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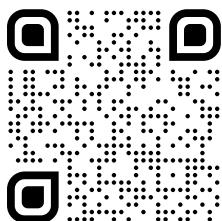
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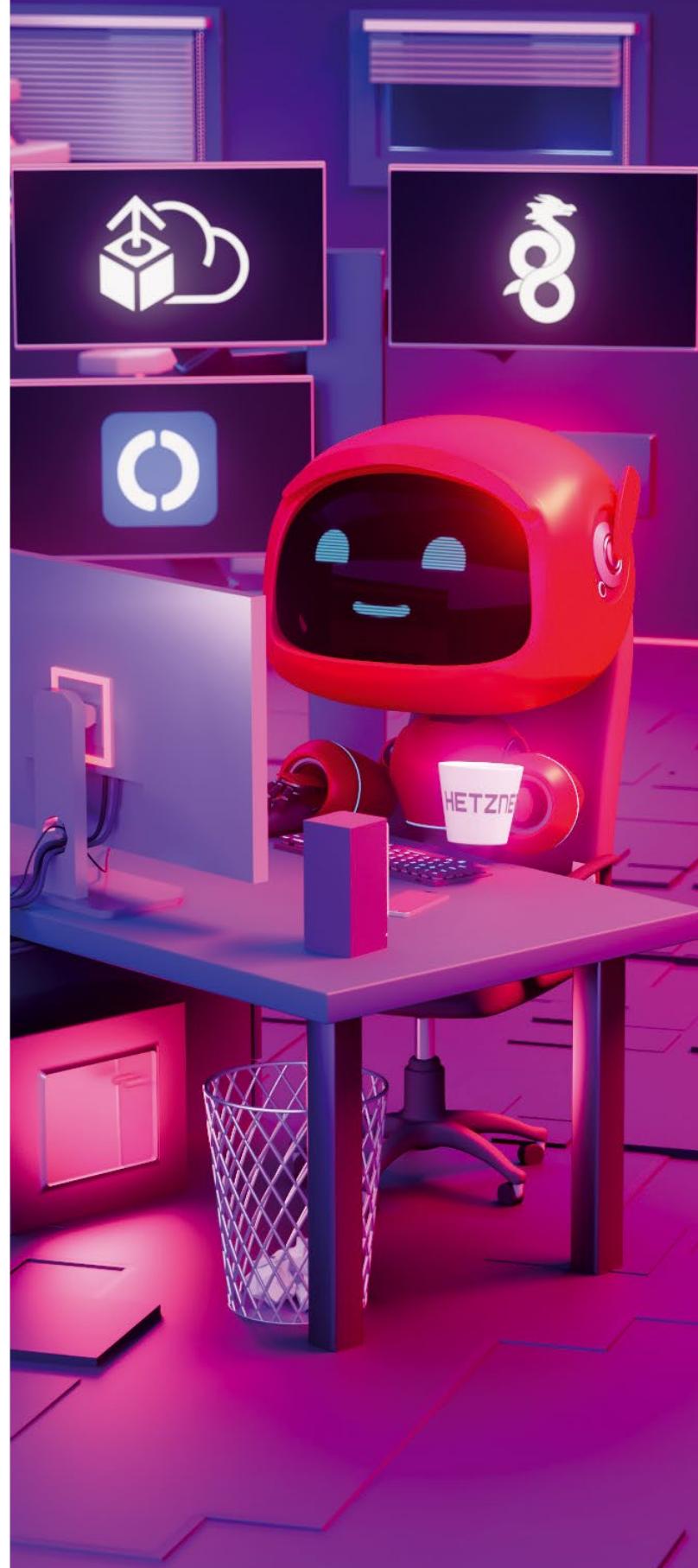
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# 10 Terrific Tools

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**ADMIN**  
Network & Security

## Contact Info

### Editor in Chief

Joe Casad, jcasad@linuxnewmedia.com

### Associate Editor

Amy Pettle

### Copy Editor

Aubrey Vaughn

### Layout and Graphic Design

Dena Friesen, Lori White

### Advertising

Jessica Pryor, jpryor@linuxnewmedia.com

### Marketing Communications

Gwen Clark, gclark@linuxnewmedia.com

### Publisher

Brian Osborn

### Customer Service / Subscription

Email: cs@linuxnewmedia.com

Phone: 1-866-247-2802

(toll-free from the US and Canada)

[www.admin-magazine.com](http://www.admin-magazine.com)

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## Dear Readers:

Experienced sys admins like to travel light, with a collection of small tools for specific tasks. What's inside your toolbox? It depends on what you need. But one thing is for sure: In today's world, getting better at your job often means finding better tools. We at *ADMIN* are all about helping you discover new tools for your collection. Read on for another great collection of practical utilities for professional admins.

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|--|---|



**Get notified on website changes**

# Page Pulse

Do you want to be alerted when a product is back in stock on your favorite online store? Do you want to know when a website without an RSS feed gets an update? With changedetection.io, you can stay up-to-date on website changes. By Koen Vervloesem

If you want to stay updated on news from various websites, Really Simple Syndication (RSS) [1] is a great solution. Many websites offer their news in an RSS feed, which is an XML file with a specific format. You can subscribe to these feeds and read the content in RSS feed readers, which can be graphical, command-line, or web-based clients.

However, not all websites provide an RSS feed, and RSS usage seems to have diminished somewhat in recent years. Moreover, not all websites offer their content in the form of articles. Still, you may want to know

about changes on these websites, such as the price of your favorite product on an online store or a new page in the table of contents of an online document. Are you then doomed to regularly visit all those websites you're interested in? With changedetection.io [2], you can monitor arbitrary changes on web pages and be notified in various ways. At first glance, changedetection.io's website (**Figure 1**) seems to suggest it is a commercial service that requires a monthly subscription fee. However, changedetection.io is a completely open source project, with

its source code [3] published under the Apache 2.0 license. The developer simply offers this solution as a subscription to fund development.

## Installing changedetection.io

Changedetection.io is a Python program, which you can install using Python's package manager pip. However, because you probably want to run this continuously as a service, it makes sense to run it in a Docker container. On Ubuntu 24.04 LTS, install Docker and Docker Compose with

```
$ sudo apt install docker.io
docker-compose-v2
```

Then add your user to the docker group:

```
$ sudo usermod -aG docker $USER
```

Log out and log in again to apply the group membership. Next, create a data directory for the container:

```
$ mkdir changedetection
```

Then create a `docker-compose.yml` file with the content from [Listing 1](#). Of course, you need to modify the path in the volume to match your user's home directory. Now, start changedetection.io with:

```
$ docker compose up -d
```

If you run this on your desktop or laptop, simply visit `http://localhost:5000` in your web browser to access the user interface (**Figure 2**). If you run this on a server, just replace `localhost` with its IP address.

The screenshot shows the homepage of changedetection.io. At the top, there's a navigation bar with links for Home, Subscription, Features, About, Contact, Tutorials, Dev, and a Start button. Below the navigation, a large banner reads "WEBSITE CHANGE DETECTION FOR CLEVER PEOPLE". It includes a subtext "Page change monitoring with alerts a breeze. The best way to monitor website changes.", a "Continue with stripe and PayPal" button, and a "Learn More" link. The main content area features several sections: "Loved by smart-shoppers, bargain-hunters, data-journalists and more. Now with intelligent product restock detection! 🚀". Below this are sections for "Features", "Notification Support" (mentioning Discord and Slack), "Target Elements" (with a small icon showing a list of items), "Browser Steps" (with a small icon showing a search bar and a cart), and "Re-stock alerts" (with a small icon showing a shopping cart). A footer at the bottom contains links for "Features", "Subscription", "About", "Contact", "Tutorials", "Dev", and "Start".

**Figure 1:** It takes some time to discover that changedetection.io is an open source project.

## The Basics

Changedetection.io starts watching two web pages as examples: the changelog of its own releases, and the Hacker News homepage. Each of these “change detection watches” gets its own row in a table. For each page, this table shows the last time it was checked as well as the last time it changed. If the page has a change that you haven’t viewed yet, the entire row is shown in bold. Clicking on the *Diff* button then shows the changes, with new lines in green and deleted lines in red.

A click on *Reset* queues a new check of the page if you don’t want to wait for the next scheduled check. By default, pages are checked every three hours.

Each page can have one or more tags, such as *Tech news* or another general category. These tags are also shown next to the page in the change detection watch table, and there are also tabs for each tag. If you click on a tag, the table only shows pages with that tag, providing a clearer overview if you have many pages added to your watch. At the bottom right of the table, you can always mark all pages of the current tag as viewed, recheck them all, or get an RSS feed with

changes of these pages for you to add to your RSS feed reader.

Each page also has two grayed-out icons at the start of its row. Clicking on the first one pauses the checks for this page, and clicking on the second one stops notifying you of changes, but keeps checking for them. A click on the *Edit* button opens the settings for the page’s change detection watch.

## Basic Settings

Before adding pages, I’ll first cover some of changedetection.io’s basic settings. After clicking on *Settings* at the top right, the *General* tab allows you to set the time between checks (the default is three hours), as well as other general settings. This is where you can set a password on changedetection.io. Click on *Save* at the bottom if you change any of the settings.

In the *Notifications* tab (Figure 3), you define how changedetection.io sends you notifications when it detects a page change. You can leave this field blank if you’re content with regularly checking the watch list manually or if you monitor the changes in your RSS feed reader. But if you want faster notifications, set this up here.

### Listing 1: changedetection.io Docker Compose File

```
01 version: '3.2'
02 services:
03   changedetection:
04     image: ghcr.io/dgtlmoon/changedetection.io
05     container_name: changedetection
06     hostname: changedetection
07     volumes:
08       - /home/koan/changedetection:/datastore
09     ports:
10       - 5000:5000
11     restart: unless-stopped
```

Changedetection.io uses Apprise [4] for notifications. Apprise is a library that supports sending notifications to more than a 100 popular services, including Telegram, Discord, Slack, Home Assistant, Kodi, Pushbullet, and email. For each of these services, Apprise defines a URL. I’ll use sending emails with Mailjet [5] as an example (for more examples, see the Apprise wiki [6]).

Enter one or more Apprise URLs in changedetection.io’s *Notification URL List*. For Mailjet, this looks like

```
mailto://username:password@in-v3.2
mailjet.com?from=Change%20Detection%20<changedetection@example.com>&to=
koen@vervloesem.eu&mode=ssl
```

The screenshot shows the main interface of changedetection.io. At the top, there's a navigation bar with links for GROUPS, SETTINGS, IMPORT, BACKUP, and various search/filter icons. Below the navigation is a search bar with placeholder text "Add a new change detection watch". Underneath the search bar, there are two input fields: one for the URL ("https://...") and one for the "watch label / tag" ("Tech news"). To the right of these fields are "Watch" and "Edit > Watch" buttons. Below this, there's a note about shared watches and a link to more info.

The main content area displays a table of watched pages. The table has columns for "All", "Tech news", and "changedetection.io". It lists two pages:

			Last Checked	Last Changed			
<input type="checkbox"/>	#	Website	5 minutes ago	Not yet	<button>Recheck</button>	<button>Edit</button>	<button>Preview</button>
<input type="checkbox"/>	1	https://news.ycombinator.com/ ↗ ↘ Tech news	5 minutes ago	Not yet	<button>Recheck</button>	<button>Edit</button>	<button>Preview</button>
<input type="checkbox"/>	2	https://changedetection.io/CHANGELOG.txt ↗ ↘ changedetection.io	5 minutes ago	Not yet	<button>Recheck</button>	<button>Edit</button>	<button>Preview</button>

At the bottom right of the table, there are buttons for "Recheck all" and an RSS feed icon. The overall interface has a dark purple header and a light blue body.

Figure 2: Changedetection.io starts watching two web pages as examples.

This defines the notification as secure SMTP, with a username and password for login and a from and to email address in SSL mode.

If you then click on *Send test notification*, you should receive a notification on all services you set up. If not, click on *Notification debug logs* and try to find out what went wrong. You can also change the title and body of the notifications, but the defaults are often fine. Don't forget to click on *Save* at the bottom to save your notification settings. For now, you can ignore the other tabs of changedetection.io's settings.

## Adding a New Change Detection Watch

If you want to monitor a specific web page for changes, you can simply add the URL in the text box at the top, under *Add a new change detection watch*. Optionally, add one or more tags (separated by a comma), and then click on *Watch* to add the watch with the

default settings or *Edit | Watch* to edit the watch's settings before adding it. By default, changedetection.io watches for web page text/HTML, JSON, and PDF changes. However, if you select *Re-stock & Price detection for single product pages*, the program looks for signs of a price or terms such as "in stock" or "out of stock," which lets you watch for changes in prices or stock status. Note that this only works if the page covers one product. There's also a Chrome extension [7] that works together with your changedetection.io instance. Just add it to Chrome, open your changedetection.io's *Settings* and go to the *API* tab. Then open the extension from the toolbar and click on *Sync API Access*. The extension then automatically configures itself to talk to your changedetection.io instance. On any page, you can now click on the extension icon in the toolbar, select whether you want to detect normal changes or stock and price changes,

optionally add one or more tags, and click on *Watch this website* to add a change detection watch (**Figure 4**).

