Google Chrome

This article is about the web browser. For the operating system, see <u>ChromeOS</u>. For other uses, see <u>Chrome (disambiguation)</u>.

Google Chrome

Google Chrome 103 running on Windows 11

Developer(s) Google

Windows XP Beta / September 2, 2008; 16 years ago
Windows XP 1.0 / December 11, 2008; 15 years ago

Initial release macOS, Linux Preview / June 4, 2009; 15 years ago

macOS, Linux Beta / December 8, 2009; 14 years ago

Multiplatform 5.0 / May 25, 2010; 14 years ago

Stable release(s) [±]

Microsoft Windows, Linux and Mac OS X

Version 74.0.3729.169 (May 21, 2019; 5 years ago) $[\pm]^{[1]}$

Written in C, C++, Assembly, HTML, Java (Android app only),

JavaScript, Python^{[2][3][4]}

Engines Blink (WebKit on iOS), V8 JavaScript engine

Android Nougat or later^[5]

ChromeOS

Operating system iOS 15 or later [6]

Linux

macOS 10.13 or later Windows 10 or later

Platform IA-32, x86-64, ARMv7, ARMv8-A

Included with Android Nougat or later

ChromeOS

Available in 47 languages [7]

Type Web browser, mobile browser

<u>Proprietary freeware</u>, based on open source

License components [8][note 1]

Website www.google.com/chrome/ Edit this at Wikidata

Google Chrome is a <u>freeware web browser</u> made by <u>Google</u>. It builds on parts from other <u>open source</u> software, including <u>WebKit</u> and <u>Mozilla</u>

<u>Firefox. [9]</u> The name comes from the <u>graphical user interface</u> frame, or "chrome", of web browsers. The open source project behind Google Chrome is known as <u>Chromium</u>. [10]

The first version was a <u>beta</u> for <u>Microsoft Windows</u> was released on September 2, 2008. [11] <u>macOS</u> and <u>Linux</u> versions were released in December 2009. [12][13]

Announcement

[change | change source]

The release announcement was going to be made on September 3, 2008, and a comic by Scott McCloud was to be sent to journalists and bloggers explaining the features of and reasons for the new browser. Copies that were for Europe were shipped early and German blogger Philipp Lenssen of Google Blogoscoped made a scanned copy of the 38-page comic available on his website after receiving it on September 1, 2008. Google then made the comic available on Google Books and their website and referenced it on its official blog along with an explanation for the early release. As of September 2, 2008, Google has a link to Google Chrome on their main page.

Design

[change | change source]

Security

[change | change source]

Blacklists

Chrome downloads updates of two <u>blacklists</u> (one for <u>phishing</u> and one for <u>malware</u>) and warns users when they try to visit a harmful site. This service is also made available for use by others via a free public <u>API</u> called "Google Safe Browsing API". In the process of maintaining these blacklists, Google also notifies the owners of listed sites who may not be aware of the presence of the <u>harmful software</u>. [16]

Sandboxing

Each tab in Chrome is <u>sandboxed</u> to "prevent malware from installing itself" or "using what happens in one tab to affect what happens in another". Following the <u>principle of least privilege</u>, each process is stripped of its rights and can compute but can't write files or read from sensitive areas (e.g. documents, desktop), this is similar to "Protected Mode" that is used by <u>Internet Explorer 7</u> on <u>Windows Vista</u>. The <u>Sandbox Team</u> is said to have "taken this existing process boundary and made it into a jail"; for example, malicious software running in one tab is unable to sniff <u>credit card</u> numbers, interact with the mouse or tell "Windows to run an <u>executable</u> on the start-up" and will be terminated when the tab is closed. This enforces a simple <u>computer security model</u> whereby there are two levels of <u>multilevel security</u> (<u>user</u> and <u>sandbox</u>) and the <u>sandbox</u> can only respond to communication requests initiated by the <u>user</u>. [16]

Plugins

Plugins such as Adobe Flash Player are typically not standardised and as such cannot be <u>sandboxed</u> like tabs. These often need to run at or above the <u>security level</u> of the browser itself. To reduce exposure to attack, plugins are run in separate processes that communicate with the renderer, itself operating at "very low privileges" in dedicated pertab processes.

