History of Web Browser Engines from 1990 until today

Many tried, few remain...

Last updated: July 2024

The loss of browser diversity since the rise of Chromium has been greatly lamented. Below you can find a graph that shows the historical and present browser engines (not browsers, but the HTML rendering engines), as well as from when to when they were developed. For the bigger engines, the market share is indicated by a coloured shape (see legend).

We're now well into the "fourth era of dominance". NCSA Mosaic dominated at the beginning (first dominance), but it was dethroned by Netscape which briefly held the majority of the market share (second dominance), both of which then were overtaken by Internet Explorer (originally using the engine from Spyglass Mosaic, and later Trident) (third dominance), which then was weakened first by Firefox (Gecko engine) but finally dethroned by Chromium (Blink engine) (fourth dominance). In terms of active and relevant engines there's now only Blink (Chrome, Edge, Opera, Vivaldi, Brave, Samsung Internet, UC Browser and many more), WebKit (Safari and all iOS browsers), and Gecko (Firefox and its forks).

But see for yourself:

1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

Timeline & Marketshare of Browser Engines

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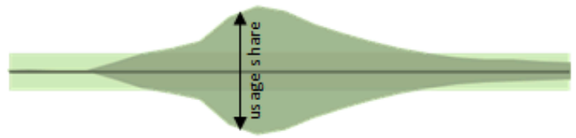
Legend:

graphical browser engines: active development/maintenance of existing code/development s

text-only browsers: active development/development stopped

embedded non-browser use (e.g. used to render emails or app UI): active development/devel

Major browser engines and their forks are highlighted with colours; their historical usage shares are indicated by a coloured shape:



1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024

WorldWideWeb/Nexus engine

Line Mode Browser engine [text-based]

ViolaWWW engine

Erwise engine

Lynx engine [text-based]

1993/94: Lynx peaks at 2% market share

MacWWW engine

MidasWWW engine

tkWWW engine

Arena engine

Cello engine

NCSA Mosaic engine

1993: NCSA Mosaic and variants peak at 97% market share

1994: Mosaic developers create Netscape, which however is not based on Mosaic code

mMosaic engine

VMS-Mosaic engine

Mosaic-CK engine

iBrowse engine

Ariadna engine

Fresco engine

HotJava/Webrunner engine

IBM WebExplorer engine

InternetWorks engine

MacWeb engine

Netscape engine/Mariner (Netscape 1-5)

1995: Netscape peaks at 83% market share

1998: Gecko engine replaces Mariner for new Netscape versions

Netmanage Chameleon engine

Pocketweb engine

Prodigy engine

SlipKnot engine

Tkhtml (HTML Viewer 3)

Netkit (NetSurfer browser)

Grail engine

Mothra engine

NetCruiser engine

Netfront engine

OmniWeb engine

Spyglass engine (Internet Explorer 1-3)

1998: IE v1-3 peak at 37% market share, new IE 4 uses new Trident engine

1995: Spyglass licenses NCSA Mosaic code and name, but develops their own engine from scratch; their browser engine is then licensed to Microsoft and used in the early Internet Explorer

UdiWWW engine

WebTV/MSN TV engine

w3m engine [text-based]

BeConn engine

Amaya engine

Arachne engine

AWeb engine

Charon engine

Cyberdog engine

Espial (Escape v1-5)

Lotus Notes engine [embedded rendering]

NetHopper engine

NetPositive engine

Opera engine (v1-3.21)

1996: first public release of the Opera browser (v2.0)

Elektra (Opera v3.5-6)

2002: Opera (using Elektra engine) has 1% market share before switching to Presto

1998: Opera 3.5 uses Elektra engine

Presto (Opera 7-12)

2013: Presto peaks at 4% market share

2015: last publicized Presto update

2003: Opera 7 uses Presto engine

2013: development stops, new Opera versions are based on Chromium (Blink engine), Opera Mini still uses server-side Presto rendering on basic phones as well as for 'extreme data savings mode' on Android today

Oracle PowerBrowser engine

PlanetWeb engine

Aplix engine

Pocket Internet Explorer engine

UP.Browser/Openwave engine

AOL IWENG engine

ICEBrowser engine

Gecko (Firefox)

Clecko (Classilla)

Goanna (Pale Moon v26+)

Charlotte engine [text-based] (for z/VM etc.)