## Change Detection Watch Settings

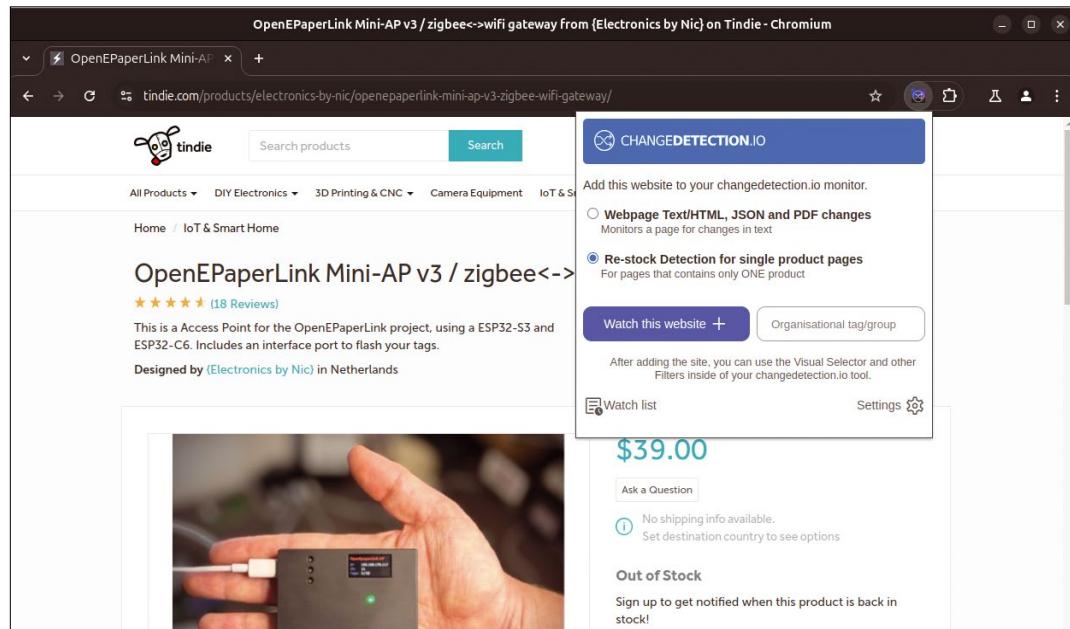
If you click on *Edit | Watch* when adding a new watch or click on *Edit* for an existing watch, you can modify various settings specific to the change detection watch. In the *General* tab, you can change the title shown in the watch table (by default the full URL), the tags, and the time between checks if you want something other than the global settings. The *Request* tab allows you to adjust how changedetection.io fetches the web pages, which I'll explain later.

For general web page changes, there are settings to filter which parts of the page changedetection.io monitors for changes. The *Visual Filter Selector* is advanced functionality that I'll explain later, and *Filters & Triggers* allows you to remove HTML elements or select only specific HTML elements from the page. For example, one of the web pages I'm watching has a footer showing how many "bad" access attempts it has blocked. Naturally, this triggers change detections I'm not interested in. When examining the web page's HTML code, I noticed that the `main` element contains all the information I need, without the footer. So I added the XPath filter `//main` to the *CSS/JSONPath/JQ/XPath Filters* text box on this tab. Don't forget to save your changes.

For stock and price detection, the *Re-stock & Price Detection* tab allows you to adjust the watch's behavior. For example, you can specify whether you want to know about any availability changes or only when an out-of-stock product is back in stock. You can also enable and disable price monitoring, and you can even trigger notifications when the price changes below or above a set value (**Figure 5**).

For both types of change detection watches, the *Notifications* tab allows you to modify the behavior from using the general notification settings to something custom for this watch. For

**Figure 3:** Add Apprise URLs for notifications of detected changes.



**Figure 4:** With changedetection.io's Chrome extension, monitoring page changes becomes even easier.

instance, you can disable notifications for this watch or add another Apprise URL for a custom notification. The *Stats* tab simply shows some statistics of the watch and allows you to download the latest HTML version that changedetection.io has downloaded from the page to debug any issues.

## Using a Chromium/JavaScript Server

By default, changedetection.io downloads the watched pages as plain HTML files using an HTTP client. This works for many web pages and is fast. However, as soon as a page uses JavaScript to render important parts of its content, this simple HTTP client won't see the content. Fortunately, you can run a web browser in a Docker container and let changedetection.io use it to fetch the watched pages.

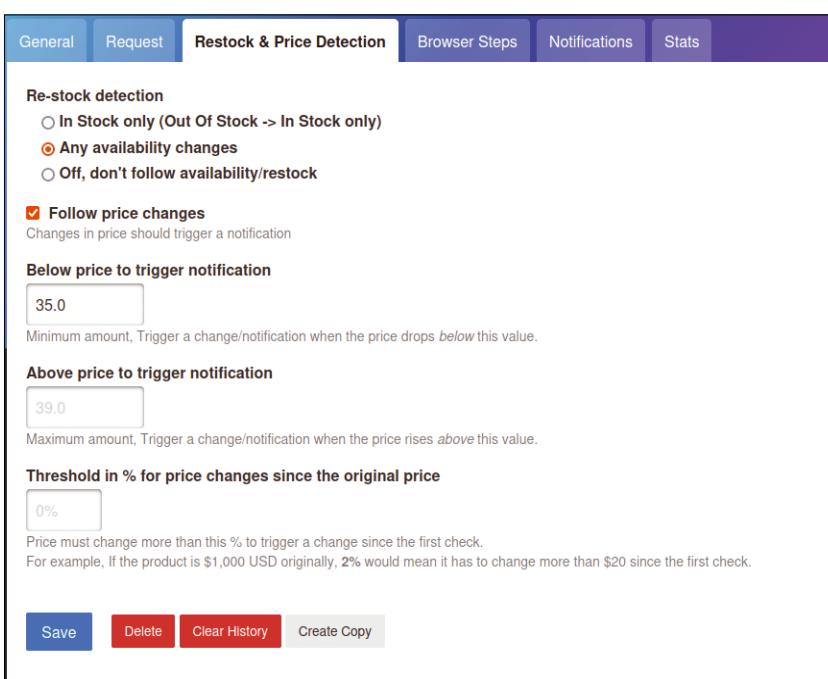
To configure this, update your `docker-compose.yml` file with the Docker Compose file shown in [Listing 2](#). This adds a second container running a Chromium web browser and lets changedetection.io's container wait until this container is started. After these changes, restart Docker Compose with:

```
$ docker compose up -d
```

In principle, you could now change changedetection.io's fetch method to *Playwright Chromium/Javascript via 'ws://playwright-chrome:3000'* in its settings, but the default fetch method is much more efficient. It's recommended to only change the fetch method for individual watches where the default method doesn't work.

You can make this change in the *Request* tab of the watch settings by

changing the *Fetch Method* to *Playwright Chromium/Javascript via 'ws://playwright-chrome:3000'*. Save your changes and wait for the queued watch to be executed. If all goes well, the change detection watch works now. However, some websites (such as Amazon) detect that you're visiting them with a bot, so they don't show the desired content. You can check this by clicking on *Preview* next to the change detection watch. If you go to the *Screenshot* tab, you'll see what the page looks like to the browser in the container, and this often shows a CAPTCHA. There are solutions for this problem, such as Bright Data's (paid) Scraping Browser [8], but that is beyond the scope of this article.



**Figure 5:** Trigger a change when the price drops below or rises above a specific value.

**Listing 2:** Docker Compose File for changedetection.io with a Chromium/JavaScript Server

```

01 version: '3.2'
02 services:
03   changedetection:
04     image: ghcr.io/dgtlmoon/changedetection.io
05     container_name: changedetection
06     hostname: changedetection
07     volumes:
08       - /home/koan/changedetection:/datastore
09     ports:
10       - 5000:5000
11     environment:
12       - PLAYWRIGHT_DRIVER_URL=ws://playwright-chrome:3000
13     restart: unless-stopped
14     depends_on:
15       playwright-chrome:
16         condition: service_started
17     playwright-chrome:
18       image: dgtlmoon/sockpuppetbrowser:latest
19       container_name: playwright-chrome
20       hostname: playwright-chrome
21       environment:
22         - SCREEN_WIDTH=1920
23         - SCREEN_HEIGHT=1024
24         - SCREEN_DEPTH=16
25         - MAX_CONCURRENT_CHROME_PROCESSES=10
26     restart: unless-stopped

```

## Visual Filter Selectors and Browser Steps

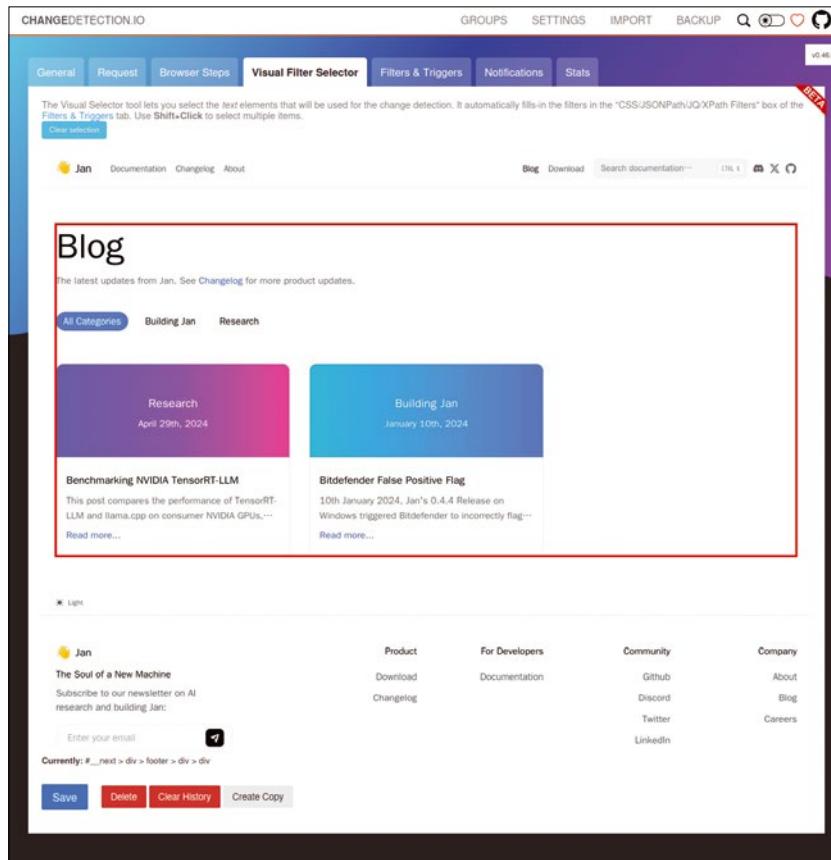
If you're using a Chromium/JavaScript server, you get even more possibilities, for example, for filters. Instead of having to look up the HTML source code and construct the XPath expression, you can just click on the *Visual Filter Selector* tab of the watch's settings. This shows the web page, and when you hover over different parts of the page, you see a red bounding box (**Figure 6**). Click on the box to select the element you want to use for change detection. This automatically fills in the corresponding filter in the *Filters & Triggers* tab. You can also select multiple elements. Click on *Save* to confirm the filter.

Another advantage of using the Chromium/JavaScript server can be found in the *Browser Steps* tab. By clicking on the play button there, changedetection.io creates a live connection to a web browser, and you can interact with the page from within this browser. You can then perform actions such as clicking on a cookie accept box or logging into

the website. After saving this, changedetection.io replays these steps every time before its change detection watch. You can use this, especially in combination with the Visual Filter Selector, to get alerts about information shown only after logging in, such as new invoices or private messages. Of course, adjust the time between checks appropriately: You don't want your account blocked because changedetection.io logs in too frequently.

## Conclusion

Changedetection.io can be a great tool for being notified of web page changes. Once you have it running for a few websites without an RSS feed, you'll likely add more and more change detection watches. The filters and triggers are quite powerful, and you can even ask changedetection.io to extract text from a page using regular expressions. Before you know it, you'll have this service constantly browsing the web for you, notifying you of anything you need to know. ■



**Figure 6:** Select the parts of the web page you want to monitor.

### Info

- [1] RSS: [<https://www.rssboard.org/rss-specification>]
- [2] changedetection.io: [<https://changedetection.io>]
- [3] changedetection.io source code: [<https://github.com/dgtlmoon/changedetection.io>]
- [4] Apprise: [<https://github.com/caronc/apprise>]
- [5] Mailjet: [<https://www.mailjet.com/>]
- [6] Apprise wiki: [<https://github.com/caronc/apprise/wiki>]
- [7] Chrome extension: [<https://chromewebstore.google.com/detail/changedetectionio-website/kfcfcfmgmlhmankjmnbijmhofdfjekbop>]
- [8] Bright Data's Scraping Browser: [<https://brightdata.com/products/scraping-browser>]

### Author

Koen Vervloesem has been writing about Linux and open source, computer security, privacy, programming, artificial intelligence, and the Internet of Things for more than 20 years. He holds master's degrees in Computer Science Engineering and Philosophy and is teaching Linux, Python, and IoT classes. You can find more on his website at [[koen.vervloesem.eu](http://koen.vervloesem.eu)].