Incognito

Chrome includes an *Incognito* mode (similar to <u>Safari</u>'s *Private Browsing* and <u>Internet Explorer 8</u>'s *InPrivate*) which "lets you browse the web in complete privacy because it doesn't record any of your activity" and discards cookies. When enabled for a window "nothing that occurs in that window is ever logged on your computer." [9]

Speed

[change | change source]

JavaScript

The JavaScript virtual machine was considered a sufficiently important project to be split off (like Adobe/Mozilla's Tamarin) and handled by a dedicated team in Denmark. Existing implementations were designed "for small programs, where the performance and interactivity of the system weren't that important" but web applications like Gmail "are using the web browser to the fullest when it comes to DOM manipulations and JavaScript". The resulting V8 JavaScript engine was designed for speed and introduces new features with that in mind such as hidden class transitions, dynamic code generation, and precise garbage collection. [16] Tests by Google show that V8 is about twice as fast as Firefox 3 and the Safari 4 beta. [19]

User interface

[change | change source]

The main user interface includes back, forward, refresh, bookmark, go and cancel options similar to <u>Safari browser</u>, while the settings location looks like <u>Internet Explorer</u> 7/8. The minimize, maximize and close window buttons are based on <u>Windows Vista</u>.

Gears

Chrome includes Gears which adds developer features that may or may not become web standards, typically relating to the building of web applications (including offline support). [16]

New Tab Page

Chrome replaces the browser <u>home page</u> which is displayed when a new tab is created with a *New Tab Page*. This shows thumbnails of the eight most visited websites along with the sites most often searched,

recent bookmarks, and recently closed tabs.^[20] This concept appeared first with Opera's Speed Dial.^[16]

Omnibox

The *Omnibox* is the URL box at the top of each tab, based on the one in Opera. It includes autocomplete functionality but will only autocomplete URLs that were manually entered (rather than all links), search suggestions, top pages (previously visited), popular pages (unvisited), and text search over history. Search engines can also be captured by the browser when used via the native user interface by pressing *Tab*. [16]

Pop-ups

Pop-up windows "are scoped to the tab they came from" and will not appear outside the tab unless the user explicitly drags them out. It is not clear whether they also run in their own process.^[16]

Rendering engine

At first, Chrome used the WebKit browser engine on advice from the Android. Since version 28, Chrome has used its own fork, or a version of WebKit called Blink. This is to allow Google to change Blink to suit Chrome's needs explicitly by removing things that Chrome doesn't need. [21] The IOS version of Chrome still uses Blink due to IOS' requirements.

Tabs

Tabs are the primary component of Chrome's user interface and as such has been moved to the top of the window rather than below the controls (similar to Opera). This subtle change is in contrast to many existing tabbed browsers which are based on windows containing tabs. Tabs (including their state) can be seamlessly transferred between window containers by dragging. Each tab has its own set of controls, including the *Omnibox* URL box. [16]

Standards

Google Chrome fails the Acid 3 Test Google Chrome fails the Acid 3 Test

Google Chrome passes the Acid2 test prior to window resizing Google Chrome passes the Acid2 test prior to window resizing

The first release of Google Chrome Beta (Build 1583) did not pass the Acid3 test; it scored 77/100 and does not render the image correctly. It passed the Acid2 test initially, but failed upon resizing. From version 4 onward, Google Chrome has passed the Acid1, 2, and 3 tests. [22]

Webapps

Webapps can be launched in their own streamlined window without the *Omnibox* URL box and browser toolbar. This limits the *browser chrome* so as not to "interrupt anything the user is trying to do", allowing web

applications to run alongside local software (similar to Mozilla Prism, Adobe AIR and Fluid).^[16]

Notes

[change | change source]

↑ Chrome's WebKit & Blink layout engines and its V8 JavaScript engine
are each free and open-source software, while its other components are
each either open-source or proprietary. However, section 9 of Google
Chrome's Terms of Service designates the whole package as
proprietary freeware.