Mnemonic engine

Gzilla engine

Dillo engine

Microsoft Word engine [embedded rendering

Robin (The Bat!) [embedded rendering]

STNC HitchHiker/MS Mobile Explorer engine

Trident (Internet Explorer 4-11)

EdgeHTML (Edge 20-44)

rseded by Blink)

KHTML (Konqueror)

wxHTML [embedded rendering]

GtkHTML [embedded rendering]

WebKit (Safari)

U3 (UC Browser)

T5 (Baidu Browser)

Ultralight [embedded rendering]

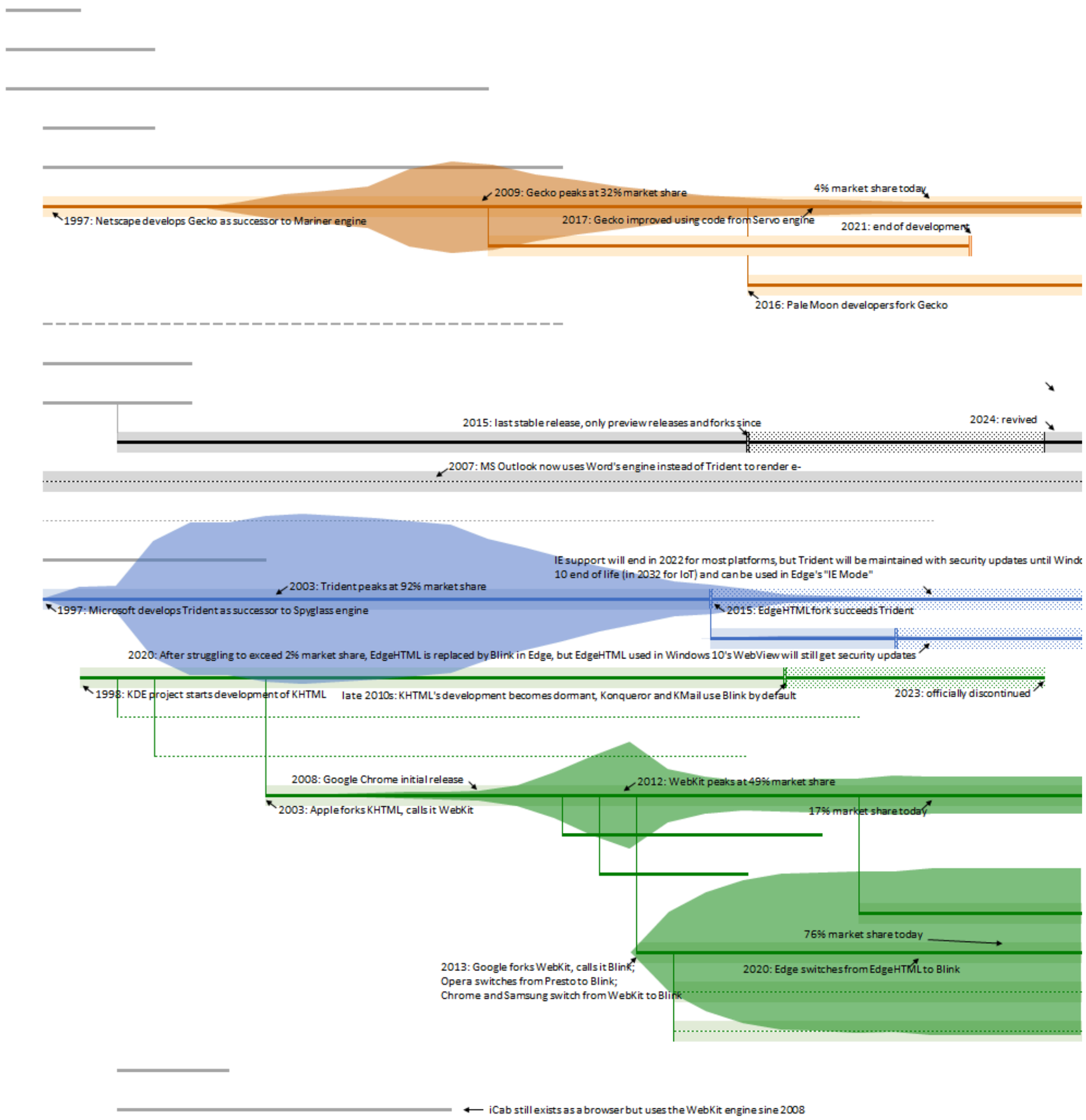
Blink (Chromium v28+)

X5 (WeChat) [embedded rendering]

T7 (baiduboxapp) [embedded rendering]

Clipper engine (Palm)

iCab engine



jB5 engine

Links engine [text-based]

Mango (BlackBerry v1-5)

