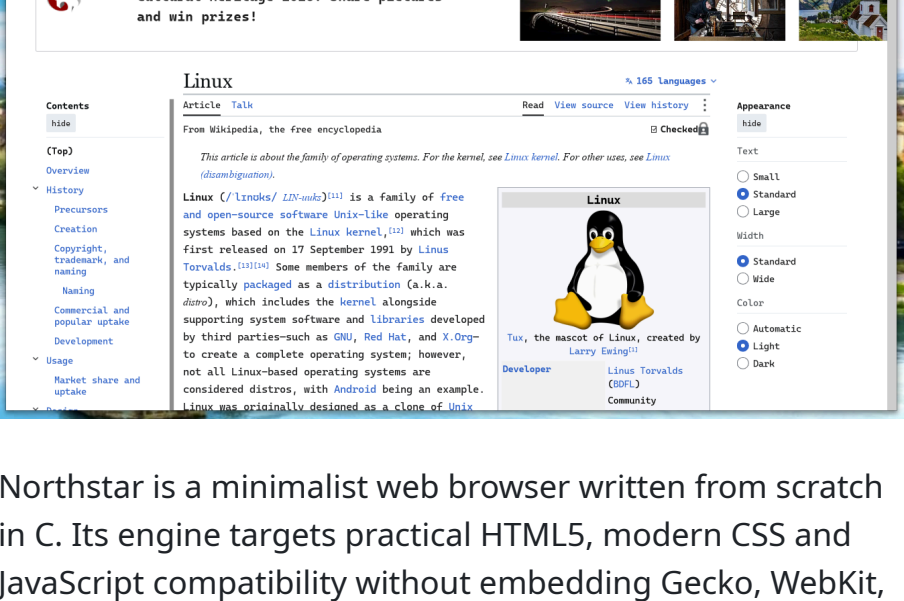


 claude	Let custom element protot...	45bf05c · yesterday
 .agents/skills	State Northstar's puri...	4 days ago
 .claude	Widen the Claude har...	last month
 .github	Run the linux-i386 CI c...	2 days ago
 cute-tests	Implement	2 months ago
 data	Fix prepend() linking t...	4 days ago
 debian	Check every depende...	2 days ago
 docs	Draw the shell's icons ...	yesterday
 scripts	Run the linux-i386 CI c...	2 days ago
 src	Let custom element p...	yesterday
 subprojects	Harden the original-Q...	last week
 .gitattributes	Northstar web browse...	3 months ago
 .gitignore	Add a 32-bit Linux CI ...	2 days ago
 AGENTS.md	State Northstar's puri...	4 days ago
 CLAUDE.md	Add a 32-bit Linux CI ...	2 days ago
 Changelog.md	Let custom element p...	yesterday
 LICENSE	Relicense to GPL v3; s...	3 months ago
 README.md	Update README.md	2 days ago
 SECURITY.md	Close the ways a cross...	2 weeks ago
 THIRD-PARTY-LICEN...	Harden the original-Q...	last week
 meson.build	Check every depende...	2 days ago
 meson_options.txt	Add a meson option t...	last week
 northstar.spec	Check every depende...	2 days ago

Northstar web browser



Northstar is a minimalist web browser written from scratch in C. Its engine targets practical HTML5, modern CSS and JavaScript compatibility without embedding Gecko, WebKit, Blink or another browser engine. Linux is the primary platform; macOS and Windows are also supported.

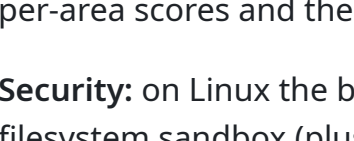
See [Nordstjernens Web Browser](#) also, which is the most complete, fully featured web browser project we are making. Nordstjernens has builds for Windows, Linux, MacOS.

Northstar is licensed under the GNU General Public License, version 3 or later.

Multiple browser variants

- This repo is the Northstar web browser, a minimalist, simple and good web browser. This is more about research about browser tech.
- [Nordstjernens Web Browser](#) is the most complete, fully featured web browser.

We are doing web browser innovation, research and development, and part of this is making multiple web browser variants to test and compare



Web standards: Behaviour is measured against the specification text, section by section, not against another browser. The engine runs web-platform-tests through headless mode; see [docs/compliance.md](#) for the current per-area scores and the known structural gaps.