References

[change | change source]

- 1. ↑ Govind, Krishna (May 21, 2019). "Stable Channel Update for Desktop". Chrome Releases. Blogger. Retrieved May 31, 2019.
- 2. <u>↑ "Chromium (Google Chrome)"</u>. *Ohloh.net*. Archived from the original on April 21, 2012. Retrieved February 8, 2012.
- 3. <u>↑ "Chromium coding style"</u>. *Google Open Source*. Retrieved March 29, 2017.
- 4. ↑ Lextrait, Vincent (January 2010). <u>"The Programming Languages Beacon, v10.0"</u>. Archived from the original on May 30, 2012. Retrieved March 14, 2010.
- 5. <u>↑ "Chrome Enterprise and Education release notes"</u>. *Google Groups*. October 25, 2022. Retrieved October 27, 2022.
- 6. <u>↑ "Google Chrome (iOS)"</u>. May 16, 2023.
- 7. <u>↑ "Supported languages"</u>. *Google Play Console Help*. Retrieved December 18, 2015.
- 8. ↑ "Google Chrome and Chrome OS Additional Terms of Service". www.google.com.
- 9. ↑ 9.0 9.1 9.2 Scott McCloud (September 1, 2008). "Google Chrome By the Google Chrome team, comics adaptation by Scott McCloud". Retrieved September 1, 2008.
- 10. ↑ http://code.google.com/chromium/
- 11. <u>↑ "It was when not if... Google Chrome"</u>. September 2008. Archived from the original on December 8, 2016. Retrieved September 2, 2008.
- 12. ↑ Mark Larson (December 8, 2009). "Beta Update: Linux, Mac, and Windows". Google. Retrieved July 11, 2012.
- 13. ↑ "Google Chrome for the holidays: Mac, Linux and extensions in beta". Googleblog.blogspot.com. Retrieved July 11, 2012.
- 14. ↑ Scott McCloud (September 1, 2008). "Surprise!". *Google Blogoscoped*. Retrieved September 1, 2008.
- 15. ↑ Philipp Lenssen (September 1, 2008). "Google Chrome, Google's Browser Project". Retrieved September 1, 2008.
- 16. ↑ 16.00 16.01 16.02 16.03 16.04 16.05 16.06 16.07 16.08 16.09 Philipp Lenssen (September 1, 2008). "Google on Google Chrome comic book". *Google Blogoscoped*. Retrieved September 1, 2008.

- 17. <u>↑ "Google Chrome"</u>. September 1, 2008. Retrieved September 2, 2008.
- 18. <u>↑ "Google Chrome"</u>. September 2, 2008. Retrieved September 2, 2008.
- 19. <u>↑</u> Limi, Alexander (September 2, 2008). <u>"Chrome: Benchmarks and more"</u>. Archived from the original on April 24, 2010. Retrieved September 2, 2008.
- 20. ↑ Philipp Lenssen. "Google Chrome Screenshots". Google Blogoscoped. Retrieved September 2, 2008.
- 21. <u>1 "Blink: Chrome's New Rendering Engine SitePoint"</u>. www.sitepoint.com. Retrieved January 1, 2021.
- 22. <u>↑</u> Anthony Laforge (January 25, 2010). <u>"Stable Channel Update"</u>. Google. Retrieved May 25, 2010.

Other websites

[change | change source]

- Official website
- Chromium project page at Google Code
- Google Chrome features
- Official Google Blog article of Google Chrome
- Google Chrome Help Archived March 1, 2015, at the Wayback Machine

	• <u>V</u>	<u>Google</u>	
	• <u>t</u> • <u>e</u>		
•	Alphabet Inc. History List of Android apps List of Easter eggs April Fools' Day List of mergers and acquisitions		
		Company	
	Divisions	 Ads AI Brain DeepMind Android booting process recovery mode software development version history 	

	China Goojje Chrome Cloud Glass Google.org Crisis Respondent RechargeIT Health Maps Pixel Search Timeline Sidewalk Las Sustainabili YouTube History "Me at the zes Social impact YouTuber	abs ty
People	Current	Krishna Bharat Vint Cerf Jeff Dean John Doerr Sanjay Ghemawat Al Gore John L. Hennessy Urs Hölzle Salar Kamangar Ray Kurzweil Ann Mather Alan Mulally Sundar Pichai (CEO) Ruth Porat (CFO) Rajen Sheth Hal Varian Susan Wojcicki Neal Mohan
	Former .	Andy Bechtolsheim Sergey Brin (Founder) David Cheriton