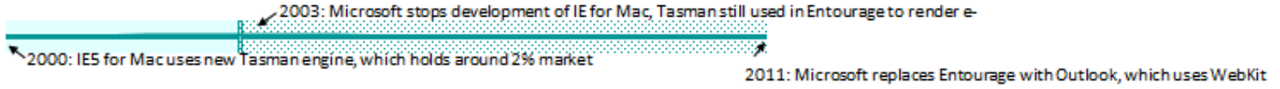
Obigo engine

WinWAP engine

Blazer engine

Interactor (Oregan Browser)

Tasman (Internet Explorer 5 for Mac)



Voyager engine

Netgem engine

Netrik engine [text-based]

Off by One engine

retawq engine [text-based]

WannaBe engine [text-based] (from 2001; 1998-2001: Gzilla fork)

Thunderhawk engine

Highwire engine

HomePageReader engine

Lumi (Polaris Browser v1-6)

Vision Mobile engine

Contiki Browser engine

iPanel Microbrowser engine

Skweezer engine

Prince [HTML to PDF conversion]

Galio engine

U2 (UC Browser)

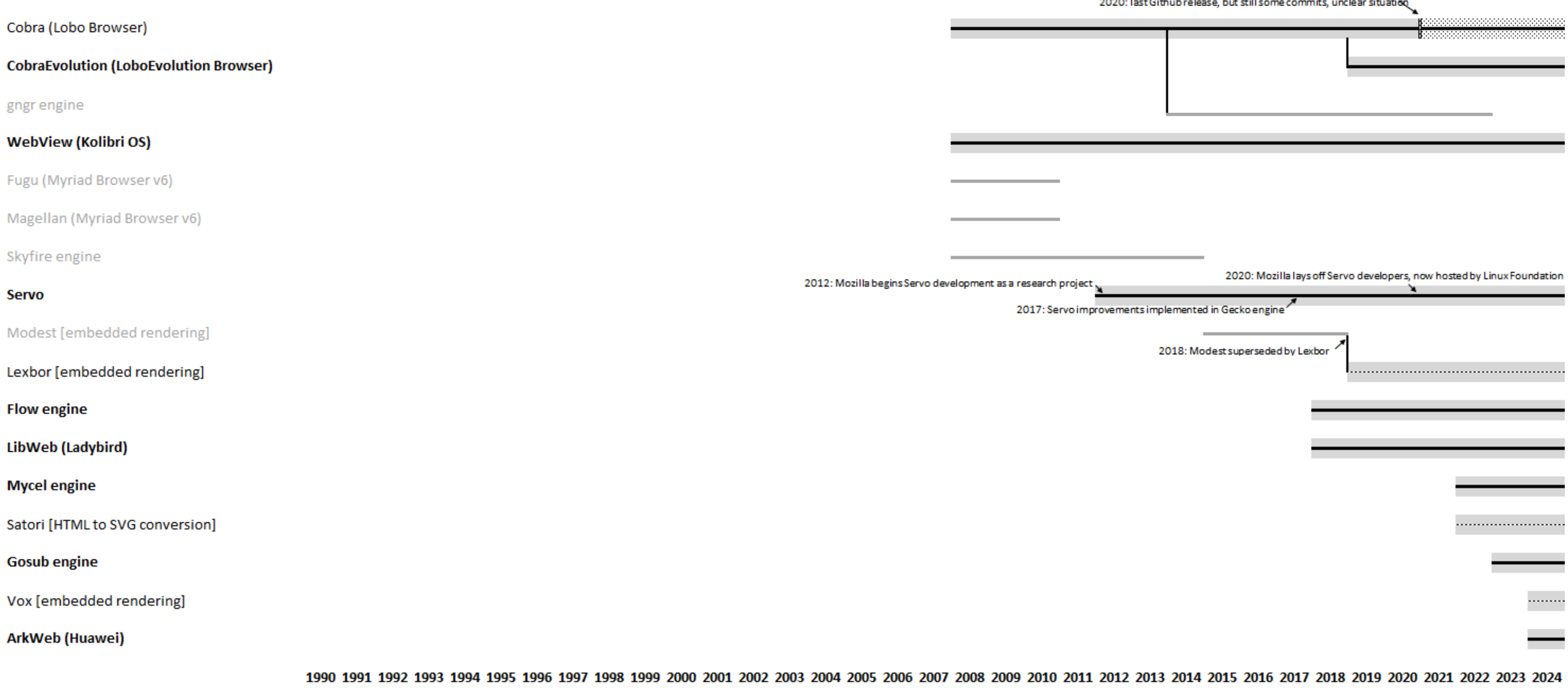
Sciter [embedded rendering]

Abaco engine

Deepfish engine

Hubbub (NetSurf)

Teashark engine



Click here to open the picture in a new tab

Today's surviving engines can be divided into multiple groups:

