuit dismissed, but the judge denied all of its arguments.[301] Main article: Jeff Bezos phone hacking incident In January 2020, a digital forensic analysis revealed that the Amazon founder Jeff Bezos received an encrypted message on WhatsApp from the official account of Saudi Arabia's Crown Prince Mohammed bin Salman. The message reportedly contained a malicious file, the receipt of which resulted in Bezos' phone being hacked. The United Nations' special rapporteur David Kaye and Agnes Callamard later confirmed that Jeff Bezos' phone was hacked through WhatsApp, as he was one of the targets of Saudi's hit list of individuals close to The Washington Post journalist Jamal Khashoggi.[302] In 2021, an FBI document obtained through a Freedom of Information request by Property of the People, Inc., a 501(c)(3) nonprofit organization, revealed that WhatsApp and iMessage are vulnerable to law-enforcement real-time searches.[303][304][284] In January 2022, an investigation by The Wire claimed that BJP, an Indian political party, allegedly used an app called Tek Fog which was capable of hacking inactive WhatsApp accounts en masse to mass message their contacts with propaganda. According to the report, a whistleblower with app access was able to hack a test WhatsApp account controlled by reporters "within minutes."[305][306] It was later determined that staff of their Meta investigative team had been duped by false information; The Wire fired the staff member involved and issued a formal apology to its readers.[307] In December 2015, it was reported that terrorist organization ISIS had been using WhatsApp to plot the November 2015 Paris attacks.[308] According to The Independent, ISIS also uses WhatsApp to traffic sex slaves.[309] In March 2017, British Home Secretary Amber Rudd said encryption capabilities of messaging tools like WhatsApp are unacceptable, as news reported that Khalid Masood used the application several minutes before perpetrating the 2017 Westminster attack. Rudd publicly called for police and intelligence agencies to be given access to WhatsApp and other encrypted messaging services to prevent future terror attacks.[310] In April 2017, the

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fiscal year 2008.[14] The company reported that it had more than 2,700 engineers, with more than 1,400 United States patents and nearly 180 Chinese-issued patents, as well as more than 1050 pending Chinese applications. It also reported pending applications for 35 separate inventions outside of China covering a wide range of networking technologies. On November 11, 2009, 3Com and Hewlett-Packard announced that Hewlett-Packard would acquire 3Com for $2.7 billion in cash.[15] On April 12, 2010, Hewlett-Packard completed its acquisition.[3] When Hewlett-Packard split into Hewlett Packard Enterprise and HP Inc., the 3Com unit continued with HPE and was ultimately integrated into Aruba Networks along with the rest of HP's networking portfolio. Main article: List of 3Com products 3Com 3c905-TX 10/100 PCI network interface controller Fixed configuration Ethernet switches including stackable switches: 3Com brand Gigabit switches Switch 5500G, 4800G, 4500G, 4200G, Baseline, OfficeConnect; 3Com brand Fast Ethernet switches Switch 5500, 4500, 4210, Baseline, OfficeConnect; H3C brand switches S5600, S5500, S5100, S3600, S3610, S3100. Modular Chassis switches: 3Com brand 8800, 7900E, 7500. H3C brand S9500, S7500, S7500E. Wide area network routers Wireless access points, adapters, and connectivity products Internet access gateways and firewalls, both wired and wireless Network management applications Network security platforms including the TippingPoint Intrusion Prevention System. IP Telephony applications including PBX and Computer Telephony Integration. Telecommunications products utilized Voice over Internet Protocol and Session Initiation Protocol (SIP). Voice platforms included VCX and NBX. Local area network interface cards IP Video Surveillance and Network Storage (marketed in China, South Africa, South America and other key markets) Consumer USB webcams and associated software (3Com HomeConnect) The 3Com Laser Library which, at the time, was a revolutionary CD based documentation and tech support tool (brain child of Dirk Martin) 3Com came close to merging with computer maker Convergent Technologies, abandoning the pact just two days before a vote was scheduled in March 1986.