 Matt Cutts • David Drummond Alan Eustace • Timnit Gebru • Omid Kordestani • Paul Otellini • <u>Larry Page</u> (Founder) • Patrick Pichette • Eric Schmidt • Ram Shriram Amit Singhal • Shirley M. Tilghman • Rachel Whetstone • 111 Eighth Avenue • Androidland • Barges • Binoculars Building • Central Saint Giles • Chelsea Market • Chrome Zone Data centers Real estate Modular Googleplex Mayfield Mall • Pier 57 • Sidewalk Toronto • St. John's Terminal YouTube Space • YouTube Theater Fonts • Croscore • Noto Product Sans • Roboto Design Logo • Doodle ■ <u>Doodle Champion Island Games</u> ■ Magic Cat Academy Material Design **Events**

 Android • Developer Challenge Developer Day Developer Lab • Code-in • Code Jam • Developer Day • <u>Developers Live</u> • Doodle4Google • G-Day • I/O Jigsaw • Living Stories • Lunar XPRIZE • Mapathon • Science Fair • Summer of Code Talks at Google Awards • CNN/YouTube presidential debates • Comedy Week YouTube • Live Music Awards Space Lab • Symphony Orchestra • 20% project • Area 120 Reply • Tables ATAP • Business Groups • Computing University Initiative **Projects and** • Data Liberation Front initiatives • Data Transfer Project • <u>Developer Expert</u> • <u>Digital Garage</u> • Digital News Initiative Digital Unlocked • **Dragonfly** • Founders' Award • Free Zone • Get Your Business Online

- Google for Education
- Google for Startups
- Labs
- Liquid Galaxy
- Made with Code
- Māori
- ML Fairness Native Client
- News Lab
- Nightingale
- OKR
- PowerMeter
- Privacy Sandbox
- Quantum Artificial Intelligence Lab
- RechargeIT
- Shield
- Silicon Initiative
- Solve for X
- Starline
- Student Ambassador Program
- Submarine communications cables
- Dunant
- Grace Hopper
- Sunroof
- Versus Debates
- YouTube
- Creator Awards
- Next Lab and Audience Development Group
- Original Channel Initiative
- Zero
- 2018 data breach
- 2018 walkouts
- Alphabet Workers Union
- Censorship
- <u>DeGoogle</u>
- "Did Google Manipulate Search for Hillary?"
- **Dragonfly**

- **Criticism** FairSearch
 - "Ideological Echo Chamber" memo
 - Litigation
 - Privacy concerns
 - Street View
 - San Francisco tech bus protests
 - Services outages

• Smartphone patent wars • Worker organization Back advertisement controversy • Censorship Copyright issues Copyright strike • Elsagate YouTube Fantastic Adventures scandal · Headquarters shooting Kohistan video case • Reactions to Innocence of Muslims • Slovenian government incident **Development** Android Automotive • Glass OS ° Go o gLinux • Goobuntu • Things Operating systems $_{\circ}$ $\overline{\text{TV}}$ • Wear OS ChromeOS • ChromiumOS • Neverware • Fuchsia • TV • ALTS AMP Angular ∘ <u>JS</u> • ARCore Libraries/ • APIs frameworks • Blockly • Chart API • Charts Dialogflow • Exposure Notification • Fast Pair • Federated Learning of Cohorts

- File System
- FlatBuffers
- Flutter
- Gears
- gRPC
- Gson
- Guava
- Guice
- Guetzli
- JAX
- gVisor
- MapReduce
- Matter
- Mobile Services
- Neural Machine Translation
- OpenSocial
- Pack
- Polymer
- Protocol Buffers
- Reqwireless
- Shell
- Skia Graphics Engine
- Tango
- TensorFlow
- Test
- WaveNet
- Weave
- Web Accelerator
- WebRTC
- App Engine
- AppJet
- Apps Script
- Cloud Platform
- Anvato
- Firebase
- Cloud Messaging
- $\textbf{Platforms} \ _{\circ} \ \underline{Crashlytics}$
 - Global IP Solutions
 - Internet Low Bitrate Codec
 - Internet Speech Audio Codec
 - Gridcentric, Inc.
 - ITA Software
 - Kubernetes