1. Active and fully-featured engines

- **Gecko** (Firefox). Down to 4% market share, mismanaged by Mozilla which prioritizes pushing its politics over improving the browser. Open source
- **Goanna** (Pale Moon), a fork of an old version of Gecko. At 0% market share and always at risk of not catching up with the newest web standards that Google invents. Open source
- **WebKit** (Safari), a fork of KHTML. Around 15-20% market share thanks to Apple's policy of only allowing WebKit-based browsers on iOS. Open source
- **Blink**, a fork of WebKit. It's the dominant engine nowadays, and it underpins Chromium, which is the basis for Chrome, Edge, Opera, Brave, Vivaldi, Samsung Internet and most other browsers; QtWebengine, which is the basis for Falkon and Otter Browser; Android WebView; Windows WebView 2; and Electron, where Blink is used to render the UI of apps. Close to 80% market share. Open source

2. Experimental new engines, not suitable for normal browsing (yet)

- **Servo**. This promising engine was developed by Mozilla, and parts of the Servo engine have been incorporated into Gecko. In 2020, Mozilla fired a quarter of their developers, which apparently included the whole Servo team. There have still been some commits to the code since then (presumably by hobbyists) but it is questionable if Servo will have a future. Update: Servo is now hosted by the Linux Foundation. Open source

- **Flow**, which focuses on TVs, but seems to be a promising newcomer. Unfortunately it's not open source so it's likely that the company will concentrate on their TV niche and that Flow won't ever become a real competitor to Blink. Closed source
- **LibWeb**, the engine powering Ladybird and the SerenityOS Browser. They have received some major donations want to publish an alpha version in 2026. Great to see another contender. Open source
- **Hubbub**, used only in NetSurf, a rather basic browser with no support for advanced web standards such as HTML 5. Open source
- **Dillo**. Basic browser for simple websites only. While the last stable release was in 2015, there have been more commits since and the project was officially revived in 2024. Open source
- **Cobra** and its fork **CobraEvolution**. These engines are used in the Lobo and LoboEvolution browsers, written in Java. It is unclear to me what's the state of this Lobo browser and engine and whether it's alive or dead, but LoboEvolution/CobraEvolution seems to be still in development. Open source
- **Gosub**, a new basic web engine in development since late 2023. Open source
- **ArkWeb**, a new in-house engine from Huawei for its upcoming HarmonyOS Next mobile operating system that first surfaced in 2024. Open source

3. Zombie engines, not in active development but still not completely dead

- **Trident** (Internet Explorer), while technically Trident will still get security updates until the end of Windows 10 (no date announced), there haven't been any new features or development of standards support since Edge came out in 2015. Microsoft announced that they will stop supporting Internet Explorer on most versions of Windows in 2022, but engine itself will remain accessible in Edge's "IE Mode" and hence will still receive security updates if necessary. For the end of life, see here. Closed source
- **EdgeHTML**, mostly known from its use in Legacy Edge, which was replaced by a newer Chromium-based Edge in 2020. Legacy Edge was forcefully removed via Windows Update in April 2021, but Microsoft confirmed that the EdgeHTML engine will still be supported with security updates, as it also been used for the built-in WebView in Windows UWP apps (superseded but not automatically replaced by Blink-based WebView 2). Closed source
- **Presto** (Opera Mini). This engine was used in Opera until version 12 (2013). The company gave up developing their own engine and created a new browser based on Blink, which Google and Opera forked from WebKit in the same year. Opera Mini, one of the mobile browsers, still uses server-side Presto rendering on basic phones (e.g. Java-based phones), however the app hasn't been updated since 2014 but it still available for download. On Android, Opera Mini uses server-side Presto rendering when the "Extreme" data savings mode is chosen. The last known update to the Presto engine was in 2015 according to a blog post, but given that it's still used in Opera Mini to some degree it is likely that the code is still somewhat maintained. Closed source (but source code has leaked)
- **U2** (UC Browser). This engine was used in older versions of UC Browser. It is not quite clear to which extent it is used today; it appears to still be used in the app for basic phones, which like Opera Mini hasn't been updated since 2014 but is still available to download. Furthermore, past version of Android seemed to have included an optional "Speed Mode" that would revert to U2 rendering instead of Blink rendering, however this feature seems to be absent from Android nowadays. Closed source
- **Arachne**. This basic browser supports only the most basic of HTML and CSS. It's not really in active development but happens to get a minor update every couple of years. Open source