## Manage your VPNs with WireGuard Easy

# Easy Wires

WireGuard is a less complex VPN solution compared to OpenVPN and IPsec. WireGuard Easy simplifies the process even further by allowing you to operate a VPN and manage clients through a user-friendly web interface. By Koen Vervloesem

**WireGuard [1]** implements a virtual private network (VPN) using state-of-the-art cryptography, emphasizing speed and simplicity. It enables you to run an encrypted tunnel over the Internet, securing your network traffic over an untrusted network. WireGuard has been part of the Linux kernel since Linux 5.6 (March 2020), but it also supports various other operating systems, including FreeBSD, OpenBSD, Windows, macOS, Android, and iOS. Installation instructions [2] for all these operating systems are available on the WireGuard website ([Figure 1](#)).

Although WireGuard is considerably easier to configure than alternative VPN solutions such as OpenVPN and IPsec, it still requires running some commands on the command line and manually editing configuration files. WireGuard Easy [3] allows easy management of WireGuard connections through a web interface. In this article, I'll guide you through installing WireGuard Easy to manage a VPN server and show how to manage clients.

## Requirements

WireGuard Easy is implemented as a Docker container that incorporates both WireGuard and a web interface for managing VPN connections. You will need a Linux machine with a kernel that supports WireGuard (all modern kernels) and Docker installed. On Ubuntu 24.04 LTS, install Docker and Docker Compose with

```
$ sudo apt install docker.io docker-compose-v2
```

Then, add your user to the docker group:

```
$ sudo usermod -aG docker $USER
```

Log out and log in again to apply the group membership.

There are two primary use cases for setting up a WireGuard VPN. In the first use case, you want a secure way to go online via an unsafe network. This can be accomplished by running the WireGuard VPN server on a virtual private server (VPS) that you rent. The VPS has a fixed IP address, making it easy to direct your VPN clients to it. Optionally, you can buy a domain name from a domain registrar and point it to the IP address. This way, your VPN clients can access the Internet over an encrypted tunnel from the unsafe network to your VPS.

In the second use case, you want a secure way to access services running on your home network when you're away from home. This setup is more elaborate. You can run the WireGuard server on any computer within your network, as long as it's always on and has a fixed IP address. A fixed IP address can be achieved by assigning a static IP address or setting an IP reservation in your DHCP server. Additionally, you need to forward WireGuard's port (UDP port 51820) from your modem to the WireGuard server. Without a fixed IP address for the server, you wouldn't be able to ensure that the port is forwarded to the correct server.

The screenshot shows the official WireGuard website. At the top, there's a navigation bar with links for 'WireGuard', 'Installation', 'Quick Start', 'Interworkings', 'Whitepaper', 'Donate', and a GitHub icon. The main content area features a large logo with the word 'WIREGUARD' in bold red letters and 'FAST, MODERN, SECURE VPN TUNNEL' below it. Below the logo, there's a section titled '# Simple & Easy-to-use' which highlights the simplicity of configuration. Another section, 'Cryptographically Sound', discusses the use of modern cryptographic primitives like Curve25519 and ChaCha20. The 'Minimal Attack Surface' section emphasizes the ease of implementation and auditability. The 'High Performance' section notes the high speed of the protocol. Finally, the 'Well Defined & Thoroughly Considered' section refers to the technical whitepaper and academic research paper. A 'Conceptual Overview' section at the bottom provides a general introduction to what WireGuard is about.

Figure 1: WireGuard implements a fast, modern, and secure VPN tunnel.

**Listing 1:** ddclient Config File for Duck DNS

```

01 # General
02 ssl=yes
03
04 # Router
05 use=web
06 web=freedns
07
08 # Protocol
09 protocol=duckdns
10 password=87b46fd5-df3d-420b-90f6-c7004f873e1e
11 example.duckdns.org

```

**Listing 2:** docker-compose.yml for ddclient

```

01 version: '3.7'
02
03 services:
04   ddclient:
05     image: lscr.io/linuxserver/ddclient: latest
06     container_name: ddclient
07     environment:
08       - PUID=1000
09       - PGID=1000
10       - TZ=Europe/Brussels
11     volumes:
12       - /home/koan/containers/ddclient:/config
13     restart: always

```

A final challenge for a VPN server at home is that many residential Internet connections don't have a fixed public IP address. So how do the VPN clients know where to connect to? The solution is to use a dynamic DNS (DynDNS) service. You have to run software on your local network (on your router or a server) that continuously checks your Internet connection's public IP address. After a change, the software sends your new IP address to the DynDNS service.

This service assigns you a subdomain of its domain, which is always updated to point to your new IP address. This way, your VPN clients can always refer to your home VPN server by your DynDNS domain name.

In this article, I'll run WireGuard Easy and a DynDNS updater as Docker containers on an Ubuntu 24.04 LTS server at home (**Figure 2**). However, you can run both containers on any other Linux distribution, and you don't even need Docker. If a firewall is active on your server, ensure the correct ports are allowed.

## DynDNS Updater

First, you need to create an account with a DynDNS service. Many offer a free account suitable for this purpose. Some examples include No-IP [4], FreeDNS [5], and Duck DNS [6]. After creating an account, register a domain with the service. The next task is to continuously update this domain so it always points to your home's public IP address.

One solution, `ddclient` [7], updates DNS entries for accounts on a wide range of DynDNS services. The project doesn't maintain an official Docker image, but the LinuxServer [8] team has created a `ddclient` Docker image on Docker Hub [9], available for x86-64 and Arm64 architectures.

First, create a configuration file for `ddclient` and replace `koan` in `/home/koan/containers/ddclient`

`koan/containers/ddclient/ddclient.conf` with `$USER`. **Listing 1** provides an example for Duck DNS.

The configuration file consists of three parts: general configuration, router configuration, and protocol configuration. Line 2 of **Listing 1**, `ssl=yes`, ensures updates to the DynDNS service occur over an encrypted SSL connection. This communication is unencrypted by default, because only a few DynDNS providers support encryption. The next part of the configuration file is called the router configuration, because `ddclient` supports fetching your public IP address from various router models. However, the easiest way, independent of your router model, is to set the mechanism to fetch your public IP address to `use=web`. With `use=web`, `ddclient` visits the FreeDNS web page to check your current IP address, which is returned in the body of a simple HTML page. Because the general configuration includes `ssl=yes`, this interaction happens over HTTPS.

The final part of the configuration file specifies the protocol that `ddclient` uses to update your DynDNS service when your public IP address changes. This depends on your DynDNS provider, so have a look at the `ddclient` protocols documentation [10]. For Duck DNS, use `protocol=duckdns`, followed by the token you registered with the service (in the form `87b46fd5-df3d-420b-90f6-c7004f873e1e`), and finally the domain registered with the service.

## Running the ddclient Container

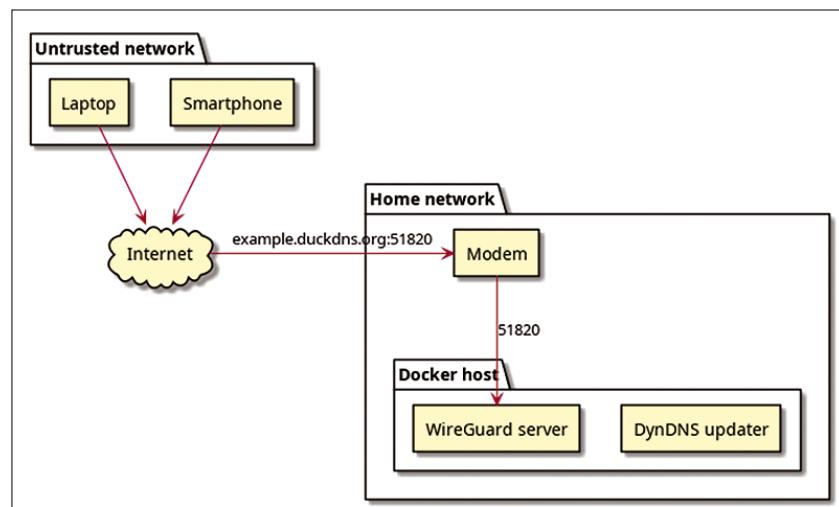
Next, create the `docker-compose.yml` file shown in **Listing 2**. Adjust the `TZ` environment variable to your time zone, and adapt the volume to the directory where you placed the `ddclient.conf` file.

Then, create and start the container with Docker Compose:

```
$ docker compose up -d
```

Wait a moment for the container to start and then check the logs:

```
$ docker logs -f ddclient
```



**Figure 2:** Remote access to your home network with a DynDNS updater, port forwarding, and a WireGuard server.

The last line should show SUCCESS and a message that your DynDNS service is linked to your IP address. From now on, the ddclient Docker container will periodically check for IP address changes and update your DynDNS accordingly.

## Running the WireGuard Easy Container

With your DynDNS service functioning, you can now set up the VPN part. First, choose a password to secure WireGuard Easy's web interface and generate a bcrypt password hash. You can do this by running the project's Docker container with the `wgpw` command and then your password:

```
$ docker run ghcr.io/wg-easy/wg-easy >
wgpw YOUR_PASSWORD
```

Replace `YOUR_PASSWORD` with your chosen password. The result will look like this:

```
PASSWORD_HASH='$2a$12$RGLbi/LtdHmp2XDwd-2
37JGexbpqobvTLFX5IIH3w0Q1Y7S0.NMmE3.'
```

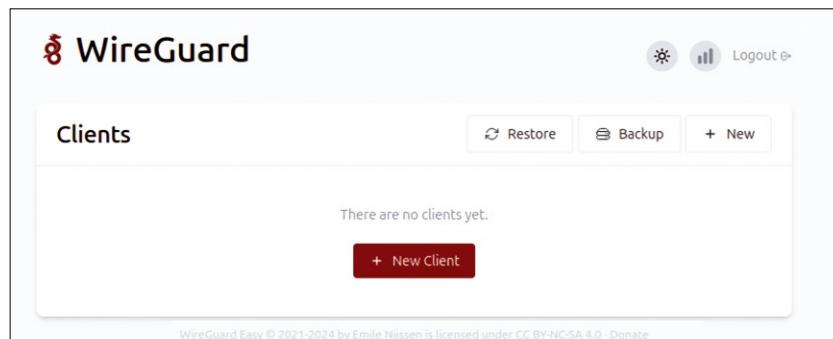
Next, add the WireGuard Easy container definition to your Docker Compose file, as shown in [Listing 3](#). Note that the configuration forwards UDP port 51820 to the container for the WireGuard VPN and TCP port 51821 for WireGuard Easy's web interface. Set the `WG_HOST` environment variable to your DynDNS domain. Additionally, create a directory for WireGuard Easy to store its configuration and specify it as a volume in `docker-compose.yml` (in this example, `/home/koan/containers/wireguard`).

The `PASSWORD_HASH` environment variable specifies the password hash that you previously generated. However, remove the single quotes and replace each `$` symbol with `$$`, as shown in [Listing 3](#).

Afterward, create and start the container with Docker Compose:

```
$ docker compose up -d
```

Wait a moment for the container to start and then check the logs:



**Figure 3:** WireGuard Easy's web interface right after installation.

```
$ docker logs -f wg-easy
```

You should see that the container starts listening on port 51821 (which is the port for WireGuard Easy's web interface) and generates a key for the WireGuard server ([Listing 4](#)). If you look at the container's directory, you'll see two files: `wg0.conf` and `wg0.json`. `wg0.conf` is a WireGuard configuration file generated by WireGuard Easy (including port 51820 where the WireGuard VPN server listens on). `wg0.json` is a JSON file with the server's private and public key and VPN IP address. The same details for the clients will be added when you begin adding clients to the VPN. Now visit WireGuard Easy's web interface at `http://IP:51821` (where IP is the IP address of your server) and enter the password. When you first visit the web interface, no clients are configured yet. There are just some buttons to back up and restore the configuration and to add a new client ([Figure 3](#)).

## Adding Clients

The next task is to add clients to your VPN server. Click on the red *New Client* button to give your client a name, and click on *Create*.

There's nothing else you need to enter, and your client now appears in the list on WireGuard Easy's web page. You can see the client's IP address on the VPN (by default 10.8.0.2 for the first client), a switch to disable and enable the client, and buttons to show the configuration's QR code, download a WireGuard

configuration file for the client, and delete the client ([Figure 4](#)).