- LevelDB
- Neatx
- <u>SageTV</u>
- Bigtable
- Bitium
- Chronicle
- VirusTotal
- Compute Engine
- Connect
- Dataflow

- Datastore
- Apigee Kaggle
 - Looker
 - Mandiant
 - Messaging
 - Orbitera
 - Shell
 - Stackdriver
 - Storage
- American Fuzzy Lop
- · Android Cloud to Device Messaging
- Android Debug Bridge
- Android Studio
- App Maker
- App Runtime for Chrome
- AppSheet
- Bazel
- Chrome Frame
- Closure Tools
- Cpplint

Tools • Data Protocol

- Gadgets
- Gerrit
- GYP
- Kythe
- Lighthouse
- MIT App Inventor
- Mashup Editor
- Native Client
- Optimize
- OpenRefine
- OR-Tools

	 PageSpeed Plugin for Eclipse Programmable Search Engine Public DNS reCAPTCHA Schema.org Search Console Sitemaps Swiffy Tesseract (software) Trendalyzer VisBug Wave Federation Protocol Web Toolkit
Search algorithms	 Hummingbird PageRank applications in biochemistry Matrix Panda Penguin Pigeon RankBrain
Others	BERT BigQuery Chrome Experiments Flutter Googlebot Keyhole Markup Language LaMDA Open Location Code PaLM Programming languages Caja Carbon Dart Go Sawzall Transformer Viewdle Webdriver Torso Web Server

• <u>AAB</u> • APK ° AV1 • On2 Technologies • <u>VP3</u> • <u>VP6</u> File formats • VP8 ■ <u>libvpx</u> • <u>VP9</u> • WebM • WebP • WOFF2 **Products** • Currents (news app) • Green Throttle Games • Owlchemy Labs • Oyster • PaperofRecord.com • Podcasts • Quick, Draw! • Santa Tracker • Songza • Stadia • games Typhoon Studios • **TV** • Vevo **Entertainment** • Video Books • Games • most downloaded apps **Play** • *Music* Newsstand • Pass • Services • BandPage • BrandConnect YouTube • Content ID Instant

• Kids • Music • Official channel • Preferred • Premium • original programming • YouTube Rewind • RightsFlow • Shorts • Studio • TV • Allo • Bump • Buzz • Chat • Contacts • Currents (social app) Dodgeball • <u>Duo</u> • Fi Wireless • Friend Connect • Gizmo5 • Google+ • Gmail • History • Inbox • Interface **Communication** • Groups • Hangouts • *Helpouts* • <u>IME</u> • Japanese • Pinyin • Transliteration • <u>Jaiku</u> • Marratech • Meebo • Meet Messages Moderator • Neotonic Software • Orkut • Postini

• Quest Visual Word Lens • Schemer • Spaces • Sparrow • <u>Talk</u> • Translate • Translator Toolkit • Voice • Voice Local Search • Wave • Aardvark Alerts • Answers • Base • <u>BeatThatQuote.com</u> • Blog Search • Books Ngram Viewer · Code Search Data Commons Dataset Search • <u>Dictionary</u> • Directory • Fast Flip • Flu Trends • Finance **Search** • Goggles Google.by • Images • Image Labeler • Image Swirl • Kaltix Knowledge Graph • Freebase • Metaweb • Like.com • News • Archive • Weather • Patents • People Cards

• Personalized Search

• Public Data Explorer • Questions and Answers • SafeSearch Scholar • Searchwiki • Shopping • Catalogs • Express • Squared • Tenor Travel • Flights • Trends Insights for Search Voice Search • WDYL Earth Endoxon • ImageAmerica • Maps • Latitude • Map Maker Navigation Navigation • Pin • Street View **■** Coverage **■** Trusted Waze • Ad Manager • AdMob • Ads • Adscape • AdSense • Attribution **Business** • BebaPay and finance . Checkout • Contributor • <u>DoubleClick</u> • Affiliate Network • Invite Media

• Marketing Platform Analytics • Looker Studio • *Urchin* • Pay (mobile app) • Wallet Pay (payment method) • <u>Send</u> ∘ *Tez* • PostRank • Primer • Softcard • Wildfire Interactive • Widevine • Bookmarks • Browser Sync • Calendar Cloud Search • Desktop • <u>Drive</u> Etherpad fflick • Files • <u>iGoogle</u> • Jamboard • Notebook • One • Photos Organization • Quickoffice and productivity • Quick Search Box • Surveys • Sync Tasks • <u>Toolbar</u>