4. Basic browsers for niche operating systems, not suitable for the "modern" web

- The engine of **iBrowse**, which is available for Amiga OS and seems to be a basic browser too without full web standards supports.Closed source
- **KolibiOS WebView**, which started as a text browser but has over time added some basic formatting and image support.Open source
- **Mycel**, formerly Opposum, a very basic web browser for Plan 9, in development since 2020. Open source
- **HighWire**. This basic browser for Atari and FreeMint had its last release in 2010 but is still being maintained with commit activity in the repo. Open source

5. Text browsers

- **Lynx** Open source
- **Links** Open source
- **w3m** Open source

6. Embedded rendering

- **Sciter**. Used for rendering the UI of apps. There's no browser using Sciter to display websites, and the engine is Closed source.
- **Ultralight**. Soft fork of WebKit that aims to be a light-weight alternative to Electron (Chromium) for apps. Open source
- **MS Word**. This is the engine used in Microsoft Office, including Outlook which uses it render HTML emails. There's no browser using the Word engine to display websites. Closed source
- **Prince**. This is a HTML/CSS engine used in a commercial product that converts HTML into PDFs. There's no browser using this engine to display websites. Closed source
- **Satori**. This is a HTML/CSS engine used used to converts HTML into SVGs. There's no browser using this engine to display websites. Open source

- **Lexbor**. Meant for HTML/CSS based apps or displaying internal HTML documents. Open source
- **Vox**, a new engine built from scratch since 2024 that aims to be an alternative to Electron. Closed source
- Chinese Blink variants. There is little information out there. There seems to be **X5** by Tencent, used in WeChat and some versions of QQ Browser, as well as **T7** used by Baidu's "baiduboxapp" (a search app for phones?), both Closed source. Other Chinese engines include UC's U3 and Baidu's T5, both of which seem to be dead now. All of these are based on Blink and it is unclear how much they actually differ or if they are just a rebranding of Blink, or a kind of CCP-approved Blink bastardization, or a real fork with useful features added.

Question Marks

Some questions remain and if anyone can help with information this will be greatly appreciated.

- Was Netscape based on NCSA Mosaic's engine?
  - No, according to: Clark, Jim; Owen Edwards (1999). Netscape Time: The Making of the Billion-Dollar Start-Up That Took on Microsoft. St. Martin's Press. ISBN 978-0312199340. *"The Mosaic Netscape web browser did not use any NCSA Mosaic code"*, quoted via Wikipedia. https://archive.org/details/netscapetimemaki00clar
- Was Spyglass Mosaic's engine (used also in IE 1-3) based on NCSA Mosaic's engine?
  - No, according to: https://ericsink.com/Browser_Wars.html. "Yes, we licensed the technology and trademarks from NCSA (at the University of Illinois), but *we never used any of the code. We wrote our browser implementations completely from scratch*, on Windows, MacOS, and Unix."
- Was Trident (IE 4-11) based on Spyglass Mosaic's engine (IE 1-3)?
  - I have never found any information, so I will assume that IE 4's Trident engine was completely developed from scratch.
- Was Presto (Opera 7-12) based on Elektra (Opera 3.5-6), and was Elektra based on the original Opera's engine?
  - I have assumed yes, but evidence is spurious: in http://www.blooberry.com/indexdot/history/opera.htm it uses the wording "rendering engine *re-write (now referred to as "Presto")*" for Opera 7. This makes it seems like Presto was just a re-write, not a new engine written completely from scratch. The same might be true for Elektra years before.
- Was iBrowse's engine based on Mosaic?
  - Wikipedia says iBrowse was a "*rewritten follow-on*" to the Amiga version of NCSA Mosaic, via Bettinson, Mat (November 1996). "Battle of the Browsers, IBrowse 1.0". CU Amiga. No. 81. EMAP. pp. 54-56. Like with Presto above, I assume that "rewritten" means "not started from scratch", but it is not very clear.
- Are the Zombie engines (see above) still maintained?
  - For EdgeHTML there is the issue of Windows WebView, for which (unlike Legacy Edge) no end of life has been announced. For Presto it is unclear because it's still kind of available in Opera Mini but only through server-side rendering so the code might be untouched for years now.
  - For U2, it's the same, just for UC Browser instead of Opera
  - Line Mode Browser (last update in 2006, but used in libwww)
- What are those obscure Chinese engines? There's U2, U3, X5, T5, and T7 at least, but besides U2, which seems to be its own thing, the rest all appear to be soft forks or mere rebrandings of WebKit/Blink. Are they really their own engines?
- The starting and end dates of obscure and historic browsers are often speculative
- Market shares are obviously hard to be determined, especially because there's not one single website which has kept track since the beginning of the web. The newest numbers I have used are from StatCounter, by the way.

Do you have any comments or corrections? **Please drop me an e-mail** or **create an issue on Github**

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