Now you need to set up the VPN on your client device. The details vary based on the device's operating system, but you can always use the client's WireGuard configuration file that you downloaded from WireGuard Easy. The WireGuard Android app [\[11\]](#) and WireGuard iOS app [\[12\]](#) allow you to scan the QR code

### Listing 3: WireGuard Easy Container Configuration

```
01 wg-easy:
02   image: ghcr.io/wg-easy/wg-easy
03   container_name: wg-easy
04   environment:
05     - WG_HOST=example.duckdns.org
06     - UI_TRAFFIC_STATS=true
07     - UI_CHART_TYPE=1
08     - PASSWORD_HASH=$2a$12$RGLbi/
          LtdHmp2XDwd37JGexbpqobvTLFX5IIH3w0Q1Y7S0.NMmE3.
09   volumes:
10     - /home/koan/containers/wireguard:/etc/wireguard
11   ports:
12     - "51820:51820/udp"
13     - "51821:51821/tcp"
14   restart: always
15   cap_add:
16     - NET_ADMIN
17     - SYS_MODULE
18   sysctls:
19     - net.ipv4.ip_forward=1
20     - net.ipv4.conf.all.src_valid_mark=1
```

### Listing 4: Generating a Key

```
2024-08-15T07:51:18.926Z Server Listening on http://0.0.0.0:51821
2024-08-15T07:51:18.932Z WireGuard Loading configuration...
$ wg genkey
$ echo ***hidden*** | wg pubkey
2024-08-15T07:51:18.952Z WireGuard Configuration generated.
2024-08-15T07:51:18.952Z WireGuard Config saving...
2024-08-15T07:51:18.955Z WireGuard Config saved.
$ wg-quick down wg0
$ wg-quick up wg0
2024-08-15T07:51:19.293Z WireGuard Config syncing...
$ wg syncconf wg0 <(wg-quick strip wg0)
2024-08-15T07:51:19.352Z WireGuard Config synced.
```

**Listing 5:** Blocking LAN Access

```
- WG_POST_UP=iptables -I FORWARD -i wg -d 192.168.0.0/24 -j REJECT;
  iptables -t nat -A POSTROUTING -o eth0 -j MASQUERADE
- WG_POST_DOWN=iptables -I FORWARD -D wg0 -d 192.168.0.0/24 -j REJECT;
  iptables -t nat -D POSTROUTING -o eth0 -j MASQUERADE
```

shown by WireGuard Easy for easier configuration.

If all goes well, your WireGuard client on your phone or other device is now connected to your VPN server. WireGuard Easy shows the client's activity, including when it was last active, whether it's still connected (indicated by a red circle), the current download and upload speed, and the total downloaded and uploaded bytes ([Figure 5](#)).

## Changing the DNS Resolver

By default, WireGuard Easy sets up Cloudflare's 1.1.1.1 as the DNS resolver for your VPN clients. However, you can change this to another DNS resolver if desired. This is particularly useful if you've set up a DNS-based ad blocker such as AdGuard Home [13] or Pi-hole [14] at home. Your devices can then benefit from the same ad-free experience on the road as when they're on your home network.

Another scenario where this is useful is if you've set up a local DNS resolver

that assigns hostnames to all your devices at home. By specifying this DNS resolver in your VPN configuration, you can access your services at home by

their local hostnames, as if your device were on your home network.

Simply add your own DNS resolver's IP address as an environment variable in the Docker Compose file:

```
WG_DEFAULT_DNS=192.168.0.121
```

Then recreate the container with

```
docker compose up -d
```

Now, the DNS resolver is specified in the client's configuration file. Remove the previous client configuration on the client device and create a new VPN configuration from the updated configuration file. Your device will now use your own DNS resolver on the VPN, benefiting from ad blocking on the road.

## Blocking Access to Your LAN

By default, WireGuard Easy creates VPN configurations where each client can access not only the Internet, but also all machines on your local area

network (LAN). If you solely want to use your VPN server as a secure way to access the Internet on the go, you can block access to your LAN for all connected clients.

To do this, add the following environment variables in the Docker Compose file ([Listing 5](#)).

Both lines are essentially the same, with the commands after `WG_POST_UP` adding firewall rules once the WireGuard network interface is up and the commands after `WG_POST_DOWN` removing the same rules once the interface is down. Just make sure to replace `192.168.0.0/24` with your LAN's network mask.

## Conclusion

WireGuard Easy lives up to its name by providing an easy way to set up a WireGuard VPN server, create new VPN client configurations, and monitor and manage connected clients. Although it offers basic functionality for now, WireGuard Easy is sufficient for several common use cases (see the WireGuard Easy wiki [\[15\]](#) for additional use cases).

### Info

- [1] WireGuard: <https://www.wireguard.com>
- [2] Installation instructions: <https://www.wireguard.com/install/>
- [3] WireGuard Easy: <https://github.com/wg-easy/wg-easy>
- [4] No-IP: <https://www.noip.com>
- [5] FreeDNS: <https://freedns.afraid.org>
- [6] Duck DNS: <https://www.duckdns.org>
- [7] ddclient: <https://ddclient.net>
- [8] LinuxServer: <https://www.linuxserver.io>
- [9] ddclient Docker image on Docker Hub: <https://hub.docker.com/r/linuxserver/ddclient>
- [10] ddclient protocols: <https://ddclient.net/protocols.html>
- [11] WireGuard Android app: <https://play.google.com/store/apps/details?id=com.wireguard.android>
- [12] WireGuard iOS app: <https://itunes.apple.com/us/app/wireguard/id1441195209?ls=1&mt=8>
- [13] AdGuard Home: <https://adguard.com/en/adguard-home/overview.html>
- [14] Pi-hole: <https://pi-hole.net>
- [15] WireGuard Easy wiki: <https://github.com/wg-easy/wg-easy/wiki>

**Figure 4:** Just enter a device name and WireGuard Easy adds your VPN client.

**Figure 5:** WireGuard Easy shows the connection status of all clients.

An open source multiplatform AirDrop alternative

# Wireless File Sharing

LocalSend lets you quickly and conveniently exchange data between devices on the same wireless network without the need for cables. By Andrea Ciarrocchi



**Unlike the operating-system-specific** AirDrop, LocalSend is open source, multiplatform file sharing tool [1][2]. Developed using the Flutter framework, LocalSend offers a consistent user interface across various operating systems, including Linux, Windows, macOS, Android, and iOS. LocalSend operates on a decentralized peer-to-peer protocol, ensuring that data does not pass through a proprietary server. Privacy is safeguarded with end-to-end encryption, protecting users from unauthorized access. Additionally, no registration or personal information is required. If you are looking for an alternative to Apple's AirDrop, LocalSend offers quick and convenient data transfer capabilities.

## Installation and Configuration

LocalSend's installation and configuration are simple and straightforward. The easiest way to download LocalSend is from its download page [3]. On Linux, you can proceed by downloading the binary files or relying on your package manager. If you choose the binary route, you only need to extract the archive, which contains the application and the necessary support files. Available archive formats include TAR, DEB, and AppImage. Once the archive is extracted, simply click on the corresponding icon and launch the LocalSend executable to start the graphical interface. If you prefer to proceed from the terminal using a TAR archive, simply type the following to decompress it and launch the application:

```
tar -xf LocalSend-1.15.2-linux-x86-64.tar.gz
localsend_app
```

You can also download LocalSend from the Snap Store. Just search for the string *LocalSend* and click the *Install* button. Finally, you can proceed with the installation via the command line using Flathub or Snap. With Flathub, type

```
flatpak install flathub org.localsend.Localsend
```

To use Snap, type

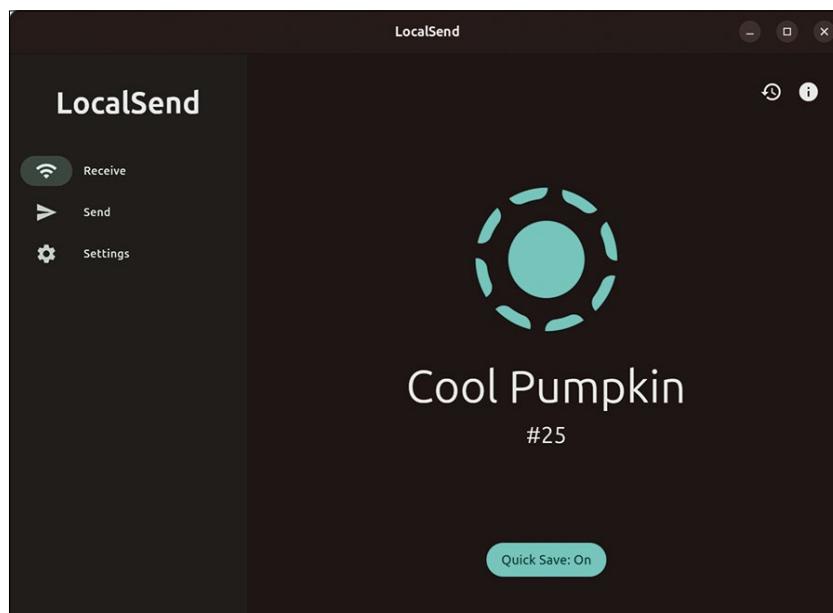
```
sudo snap install localsend
```

On Android, LocalSend can be downloaded and installed through the Play Store (or an alternative store such as F-Droid). Alternatively, the APK file is available on the website [3]. Once this file is saved on your smartphone, navigate to the destination folder using a filesystem navigation app (such as Files). You will need to open the APK file to proceed with the

installation, which requires enabling side loading. If you are using Android 13, you will be prompted to enable this option as soon as you start the installation. Just switch the toggle on the active state to proceed. LocalSend does not require any configuration and works immediately after installation. The only condition is that the devices must be connected to the same WiFi network.

## Getting Started

LocalSend's interface is sleek and well organized, ensuring user-friendly navigation. It serves as an excellent example of adaptive design, seamlessly adjusting to the device you're using. Notably, the desktop version features a left-side menu (Figure 1), while the smartphone version opts for a bottom toolbar (Figure 2). Every device is assigned a whimsical name, such as "Good Raspberry" or



**Figure 1:** LocalSend's interface seamlessly adjusts to your device. The desktop version features a left-side menu ...



**Figure 2:** ... while the smartphone version moves the menu to a bottom toolbar.

“Cool Pumpkin,” and a code, which corresponds to the last digits of the device’s local IP address, preceded by the # symbol. For instance, if a device has the IP address 194.184.145.117, its code would be #117. Regardless of orientation, the menu provides access to sections dedicated to file transfer, settings, and more. To transfer files, folders, text messages, or clipboard content, designate

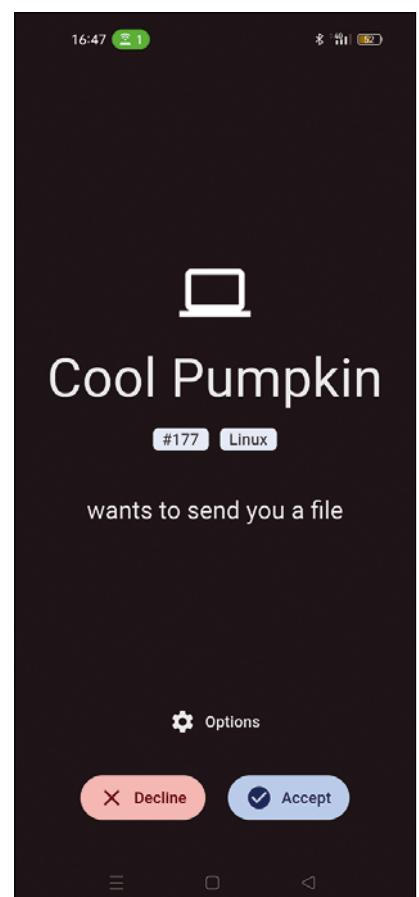
one device as the client (by selecting *Send*) and the other as the server (by selecting *Receive*). Enabling *Quick Save* mode automatically accepts receive requests, and downloads begin promptly. By clicking on *Receive*, you can find the device’s IP address, listening port, and a history of exchanged files. Within the *History* section, you can either delete individual items or the entire history, open received files, and view details such as name, path, size, sender, and reception date and time.

Additionally, mobile devices can send apps; Android users, for example, can select APK packages from their installed apps. On Android and iOS, LocalSend is integrated into the sharing widgets, making it easy to exchange data between devices, similar to a copy-and-paste function. The list of nearby devices updates automatically, but you can also refresh it manually. Notable sending options include the ability to send a file to multiple recipients at once and to share an item via a download link if the recipient doesn’t have LocalSend installed. *Settings* lets you to customize the interface in terms of theme, color, and language. In the *Receive* section, you can enable *Quick Save* (accepting and starting downloads without explicit user authorization), choose the destination folder, enable automatic saving of media to the gallery, set the related dialog box to close automatically at the end of downloads, and save transfers in the history. In the *Network* section, users can disable or restart the server function

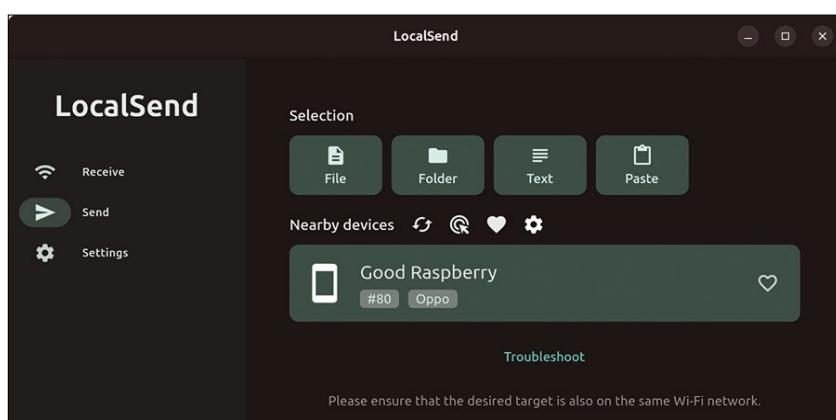
for reception and change the device name. The *Other* section provides access to the application’s credits page, a donation link to support the project, and the privacy policy. If you check *Advanced settings*, you can enable or disable graphical interface animations and end-to-end encryption, as well as manually select the type of device in use or set the model name, server listening port, and multicast address. For more information on the multicast concept, refer to Wikipedia [4].