Security: on Linux the browser runs behind a Landlock filesystem sandbox (plus `PR_SET_NO_NEW_PRIVS`), with a default-deny seccomp syscall filter in both GUI and headless/tooling modes · no JIT. See [SECURITY.md](#) for the exact per-mode posture.

Minimalism: one page per window, one process. The GTK shell runs on the main thread and the page engine on one dedicated thread with its own main loop, so a slow page never freezes the window; the shell posts requests to that thread and gets rendered frames back, all inside the same process. The engine is a compact body of C — about 177,000 lines of original C, excluding the vendored WAMR, Wuffs and audio decoders — small enough for one person to read and audit end-to-end. See [docs/architecture.md](#) for how it fits together.

What this edition is

This edition strips Northstar down to a tab-less, single-process desktop browser, based on the [Nordstjernens project](#). It deliberately omits tabs, per-tab renderer processes, WebGL, WebGPU, an embedded PDF viewer and AI-style web APIs. It does not send telemetry or update pings.

Audio still plays in-process (MP3, MP2, Ogg Opus/Vorbis). Images decode in-tree (PNG/APNG, GIF, BMP, JPEG and WebP via Wuffs, AVIF through libavif when available, and SVG in the engine).

Browser features

- HTML** parsed to a DOM by lexbor; **CSS** by the engine's own cascade — flex, grid, transforms, gradients, @keyframes, scroll snap, and typed calc() math over lengths, angles, times and resolutions.
- JavaScript** on the QuickJS interpreter — DOM, Shadow DOM, observer APIs, Canvas 2D (Path2D, ImageBitmap, DOMMatrix), WebCrypto (crypto.subtle over OpenSSL).
- Custom elements** — autonomous and customized built-in elements.
- Workers** — dedicated workers with structured-clone messaging, message channels and broadcast channels.
- Storage** — IndexedDB over SQLite, localStorage / sessionStorage and the Cache API (caches, request/response pairs per the Service Workers specification), each partitioned by site.
- Live connections** — WebSockets (with libcurl 8.11 or newer, or one built with WebSocket support) and server-sent events.
- Navigation API** — window.navigation for single-page routing.
- Service workers** — origin-scoped registration, persistence, controlled-page fetch interception and offline pages served from the Cache API.
- WebExtensions** — installed local extensions with manifest content scripts, safe packaged resources, local storage and runtime messaging.
- Networking** over HTTP/2 with libcurl — HTTP/3 through Alt-Svc when the linked libcurl provides it — HTTPS-first navigation, HSTS, optional DNS-over-HTTPS, CSP, subresource-integrity (SRI) checks for scripts, and cookies partitioned by site in one libcurl store that document.cookie and network requests share.
- Safe browsing** — before a top-level navigation is fetched, its host is checked against a local SHA-256 blocklist. The check runs entirely on-device. The bundled list carries only test entries; a real list goes in ~/.config/northstar/safebrowsing.list or is named by NS_SAFEBSROWING_LIST.
- Media** — images (PNG/APNG, GIF, BMP, JPEG, WebP, optional AVIF, SVG); audio (<audio>) decodes and plays in the browser process, alongside a Web Audio graph. <video> plays MPEG-1 (video/mpeg), decoded in-tree by the same pl_mpeg that already handles MP2 audio. MPEG-1 is an ISO standard whose patents have expired, so it costs no dependency and no licence; it is also not a format the modern web serves, so this is video support for local and self-hosted clips rather than for streaming sites.
- Printing** — Ctrl+P lays the page out for paper and hands the sheets to the operating system's own print dialog through GtkPrintOperation: CUPS on Linux, the Win32 dialog on Windows, the Cocoa panel on macOS. @media print matches, @page sets the sheet size and margins, and break-before / break-after / break-inside decide where a sheet ends.
- MathML** — a minimalist presentation-MathML renderer.
- Spell checking** — optional, via the Enchant library.
- WebAssembly** — the JavaScript API over a vendored WAMR interpreter.
- One process, no tabs** — each window shows one page (New Window opens another in the same process), and the page engine runs on its own thread inside the shell process; there are no renderer processes. A watchdog restarts the browser, with its session, after a crash or hang.
- UI** — bookmarks, history, downloads, find-in-page, zoom, full screen, printing, save as PDF or image, page source, developer tools with a JS console, settings, private browsing (--private), and a UI translated into 40 languages that follows the operating-system language.
- Headless mode** — text, DOM, layout, PNG and PDF dumps, scripted input and web-platform-tests runs from the command line; see [docs/building.md](#).