	Docs Editors	 Docs Drawings Forms Fusion Tables Keep Sheets Slides Sites
	Publishing	 Apture Blogger Pyra Labs Domains FeedBurner One Pass Page Creator Sites Web Designer
Education •	 Classroom Grasshopper Socratic Photomath Read Along Workspace Marketplace 	
Others	 Account Dashboard Takeout Android Auto Android Beam Arts & Culture Assistant Authenticator Body BufferBox Building Maker BumpTop Cast List of supported apps Cloud Print Crowdsource 	

- Expeditions
- Family Link
- Find My Device
- Fit
- Google Fonts
- Gboard
- Gemini
- Gesture Search
- Impermium
- Knol
- Lively
- Live Transcribe
- MyTracks
- Nearby Share
- Now
- Offers
- Opinion Rewards
- Person Finder
- PlinkArt
- Poly
- Question Hub
- Reader
- Safe Browsing
- Sidewiki
- SlickLogin
- Sound Amplifier
- Speech Services
- Station
- Store
- TalkBack
- Tilt Brush
- URL Shortener
- Voice Access
- Wavii
- Web Light
- WiFi
- Apps
- Chromium
- Dinosaur Game
- Chrome GreenBorder
 - Remote Desktop
 - Web Store
 - <u>V8</u>

	Images and photography	
	H	[ardware
Smartphone	• Android Dev • Android One • Nexus • Nexus One • S • Galaxy Nexu • 4 • 5 • 6 • 5X • 6P • Comparison • Pixel • Pixel • Pixel • Pixel • S • 2 • 3 • 3a • 4 • 4a • 5 • 5a • 6 • 6a • 7 • 7a • Fold • Comparison • Play Edition • Project Ara	
Laptops and tablet	• Chromebook	

• Nexus • 7 (2012) • 7 (2013) • 10 • 9 • Comparison • Pixel • Chromebook Pixel • Pixelbook • Pixelbook • Pixelbook Go • C	
 Slate Tablet 	

- Chromebit
- Chromebox
- Clips
- Digital media players
- Chromecast
- Nexus Player
- Nexus Q
- <u>Dropcam</u>
- Fitbit
- List of products
- Liquid Galaxy
- Nest
- Smart Speakers
- Thermostat
- Wifi

- Others OnHub
 - Pixel Buds
 - Pixel Visual Core
 - Pixel Watch
 - Project Iris (unreleased)
 - Search Appliance
 - Sycamore processor
 - Tensor
 - Tensor Processing Unit
 - Titan Security Key
 - Virtual reality
 - Cardboard
 - Contact Lens
 - Daydream
 - Glass

Related

- "Don't be evil"
- Gayglers
- Google (verb)
- Google bombing
- o 2004 U.S. presidential election

Terms and phrases • Google effect

- Googlefight
- Google hacking
- Googleshare
- Google tax
- Googlewhack
- Googlization

• "Illegal flower tribute" Rooting • Search engine manipulation effect Sitelink • Site reliability engineering YouTube poop AlphaGo • Google: Behind the Screen Google Current **Documentaries** • Google Maps Road Trip • Google and the World Brain The Creepy Line Google Hacks • The Google Story • Google Volume One • Googled: The End of the World as We Know It **Books** • How Google Works • I'm Feeling Lucky • In the Plex • The Google Book Google Feud • Google Me (film) • "Google Me" (Kim Zolciak song) • "Google Me" (Teyana Taylor song) • Is Google Making Us Stupid? Popular culture Proceratium google • Matt Nathanson: Live at Google • The Billion Dollar Code • The Internship • Where on Google Earth is Carmen Sandiego? • elgooG • g.co .google Pimp My Search Others Predictions of the end • Relationship with Wikipedia Sensorvault • Stanford Digital Library Project

•	Italics indicate discontinued products or services. Commons Outline
	Authority control Edit this at Wikidata
International	• FAST • VIAF
National	• Germany • Israel • United States

Retrieved from "https://simple.wikipedia.org/w/index.php?title=Google_Chrome&oldid=9800016"