## Transferring Between Linux and Android Devices

LocalSend lets you transfer files between Linux and Android devices. To send a file from a Linux laptop to an Android phone, both devices must be connected to the same WiFi network and have LocalSend installed. Run the application on both devices. On Linux, click on the *Send* button and select the file you want to send.



**Figure 4:** LocalSend notifies you that another device wants to send you a file.



**Figure 3:** LocalSend scans for available devices on a network.

LocalSend will scan for available devices on the same network (**Figure 3**). On Android, tap the *Receive* button. LocalSend will start searching for devices sending files. Once the Linux device appears on your Android device, you will receive a notification or prompt to accept the incoming file (**Figure 4**). After accepting the file on the receiving device, the transfer will start (**Figure 5**). Once completed, you can find the received file in the designated folder on the Android device. Because the interface is the same across platforms, simply reverse the instructions to transfer files from Android to Linux. Of course, file transfers can also occur between devices of the same type (e.g., two or more smartphones or two or more desktop environments).

## Known Issues and Future Development

LocalSend uses REST APIs and sends data via HTTPS, with only one party needing to set up an HTTP server. The application handles all these aspects automatically in a way that is invisible to the user and works without requiring any initial configuration. Due to the complexity of networks and various operating conditions, the developers have created a communication protocol that adapts to different situations (see GitHub for more details **[5]**). At the time of writing, around one hundred people are contributing to the project, and both the development and support communities are active. If you need assistance, you'll find language-specific groups on the LocalSend Community page **[6]**.

LocalSend is an exceptionally useful tool and has the potential to become a reference tool for productivity. Adding a few more features could make it even more appealing. For instance, it would be great to have a menu option to send a file directly from the disk when right-clicking on it and the option for two-factor authentication.

Common issues include the inability to see nearby devices or establish a connection between the client and server. The first problem can be complex and depend on various factors. If you are using a hotspot, restarting LocalSend might resolve the issue. Otherwise, ensure that access point isolation is disabled on your wireless router, because this setting can prevent connections between devices on the same network for security reasons.

Another frequent issue is related to firewall settings that block connections and prevent data exchange. In such cases, you need to set exceptions for the TCP and UDP ports used by LocalSend. The relevant port information can be found in *Settings*. For example, to set an exception for port 53317 to allow traffic in Uncomplicated Firewall (ufw), enter the following commands:

```
sudo ufw allow 53317/tcp
sudo ufw allow 53317/udp
```

Although it should already work, you can ensure that your firewall settings have been successfully changed with the following command:

```
sudo ufw status | grep 53317
```

which will display the current status of port 53317, confirming whether it is allowed for both TCP and UDP protocols. In addition, the *troubleshoot* link offers an automatic fix for the issue.

It's also possible that the client and server are configured in ways that are incompatible with respect to communication ports or encryption settings. Due to a known issue, a device might not appear within a network with more than 24 access points when multicast scanning is unavailable.

Cloud storage is a viable alternative to LocalSend. However, using cloud storage typically takes about twice as long to transfer data because sending and receiving cannot happen simultaneously. Additionally, cloud storage requires sharing your files over the Internet, whereas LocalSend can work offline as long as you are connected to a WiFi network.

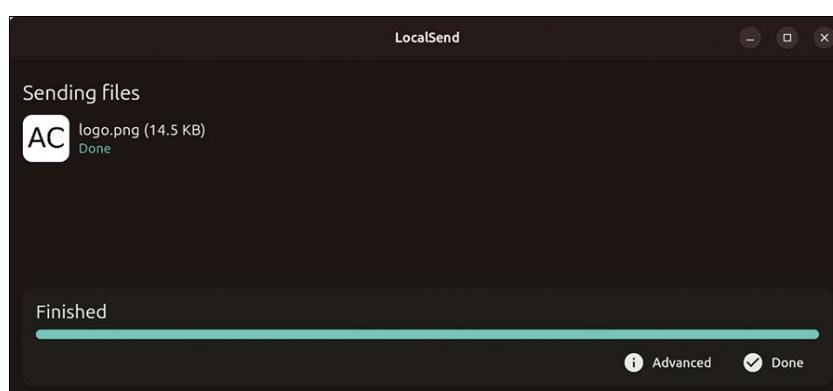
If you are looking to share files across devices regardless of operating system, LocalSend offers a user-friendly and intuitive solution. ■

### Info

- [1]** LocalSend: [<https://localsend.org>]
- [2]** LocalSend GitHub repository: [<https://github.com/localsend>]
- [3]** LocalSend download: [<https://localsend.org/download>]
- [4]** Multicast: [<https://en.wikipedia.org/wiki/Multicast>]
- [5]** LocalSend protocol: [<https://github.com/localsend/protocol>]
- [6]** LocalSend Community page: [<https://localsend.org/community>]

### Author

**Andrea Ciarrocchi** ([andreaciarrocchi.altervista.org](https://andreaciarrocchi.altervista.org)) is a technology enthusiast.



**Figure 5:** Upon clicking *Accept*, LocalSend shows you details of the file transfer.



## A modern cd command

# Smarter Navigation

Zoxide, a modern version of cd, lets you navigate long directory paths with less typing.

By Bruce Byfield

**In most shells**, the main navigation utility is `cd` (change directory). Generally, `cd` is built into the shell, which is why it does not have its own man page like other commands. The lack of a man page is usually not noticed, because the bare `cd` is all that most users need. However, when directories have multiple levels, `cd` can require tedious typing, especially when you have to travel up the directory structure and down another branch. A modern version of `cd`, zoxide, changes all that by using a database that, once set up, requires the typing of only the last directory in the path.

To get its results, zoxide relies on an algorithm based on how often a directory is accessed. When first added to the database, a directory is given a score of 1. Each time it is accessed, its score rises by one. When a query is made, a directory adds 4 if accessed in the last hour and 2 if accessed in the last day or last week. The higher the value, the most likely a directory is to be the one sought. When the database reaches the maximum number of entries, it reassigns the frequency of access and deletes any directory that falls below 1.

## Installation and Configuration

Zoxide is available in many distributions, as well as on multiple platforms and in multiple package formats. However, installing the package is just the beginning. To be functional, zoxide requires at least some configuration.

To start, users need to add zoxide to their shell. In Bash, the line

```
eval "$(zoxide init bash)"
```

must be added to the end of `~/.bashrc`. This line can be added manually, or with `zoxide-init` (more on this later). The project's GitHub page gives instructions for other common shells. In order for zoxide to deal with directory name conflicts, the fuzzy searcher `fzf` must be installed. Optionally, you can change the default command `z` with `cmd NAME`, even replacing the `cd` command. Directories that are scored in searches can also be set with `--hook SETTING`, with a choice of `none`, `prompt`, or `pwd`.

Still another option is to integrate zoxide with other applications such as Emacs, Vim, and neovim, as well as several lesser-known file managers such as felix and ranger, as outlined on the GitHub page [1]. Usually, integration involves the installation of a sub-project. For example, for Vim and neovim integration, `zoxide.vim` must be added via one of several package managers, and it is used by a half dozen Vim commands. Similarly, Emacs integration requires `zoxide.el` and enables a dozen functions, such as `zoxide-cd` and `zoxide-open-with`. Unfortunately, many popular text editors, such as JOE, or file managers like Dolphin or Caja, are not yet supported.

Zoxide's behavior can also be set with environmental variables:

- `_ZO_DATA_DIR`: Specifies the directory in which the database is stored. The default is `$XDG_DATA_HOME` or `$HOME/.local/share`.
- `_ZO_ECHO`: When set to 1, `z` will display the matched directory before navigating to it. With this variable, you do not need to run `pwd` from the destination for its complete path.
- `_ZO_EXCLUDE_DIRS`: Excludes the specified directories from the

database. `/home` is included by default. This feature can be useful for privacy and security.

- `_ZO_FZF_OPTS`: Provides custom options to pass to `fzf` during interactive selection. Useful options include case-sensitivity, alternative ways of weighting directories in search results, and assorted display options. See `man fzf` for the list of options.
- `_ZO_MAXAGE`: Limits the maximum number of entries in the database. The default is 10,000.

## Using zoxide

All this lengthy configuration results in the basic use of Zoxide being simple. Type `z PATH`, and the final directory is added to the database. The next time you need to navigate to that directory, you only need to type `z DIRECTORY`, no matter how deep in the directory tree it is buried. For instance, if you type

```
z /home/bb/creative
```

next time you only need to type `z creative`. Once zoxide is set up, you can quickly add your most-used directories to the database and simplify your future navigation. When paths are similar, you can use `zi` as the basic command or press Space + Tab to choose from a list (Figure 1).

As the database is populated, zoxide will choose the highest ranked directory by default. You can change this behavior by searching for multiple directories in the path, or by specifying a subdirectory with `/`. As in `cd`, you can also move up one directory with `z ..` or into the previous directory with `z -`.

For many users, no further information is needed. However, zoxide's database can be edited by sub-commands placed after the basic command:

- **zoxide add PATHS:** Adds a path with a ranking of 1, or adds 1 to the ranking of a directory already in the database. After either, the last updated field of the entry is updated. Directories excluded by the `_ZO_EXCLUDE_DIRS` environmental variable cannot be added. This subcommand is a quicker way to add directories than letting zoxide learn from your navigation.
- **-zoxide import --from FORMAT:** The format is autojump or z for fasd, z.lua, or zsh-z.
- **-zoxide-init:** Automatically initializes a command shell to read it for use. This action can also be done manually in a text editor.
- **-zoxide query KEYWORDS OPTIONS:** Searches the database for keywords. Options for results are

`--all` and `--exclude PATH`. With fzf installed, `--interactive (-i)` is enabled. With `--list (-l)`, all results are listed, not just the most used, while `--score (-s)` lists rankings, which can be manipulated with `zoxide-add`.

- **-zoxide remove PATHS:** Deletes directories from the database. To permanently remove a directory from the database, specify it in the `_ZO_EXCLUDE_DIRS` environment variable.

Except for `zoxide-query`, none of the subcommands return feedback.

## Alternative Navigation

If zoxide does not suit you, there are other `cd` replacements, including autojump, z.lua, and rupa/z. Many of these alternatives are structured similarly to zoxide, using a database and assigning directories a score based on frequency of use. Some, such as zsf, can be combined with zoxide during

configuration. Data from some can be transferred to zoxide. Keep in mind that zoxide has the advantages of being simple to use and easy to learn. True, new users might wish for a zoxide installer to replace the complicated configuration process. More advanced users might wish for additional features, such as associating a directory with a particular application. However, once set up, zoxide in its current form is a substitute for `cd` that is only slightly more complicated. Users might want to make zoxide an alias of `cd` by adding `alias z='cd'` to their shell configuration file. With zoxide, users will save thousands of keystrokes, an improvement that is both efficient and ergonomic. ■

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### Info

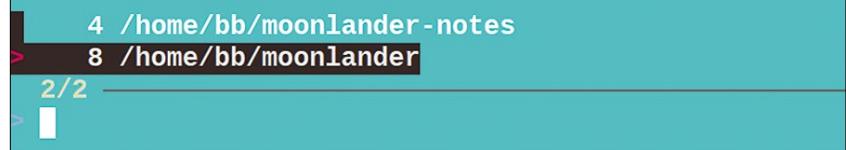
[1] zoxide: [<https://github.com/ajeetdsouza/zoxide>]

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### Author

Bruce Byfield is a computer journalist and a freelance writer and editor specializing in free and open source software. In addition to his writing projects, he also teaches live and e-learning courses. In his spare time, Bruce writes about Northwest Coast art ([<http://brucebyfield.wordpress.com>]). He is also co-founder of Prentice Pieces, a blog about writing and fantasy at [<https://prenticepieces.com/>].

---



The screenshot shows a terminal window with the following output:

```
4 /home/bb/moonlander-notes
> 8 /home/bb/moonlander
2/2
```

The user has typed "moonlander" and is presented with two suggestions: "4 /home/bb/moonlander-notes" and "8 /home/bb/moonlander". The prompt "2/2" indicates that these are the first two results out of a total of two available.