[16] Later, 3Com went on to acquire the following:[17] Bridge Communications in 1987 BICC Data Networks in 1992 Star-Tek in 1993 Synernetics in 1993 Centrum in 1994 NiceCom in 1994 AccessWorks, Sonix Communications, Primary Access, and Chipcom in 1995 Axon Networks and OnStream Networks in 1996 USRobotics merger/acquisition in 1997 (included product lines: Sportster, Courier, Palm, Megahertz, Conferencelink, Audrey, and more) NBX in 1999 Kerbango in 2000 TippingPoint in 2005 Huawei-3Com (H3C) in 2007 (Bought out Huawei's 49% stake for US$882 million from a 2003 joint venture) CommWorks Corporation was a subsidiary of 3Com Corporation, based in Rolling Meadows, Illinois. It was sold to UTStarcom of Alameda, California in 2003. CommWorks was formerly the Carrier Network Business unit of 3Com, comprising several acquired companies: U.S. Robotics (Rolling Meadows, Illinois),[18] Call Technologies (Reston, Virginia),[19] and LANsource (Toronto, Ontario, Canada).[20] CommWorks was able to use technology from each company to create IP softswitch and IP communications software. U.S. Robotics provided media gateways (the Total Control 1000 product line, formerly used for dial-modem termination) and softswitch technology. Call Technologies provided Unified Messaging software. LANsource provided fax-over-IP software that was integrated with the Unified Messaging platform. The Carrier Network Business unit of 3Com developed an Inter-working function technology that became the first and dominant 2G CDMA wireless data gateway product. In partnership with Unwired Planet (now Openwave) and Qualcomm Quicknet connect allowed for 6 second connect times versus modems connecting the call in approximately 30 seconds.[21] This product was deployed in the United States, Japan,[22] and Korea covering the 2G CDMA market sample carriers included Sprint.[23] It led to follow on products that became core to CommWorks now UTStarcom offerings including the 2.5 and 3G packet data gateway products known as PDSN and Home Agents. CommWorks/3Com co-developed an H.323-based softswitch with AT&T in 1998 for use in a "transparent trunking" application for AT&T's residential long-distance customers.[24] Long distance telephone calls were redirected from the LEC's ingress CLASS 5 switch to the Total Control 1000 media gateway, where it was converted from TDM to IP and transported across AT&T's WorldNet IP backbone. When it reached the destination, it was passed to the egress LEC's CLASS 5 switch as an untariffed data call. CommWorks modified the gateway and softswitch software to support SIP for MCI/WorldCom's hosted business offering in 2000.[25] Although 3Com sold CommWorks to UTStarcom,[26] they retained intellectual property rights to the softswitch technology. After modifying the software to enable enterprise PBX features, 3Com released this technology as VCX, the industry's first pure SIP PBX, in 2003.[27] 3Station Busy Override Ungermann-Bass Sytek List of acquisitions by Hewlett-Packard ^ a b c d e f Hedden, Heather Behn; Salamie, David E.; Meyer, Stephen (2010) [previous versions appeared in vol.11 and 34]. Jacques, Derek; Kepos, Paula (eds.). "3Com Corporation". International Directory of Company Histories. 106. Farmington Hills, Michigan: St. James Press (Gale, Cengage Learning group): 465–466. ISBN 978-1-55862-640-9. ^ "Bob Metcalfe: Serial Innovator". The Henry Ford. Archived from the original on 2024-10-07. 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Official website at the Wayback Machine (archived 1996-10-23) Retrieved from " 3Ethernet network card line 3Com 3c509B-Combo card (3C509BC), second generation for the ISA 16-bit bus and 10BASE-T, AUI and 10BASE-2. 3Com 3c509 is a line of Ethernet IEEE 802.3 network cards for the ISA, EISA, MCA and PCMCIA computer buses.[1] It was designed by 3Com and put on the market in 1992, followed by the improved version 3c509B in 1994.[1][2] The 3Com 3c5x9 family of network controllers has various interface combinations of computer bus including ISA, EISA, MCA, and PCMCIA. For network connection, 10BASE-2, AUI and 10BASE-T are used. Physical card configurations Combinations for Etherlink III [1] Adapter number Bus Network Connector 3C509-TPO ISA 10BASE-T 8P8C 3C509B-TPO ISA 10BASE-T 8P8C 3C509-TP ISA 10BASE-T, AUI 8P8C, DA-15 3C509B-TP ISA 10BASE-T, AUI 8P8C, DA-15 3C509B-TPC ISA 10BASE-T, 10BASE2 8P8C, BNC 3C509-Coax ISA AUI, 10BASE2 DA-15, BNC 3C509B-Coax ISA AUI, 10BASE2 DA-15, BNC 3C509-Combo ISA 10BASE-T, AUI, 10BASE2 8P8C, DA-15, BNC 3C509B-Combo ISA 10BASE-T, AUI, 10BASE2 8P8C, DA-15, BNC 3C579 EISA AUI, 10BASE2 DA-15, BNC 3C579-TP EISA 10BASE-T, AUI 8P8C, DA-15 3C529 MCA AUI, 10BASE2 DA-15, BNC 3C529-TP MCA 10BASE-T, AUI 8P8C, DA-15 3C589-TP PCMCIA 10BASE-T 8P8C 3C589B-TP PCMCIA 10BASE-T 8P8C 3C589-Combo PCMCIA 10BASE-T, 10BASE2 8P8C, BNC 3C589B-Combo PCMCIA 10BASE-T, 10BASE2 8P8C, BNC B = On ISA and PCMCIA, adapter numbers indicate that these adapters are part of the second generation of the Parallel Tasking EtherLink III technology.