Build and run

On Debian or Ubuntu, install the required development packages:

```
sudo apt install build-essential git pkg-config \
libgtk-4-dev libcurl4-openssl-dev libssl-dev
libharfbuzz-dev libfribidi-dev libcairo2-dev
libfreetype-dev libpsl-dev libsqlite3-dev l
zlib-dev
meson setup builddir
meson compile -C builddir
./builddir/src/gtk/northstar
```

For macOS (Homebrew or MacPorts), other Linux distributions and Windows, see [docs/building.md](#).

The development helper configures the default build directory when needed and runs the same compile command:

```
./scripts/dev.sh build
./scripts/dev.sh smoke
```

The smoke command renders deterministic local fixtures through the headless engine and compares them with the checked-in baselines. A single page can also be rendered directly:

```
./builddir/src/gtk/northstar --headless --dump=tr
```

Meson feature options include --Davif=disabled, --Audio=disabled and --Dwasm=disabled for smaller builds. --Djs_engine=quickjs builds on Fabrice Bellard's original QuickJS instead of the default quickjs-ng.

WAMR, Wuffs, pl_mpeg and minimp3 are vendored in-tree. ns-pango, lexbor and quickjs-ng are pinned upstream subprojects (see subprojects/*.wrap) that meson setup fetches; see [docs/building.md](#) for how a pin is made.

Dependencies

Northstar's engine is written from scratch — it contains no forked browser engine (no Gecko, WebKit, or Blink). It is the GPL edition of the [Nordstjernens project](#).

About

Northstar web browser, Open Source License: GPL v3. Northstar web browser is a real web browser, not based on Firefox or Chrome.

[nordstjernens.org/northstar...](#)

[browser](#) [html](#) [http](#)

[web](#)

Readme

GPL-3.0 license

Security policy

Activity

Custom properties

114 stars

2 watching

8 forks

Report repository

Releases 12

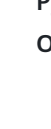
Northstar Browser ...

Latest

5 days ago

+ 11 releases

Contributors 3

 claude

Claude

 andreasrosdal

Andreas R...

 swinful

Samuel A Winful

Languages



Component	Role
lexbor v3.0.1	HTML5 → DOM parser and the WHATWG URL module
quickjs-ng v0.17.0	JavaScript engine — no JIT
QuickJS 2026-06-04	The original JavaScript engine, used instead of quickjs-ng with <code>-Djs_engine=quickjs</code>
ns-pango	Text itemization, shaping and line breaking — a Pango fork with a cross-layout shaping cache

lexbor (3.0 or newer) and quickjs-ng take a system copy instead when the build finds one; ns-pango is always the subproject, since the fork's renamed symbols are what let it coexist with the system Pango that GTK loads.

Vendored in-tree (built from the main tree, no submodules):

Component	Role
WAMR (subset)	WebAssembly interpreter
Wuffs v0.4	Memory-safe image decoding — PNG/APNG, GIF, BMP, JPEG, WebP
pl_mpeg (MIT)	In-process MPEG-1 video and MP2 audio decode
minimp3 (CC0)	In-process MP3 audio decode

Required system libraries: GTK 4 (≥ 4.14 ; $\geq 4.22.1$ on Windows), GLib (≥ 2.80), Cairo (≥ 1.18), HarfBuzz (≥ 8.3), FriBidi, fontconfig (≥ 2.15), FreeType, libcurl (≥ 8.5), OpenSSL (libcrypto), uchardet, libpsl, SQLite and zlib — Ubuntu 24.04, Debian 13 and Fedora 40 meet every floor; Ubuntu 22.04 and older cannot build it. The engine lays text out through ns-pango rather than the system Pango; GTK still links the system Pango for its own widgets, and the two coexist because every symbol in the fork is renamed. Linux builds also require libseccomp. SDL2 is required when in-process audio is enabled.

Optional (auto-detected): libavif (AVIF images), opusfile / vorbisfile (in-process Ogg audio), Enchant (spell-checking) and libthai (Thai line breaking).

License

Northstar is free software, licensed under the **GNU General Public License, version 3 or later** — see [LICENSE](#).

Project home: <https://nordstjernen.org/northstar-browser/> ·

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Builds

 linux

passing

 musl

passing

 macos

passing

 windows

passing