Figure 1: When directories contain similar names, zoxide provides a list of alternatives to select from.



## Monitoring system statuses

# Mission Control

Mission Center, a graphical system monitor, groups all important system statuses in a compact, intuitive interface. By Erik Bärwaldt

**Many distributions come with software for monitoring a computer's system status.** In most cases, these are apps integrated into the desktop environment. Gnome, for example, introduced a system monitor at an early stage and KDE followed suit, providing a graphical front end for system monitoring in the form of KSysGuard [1]. The Mate desktop took over the existing tool from older Gnome versions without changing the visuals, and even Xfce has its own panel applet for displaying system statuses.

Other desktop environments, on the other hand, use terminal programs such as htop or Btop ++ [2] with very plain, pseudo-graphic interfaces. Unlike graphical applications, these tools do not give users the ability to select different monitor views at the push of a button.

This is where Mission Center [3] enters the scene. Mission Center, written in the Rust programming language and based on the GTK4 toolkit and Libadwaita, works independently of the desktop environment. With its fresh appearance, it outshines many of the traditional graphical monitoring programs. Not limited to displaying CPU and RAM utilization and network data transfer rates, Mission Center also displays a variety of additional parameters for mass storage devices and even the performance of graphics processors. In addition to graphical views, Mission Center displays plain statistics for various components. Like other system monitoring tools, Mission Center lets you toggle between various displays at the push of a button; as a result, you can also view tables for loaded applications and services on the active system.

## Setup

In addition to the source code, the Mission Center developers offer the software as an AppImage on their GitLab page [4]. You'll also find Mission Center in the Ubuntu Snap Store and on Flathub [5]. Because the AppImage will run on practically any Linux derivative without additional underpinnings, I will be referencing the AppImage in this article.

## Use

After starting Mission Center, a modern, three-panel window based on Gnome conventions pops up. On the left, you can see the individual display options in a column with a gray background. The large middle section contains graphical

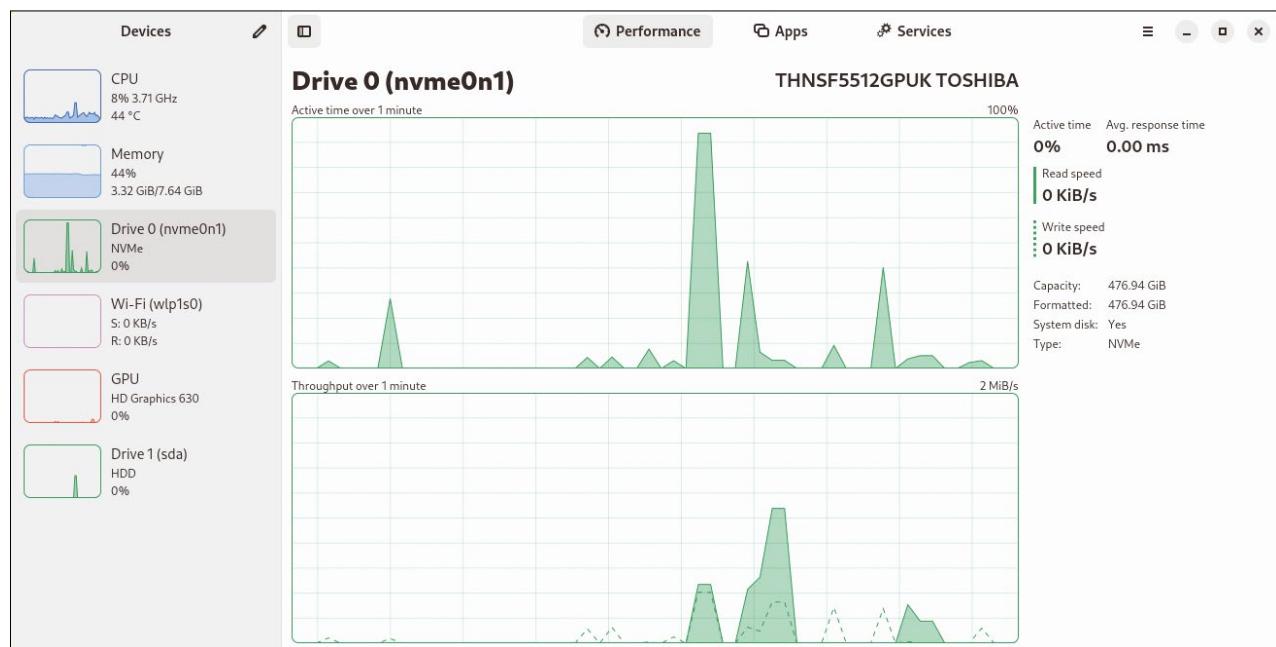


Figure 1: Mission Center, which is reminiscent of the Windows Task Manager, displays numerous parameters of critical hardware components.

displays for the components listed on the left. On the right, there is another column with transfer rates or component utilization statistics (**Figure 1**). Mission Center updates the graphs in the middle window segment at short intervals to ensure a good overview of your selected component's current status.

The titlebar contains three buttons. The *Performance* button, which is enabled by default, shows you the Performance view.

Clicking on *Apps* displays data for active programs in a table containing the program icon, which helps users quickly identify active programs. Mission Center displays applications that start several processes in a tree with branches for each individual process.

**Figure 2**, for example, shows the Firefox web browser is using more than a dozen processes although just five tabs are open, taking 2.2GB RAM to do this.

To the right of the individual programs and processes, you will find the process IDs (PIDs), the CPU and GPU loads, the RAM requirement, and the mass storage utilization in separate columns of the table. Mission Center also updates these at short intervals. You can right-click on one of the processes to open a menu where you can terminate the process gracefully by selecting *Stop Process*. If a process does not respond to regular termination, you can use the *Force Stop Process* option instead.

Clicking on the *Services* button in the titlebar opens a similar dialog for system services (**Figure 3**). Along with the individual services, the associated PID and a short description are listed for each service. On the far right, you can open a control menu for the process in question. A single click lets you stop or restart the selected process. Clicking on *Details* reveals the service's details in a separate window.

## Settings

To make basic changes to the settings, click on the hamburger menu

top right in the program window and open the *Preferences* entry. In the Preferences dialog, you can modify the design of the graphics and change the update intervals. You can also enable some options for the app display using the slider (**Figure 4**).

Some display functions can also be made more meaningful in the Preferences dialog. For example, Mission Center shows you the total CPU load by default, irrespective of the number of physical and logical processor cores. You can change this by right-clicking on the graph. In the context menu, then select the *Change Graph To | Logical Processors* option. Mission Center now closes the individual

graph and instead displays separate, continuously updated sub-graphs for each logical CPU core (**Figure 5**).

## Fine-Tuning

If you map a drive letter to an integrated card reader, Mission Center will identify the reader and deliver information to match. You can disable views that are not required by clicking on the button with the pencil symbol top right in the main window's left panel and then disabling the slider for components you don't need in edit mode.

For graphics cards in particular, the developers point out that the

Name	PID	13% CPU	43% Memory	0% Drive	1% GPU Usage
firefox-esr	2342	0%	446 MiB	0 MiB/s	0%
firefox-esr	9180	0%	74 MiB	0 MiB/s	0%
firefox-esr	2453	0%	529 MiB	0 MiB/s	0%
firefox-esr	2779	0%	111 MiB	0 MiB/s	0%
firefox-esr	2417	0%	38 MiB	0 MiB/s	0%
firefox-esr	3290	0%	98 MiB	0 MiB/s	0%
firefox-esr	5173	0%	159 MiB	0 MiB/s	0%
firefox-esr	10988	0%	72 MiB	0 MiB/s	0%
firefox-esr	8042	1%	237 MiB	0 MiB/s	0%
firefox-esr	5112	0%	155 MiB	0 MiB/s	0%
firefox-esr	2506	0%	49 MiB	0 MiB/s	0%
firefox-esr	6579	0%	150 MiB	0 MiB/s	0%
firefox-esr	8148	0%	72 MiB	0 MiB/s	0%
firefox-esr	5251	0%	131 MiB	0 MiB/s	0%
mate-terminal	11556	0%	50 MiB	0 MiB/s	0%
bash	11588	0%	8 MiB	0 MiB/s	0%

**Figure 2:** In the Apps view, the software shows active programs and their resource usage.

Name	PID	Description	⋮
systemd-udev-settle.service		Wait for udev To Complete Device Initialization	⋮
modprobe@efi_pstore.service		Load Kernel Module efi_pstore	⋮
blk-availability.service		Availability of block devices	⋮
getty@tty1.service	1214	Getty on tty1	⋮
systemd-machine-id-commit.service		Commit a transient machine-id on disk	⋮
systemd-quotacheck.service		File System Quota Check	⋮
lvm2-lvmpoold.service		LVM2 poll daemon	⋮
lm-sensors.service		Initialize hardware monitoring sensors	⋮
tor.service		Anonymizing overlay network for TCP (multi-instance-master)	⋮

**Figure 3:** Mission Center also displays system services in a clear-cut table.

performance display is currently still experimental. For example, Mission Center only supports Intel

Broadwell graphics chips (from late 2014) or newer. In some cases, Mission Center fails to identify dedicated

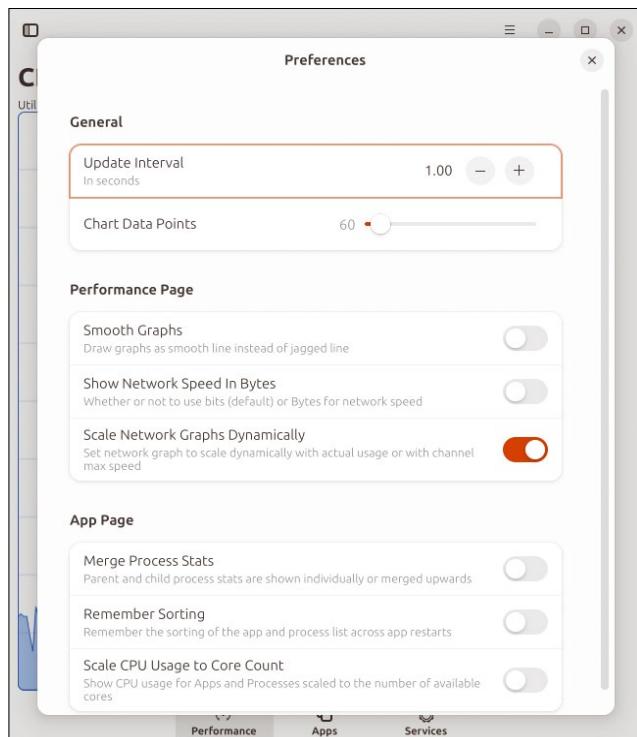
graphics chipsets with free graphics drivers. I recommend that NVIDIA graphics card owners install the proprietary driver instead of the open source Nouveau module. After doing so, you will see detailed data on the GPU, including the load and temperature, clock and memory speed, and energy consumption.

## Conclusions

Not only does Mission Center impress with its state-of-the-art look, it also offers much information that other candidates in the system monitoring field tend to leave out. The application is under active development and some functions are still considered experimental. Because Mission Center is available as a Snap, Flatpak, and AppImage, it can be used independently of your choice of distribution, including distributions that previously did not offer a graphical system monitor. ■

### Info

- [1] KSysGuard: [<https://invent.kde.org/plasma/ksysguard>]
- [2] Btop++: [<https://github.com/aristocratos/btop>]
- [3] Mission Center: [<https://missioncenter.io>]
- [4] Mission Center GitLab page: [<https://gitlab.com/mission-center-devs/mission-center>]
- [5] Flatpak: [<https://flathub.org/apps/io.missioncenter.MissionCenter>]



**Figure 4:** The Preferences dialog is limited to the bare essentials.



**Figure 5:** Selecting Logical Processors displays a separate graph for each logical CPU core.



Compare PDF documents with DiffPDF

# Subtle Differences

Most PDF viewers lack a function for comparing PDF files, but DiffPDF shows you the differences at a glance. By Erik Bärwaldt

**Differ tools**, which compare two files and visually highlight the differences between them, exist for many file and archive formats. These programs are particularly useful if you have two or more versions of a file and cannot see the differences immediately. Many of these comparison tools are command-line-based and require knowledge of an extensive set of parameters. If you need to compare PDF files, DiffPDF [1], with its graphical user interface, compares both the text components of two PDF files as well as the embedded images for differences.

According to the original developer, the free version of DiffPDF is no longer under active maintenance due to the European Union's 2024 Cyber Resilience Act [2]. As a result, the binary package is no longer available on the DiffPDF website. Instead, you need to download it from your distribution's repository. You will find DiffPDF in the repositories of most of the popular distributions [3] and can conveniently install it with your distribution's package manager. Doing so creates a starter in the main menu. You can also run the software at a prompt. For an overview of parameters, use the `diffpdf --help` command. The graphical version also comes with a help function that explains the tool's individual functions. On first launch, a three-pane program window pops up. When loaded, the files to be compared appear in the two larger panes on the left and in the middle. Above this, there is a single line with the fields for the file names and paths. You can see the actual controls in the third window segment on the far right. The *Controls* tab and the matching dialog are shown at the top. The *Actions* dialog is located in another tab line at the

bottom. However, you will not find a menubar or a buttonbar.