[1] The DIP-28 (U1) EPROM for network booting may be 8, 16, or 32 KB in size.[1] This means EPROMs of type 64, 128, and 256 kbit (2^10) are compatible, like the 27C256. Boot ROM address is located between 0xC0000 - 0xDE000.[1] The Etherlink III 3C509B-Combo is registered with the FCC ID DF63C509B. The main components on the card are Y1: crystal oscillator 20 MHz, U50: coaxial transceiver interface DP8392, U4: main controller 3Com 9513S (or 9545S etc.), U6: 8 kB 70 ns CMOS static RAM, U1: DIP-28 27C256 style EPROM for boot code, U3: 1024 bit 5V CMOS Serial EEPROM (configuration). Detailed teardown 3C509B-Combo 1994 ASSY 03-0021-001 REV-A 3C509B-Combo 1996 ASSY 03-0021-004 REV-B Label: Etherlink III (C) 1994 3C509B-C ALL RIGHTS RESERVED ASSY 03-0021-001 REV-A FCC ID: DF63C509B Barcode: EA=0020AFDCC34C SN=6AHDCC34C MADE IN U.S.A. R = Resistor C = Capacitor L = Inductance Q = Transistor CR = Transistor FL = Transformer T = Transformer U = Integrated circuit J = Jumper or connector VR F FL70: Pulse transformer bel9509 A 0556-3873-03 * HIPOTTED Y1: 20 MHz crystal 20.000M 652DA U50: P9512BR DP8392CN Coaxial Transceiver Interface T50: Pulse transformer, pinout: 2x8 VALOR ST7033 x00: Pulse transformer VALOR PT0018 CHINA M 9449 C U4: Plastic package 33x33 pins Parallel Tasking TM 3Com 40-0130-002 9513S 22050553 AT&T 40-01302 Another chip with the same function: 40-0130-003 9545S 48324401 AT&T 40-01303 U6: 8192 x 8-bit 70 ns CMOS static RAM HY 6264A LJ-70 9509B KOREA Another chip with the same function: CY6264-70OSC (photo) U1: Boot ROM DIP-28 EPROM 8, 16, or 32 KB (27/28C256) for boot code. U3: 256 Bit/1K 5.0V CMOS Serial EEPROM B 52AH 93C46 M8 Q41: N-Channel Logic level Power MOSFET 60V, 11A, 107 mΩ (using ASSY 03-0021-004 due to obscured view) F3055L 96 45 (H)H VR41: 3-Terminal 0.5 A Negative Voltage Regulator (-5V) in D2PAK KA79 M05 ASSY 03-0021-004 REV-B has written on it: U.S. Patents: U.S. patent 5,307,459 Connector for the computer bus: ISA 16-bit Connections for networking: 10BASE-T (8P8C), AUI (DA-15), 10BASE2 (BNC) Some of the possible ISA I/O bases are 0x280, 0x300, 0x310, 0x320, 0x330, 0x340, 0x350. And IRQ 5, 7, 9, 10, 11, 12. The driver for OpenBSD,[3] NetBSD and FreeBSD is "ep";[4][5] for Linux it is "eth".[6][7] 3c509B-C from 1996 specify the use of U.S. patent 5,307,459 with a priority date of 1992-07-28. The patent describes a method where a data transfer counter triggers a threshold logic that generates an early indication or interrupt signal before the transfer is completed. The adapter also writes timing information into status registers such that a device driver can optimize for any latency.[8] PC/TCP Packet Driver for use with MS-DOS or PC DOS on X86 Amiga networking (Miami Network Interface MNI, gg2-3c509.mni) AMD Lance Am7990 - 1985, AMD Am7990 network chip NE2000 - 1987, Novell's NE2000 network card RTL8139 - 1999, Realtek 8139 PCI network chip ^ a b c d e f "EtherLink III Parallel Tasking ISA, EISA, Micro Channel, and PCMCIA, Adapter Drivers Technical Reference, Members of the 3Com EtherLink III family of adapters" (PDF) (published 2011-08-29). August 1994. Retrieved 2016-04-06. (PDF) ^ "3Com 3C509B-TPO - WikiDevi". 2014-09-12. Retrieved 2016-04-06. (HTML) ^ "import from mindrot · kirei/flashboot@32e5b6b". GitHub. Retrieved 3 August 2017. ^ "FreeBSD 4.11-RELEASE #1" (TXT). Berklix.com. 2006-12-17. Retrieved 2017-08-04. ^ "cpu0: Intel 486DX (486-class)" (TXT). Fml.org. Retrieved 2017-08-04. ^ "LEAF Linux Embedded Appliance Framework / Mailing Lists". sourceforge.net. Retrieved 3 August 2017. ^ Threads, Gossamer. "Mailing List Archive: no interrupts to 3c509B". Gossamer-threads.com. Retrieved 3 August 2017. ^ U.S. patent 5,307,459 jaapsch.net - 27C256 256K (32K x 8) CMOS EPROM PIC18F452 and 3COM 3C509B Ethernet ISA card, Controlling an ISA 16-bit network card with a PIC18F452 Workaround to install NE2000 / 3C509 Non Plug&Play ISA Network Adapters (2002) Retrieved from " 4 The following pages link to 3Com 3c509 External tools (link count transclusion count sorted list) · See help page for transcluding these entries Showing 11 items. 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