## Using the Program

Start by loading the two files you want to compare. To do so, select *File #1* top left. DiffPDF then opens a file manager to let you browse to the directory of the first file and load it. This file is not shown in the window segment for the time being; instead you will see a prompt relating to selecting the second file. Now click on *File #2* and select and load the comparison document. You will still only see a note, telling you to start the comparison by pressing the button. If you accidentally select the same file twice, DiffPDF displays a warning telling you that it *Cannot compare a file to itself*.

Alternatively, you can drag and drop the files to be compared from the file browser into the window segments. The user instructions are identical to those displayed for manual file selection in the dialog. Now press *Compare* in the *Actions* section bottom right to load the two documents into a slightly smaller view in the corresponding window segments. The differences are highlighted in red ([Figure 1](#)).

On the left-hand side of the view, you will find red vertical bars at the points where DiffPDF has identified differences. You can adjust the width of these markers to suit your needs after clicking on *Options* on the right below the *Compare* button and entering a larger numerical value in the *Rule width* input field in the dialog. In the *Highlighting* tab in the same window, you can make further changes to the appearance if necessary. For example, you can change

the highlighting color by choosing an entry from the selection list and alter the opacity of the color-highlighted background to improve readability. To view the individual pages of multipage documents opposite each other in the window segments, select the respective pair of pages in the *View* selection field in the *Controls* tab top right. You can then use the *Previous* and *Next* buttons to scroll through the documents page by page. If the pages are so small that you cannot clearly see the differences on screen, you can zoom in by selecting a larger value in the *Zoom* field. As soon as you click *Compare* again after making the change, both documents will be zoomed with the new setting.

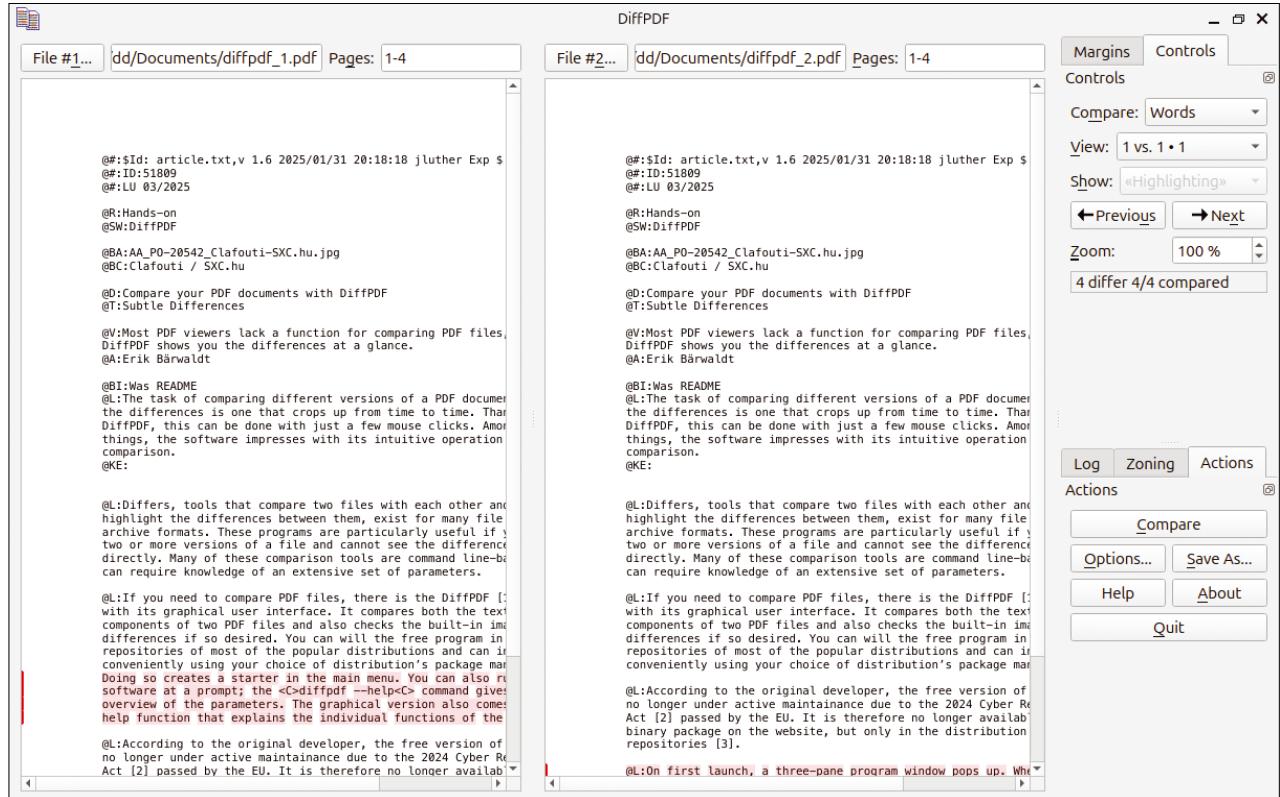
## Comparison Modes

DiffPDF offers three different comparison modes, which you can set in the *Compare* selection box in the *Controls* tab top right. By default, DiffPDF uses a word-for-word comparison, but it alternatively supports character-for-character and visual modes. Visual mode is used to compare images in the PDFs. You can use this function, say, to make sure that individual charts or images are up to date when evaluating statistical data. The character-for-character comparison, on the other hand, enables comparison of PDF documents based on logo-graphic writing systems, including Chinese Hánzi and Japanese Kanji. The *Zoning* tab bottom right in the program window is where you define range numbers, which the app then includes in the comparison, as well as the horizontal and vertical tolerances ([Figure 2](#)). You can define columns here, for example. A little effort put into customization can help to reduce

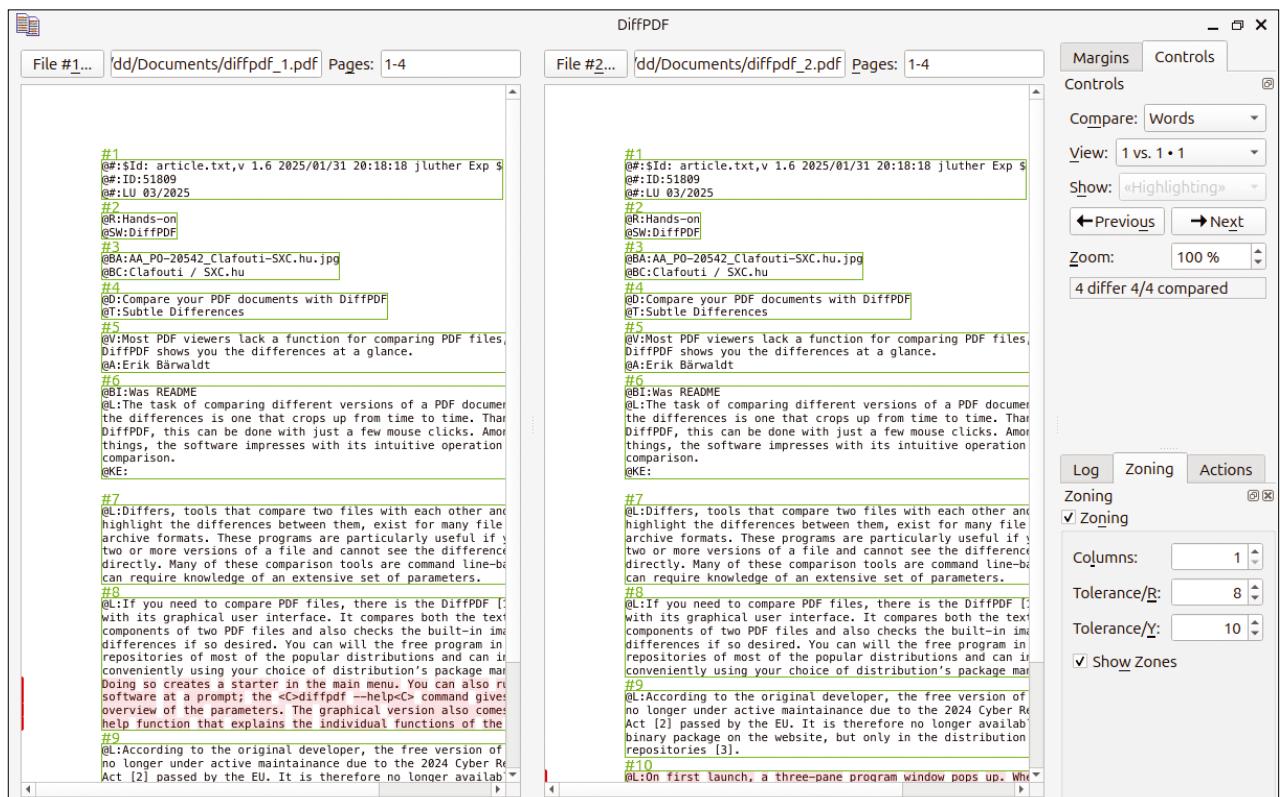
the false positive rate, especially for tables. In the case of single-column continuous text, DiffPDF provides the

individual areas with a small frame and an ascending number, which helps you to find certain paragraphs

more quickly and improves the overview. For multipage documents, the numbering restarts on each page.



**Figure 1:** The differences immediately catch the eye thanks to color highlighting.



**Figure 2:** You can use area numbering to improve the overview.

DiffPDF compares the documents page by page. This is why it tags document parts as different if they exist in both files but on different pages. The number of differences found is shown in red in the log data, which you will find bottom right below *Log*. The log also tells you the number of pages where DiffPDF found differences.

## Documentation

You can save the individual comparisons for documentation purposes by using the *Save as* option in the *Actions* tab bottom right. In the configuration dialog, you need to specify whether you want the routine to save all pages or just the current page and whether the program should save just one of the two compared pages or both pages side by side. After specifying a file name and a path, the application saves the content as a PDF file that you can then open with any

standard PDF viewer (**Figure 3**). DiffPDF does not save the control and configuration dialogs displayed in the program window on the right. Instead, it limits the content to the results of the current comparison, including all visual highlighting.

## Conclusions

DiffPDF is a handy program for comparing two PDF files. The software is intuitive in its use and can be adapted to individual requirements thanks to its wide-ranging configuration options. This is a massive benefit for users with visual impairments in particular. On a simple scale, the application can also be used for version documentation if you want or need to continuously add to and edit a PDF file and document the individual versions including the differences between them.

If you are using the program on a GTK-based desktop such as Gnome, Mate, or Cinnamon, please note that

the changes you make to DiffPDF's visual appearance, which is based on the Qt framework, may not take effect. Because these minor annoyances play a very small role in terms of functionality, DiffPDF is still a good choice for users who frequently need to compare PDF files, regardless of the desktop environment they use. ■

## Info

### [1] DiffPDF:

[\[http://www.qtrac.plus.com/difffpdf.html\]](http://www.qtrac.plus.com/difffpdf.html)

### [2] Cyber Resilience Act:

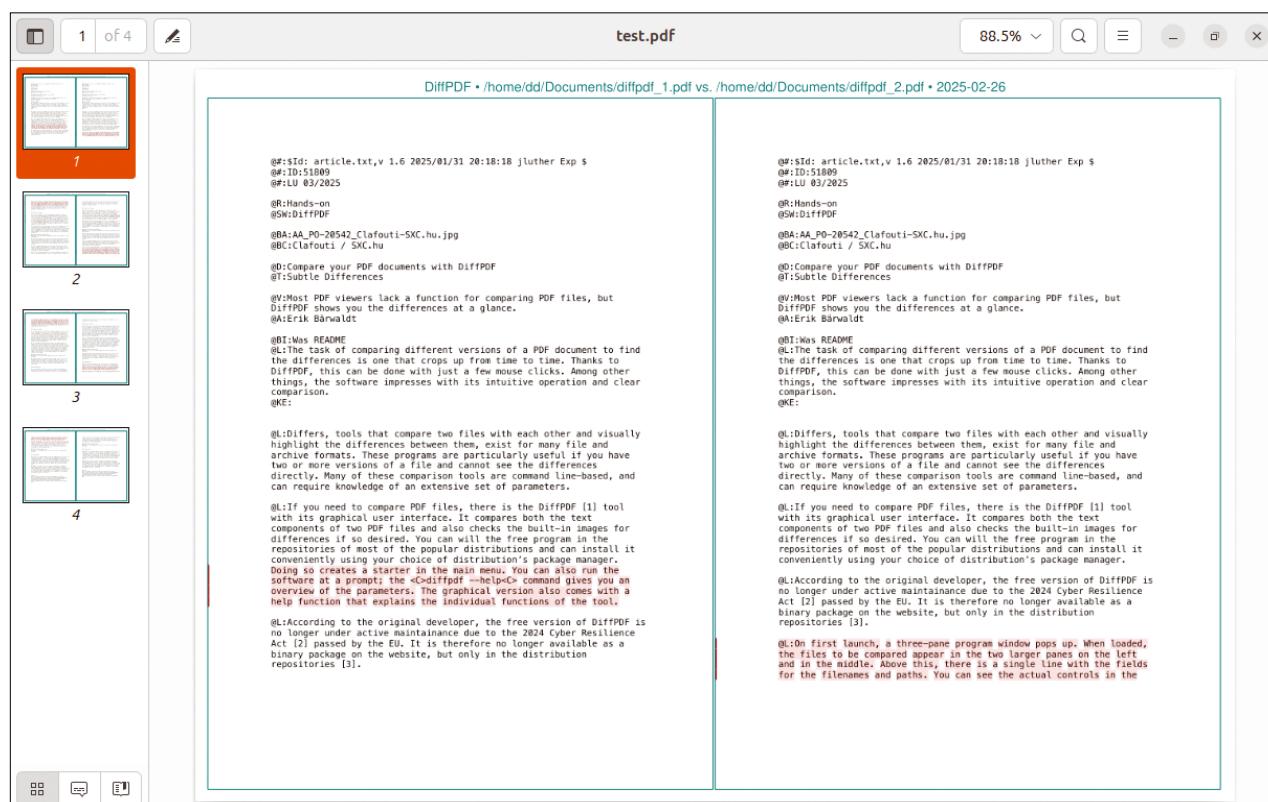
[\[https://www.bsi.bund.de/EN/Themen/Unternehmen-und-Organisationen/Informationen-und-Empfehlungen/Cyber\\_Resilience\\_Act/cyber\\_resilience\\_act\\_node.html\]](https://www.bsi.bund.de/EN/Themen/Unternehmen-und-Organisationen/Informationen-und-Empfehlungen/Cyber_Resilience_Act/cyber_resilience_act_node.html)

### [3] Package overview:

[\[https://pkgs.org/search/?q=difffpdf\]](https://pkgs.org/search/?q=difffpdf)

## Author

**Erik Bärwaldt** is a self-employed IT admin and technical author living in the United Kingdom. He writes for several IT magazines.



**Figure 3:** The comparison results can be saved for documentation purposes.



Rethinking basic functions

# Revisionism

The modern electerm combines terminal, file manager, and remote connection functions into a single app. By Bruce Byfield

**Linux is in an era of revisionism.** Functionality that has been part of Linux from the start – such as virtual terminals, file managers, and commands like `ls` and `cd` – is being rethought to take advantage of modern hardware and better fit modern needs and expectations. These revisions vary wildly in quality. On the one hand, some are eccentrically engineered, such as one terminal that replaces man pages with AI queries. On the other hand, experiments such as electerm [1] merge terminals, file managers, and remote connections into a single app with versions for Docker and the web. Although few of electerm's functions are new, merging these functions into a convenient single app is such a logical move that electerm seems likely someday to dethrone such classic apps as Miguel de Icaza's 30-year-old Midnight Commander. Electerm is too new to be found in distro repositories. However, the project's GitHub page offers DEB,

RPM, ARM64, ARM Beta, Snap, ArchImage, and tarball packages, as well as macOS and Windows 10-11 versions. Electerm installs ready to use, but you can use the *Setting* icon in the sidebar on the left to customize shortcut keys, bookmarks to open on startup, terminal rollback, background image, a limited selection of fonts, and password encryption. By default, electerm opens in a white on black theme, but you can choose from 32 predefined themes via the *Terminal themes* icon, as well as define your own theme. You can also add your own bookmarks via the *New bookmark* icon, not only to files and directories, but also network locations.

## Starting electerm

Without options, the `electerm` command works with the local system. However, options can also make an external connection, making it act as an SSH, Telnet, RDP, or VNC server, or connecting via serial port. Used

as an SSH server, the command is `electerm ADDRESS` or `electerm PORT`. Other protocols must be specified so that the command for Telenet would start with

```
electerm -tp "telnet" -opts
```

Under the `-ops` option, the host, port, user, passphrase, or password are entered. For example:

```
electerm -tp "vnc" -opts
{'host':'192.168.1.1','port':3389,
'username':'root','password':'123456'}
```

In addition, temporary environmental variables can be set with

```
--set-env VARIABLES
```

From an already running instance, these commands can be opened in a new tab with `-T NAME`. Commonly used command sequences can be stored in a CSV file and loaded with

```
electerm -bo "/FULL-PATH"
```

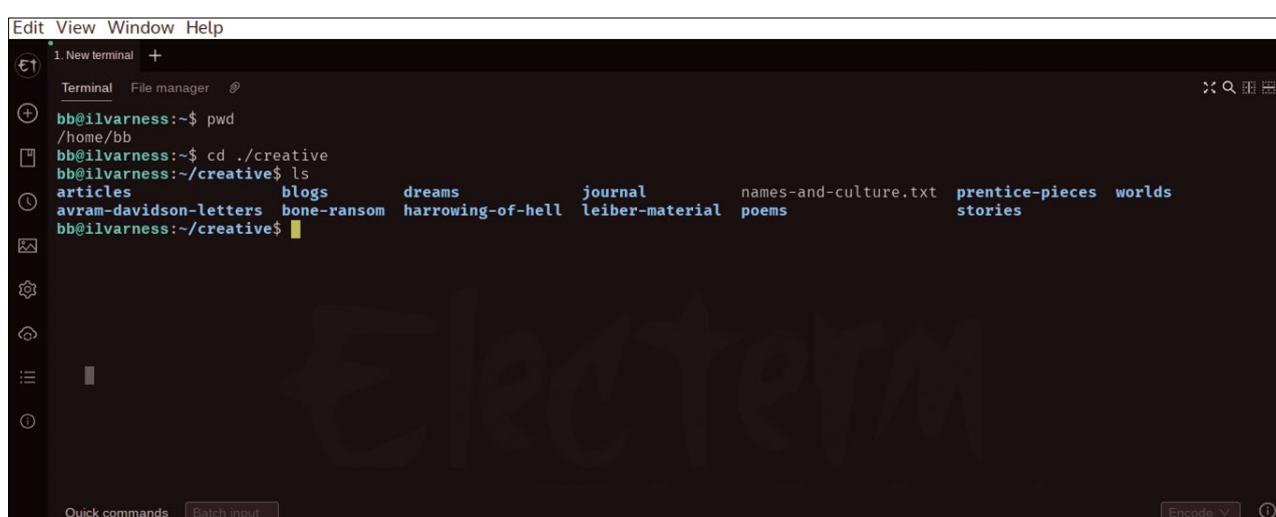
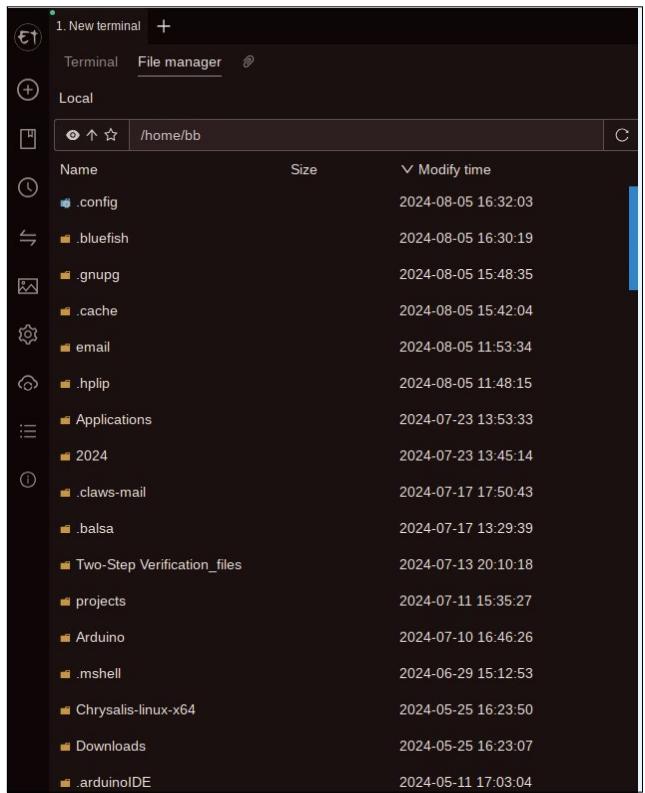


Figure 1: Electerm's command line.



**Figure 2:** Electerm's file manager.

## Subwindows

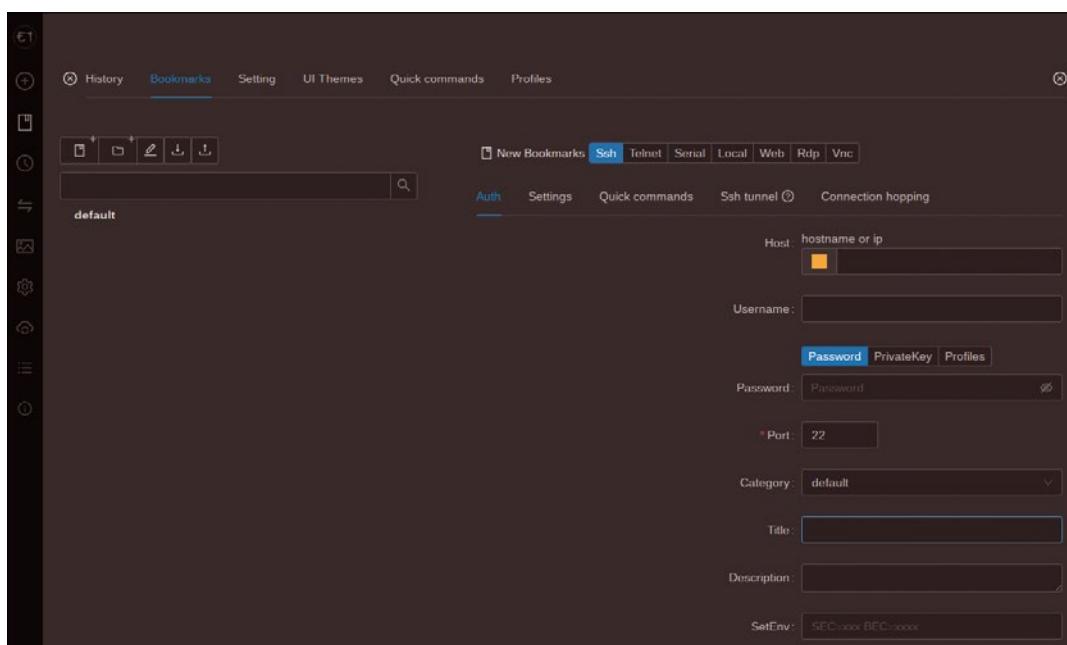
The electerm window is simple in design. At the top, you'll find the menu for the currently selected functions. Below this are tabs for *Terminal* and *File manager*. A vertical icon sidebar on the left hosts the basic functions with the *Menu* at the top followed by *New bookmark*, *Bookmarks*, *History*, *Terminal themes*, *Setting*, *Setting sync*, and *BatchOp* (batch operation). Where convenient, there is some redundancy, which increases ease of use. Electerm opens in the terminal, which is similar to

most common functions (**Figure 1**). *File Manager* is located to the right of *Terminal*, on the reasonable assumption that it is the second most-used function. At the top left are icons to toggle the display of hidden files or directories, to move up to the next directory in the hierarchy,

those installed in most modern distributions, with files, directories, cursors, and other display elements color-coded. It can be customized in *Terminal themes*. A right-click menu includes *Cut*, *Copy*, *Paste*, *Search*, and *Split*. Compared to many distributions' default terminals, electerm's terminal is perhaps rather basic, but it is more than adequate for the

or to create a bookmark. The right-click menu gives all the expected options, although the *Edit* function only works with the system editor. To open a binary file, you need to use the less obvious *Open*. Compared to desktop file managers such as Dolphin, electerm's file manager is less convenient to use, but it compares favorably to other command-line file managers and is certainly more useful than the venerable `ls` commands (**Figure 2**). Clicking on *Bookmarks* lets you import and export bookmarks, as well as create both bookmarks and categories for them. Bookmarks can be local or remote, password-protected and encrypted, and given their own environments and starting directories. Electerm's developers have given careful consideration to bookmarks, and the result is more than a mere link. For convenience, *New bookmarks* has its own icon, but it is identical to *Bookmarks* (**Figure 3**).

In most shells, history is a complicated tool, a matter of scanning with arrow keys or remembering when an entry was made. For this reason, many users tend to avoid it for traversing more than a few entries back. By contrast, electerm's graphical display makes its *History* more powerful



**Figure 3:** The bookmarks in electerm are uniquely full featured.

than most, for the simple reason that it is easier to use. With a glance and a click, electerm moves to the selection. *BatchOp* provides a basic editor for preparing batch files and saving them as a CSV file. It shows the values required for a remote and local batch file, as well as what each looks like. For convenience, an existing file can be imported and modified when a new file does not need to be written from scratch. Batch files can be run from the *Quick commands* link at the bottom of the terminal. *BatchOP* removes

the need for a separate editor, at least for simple scripts ([Figure 4](#)).

## Progress Report

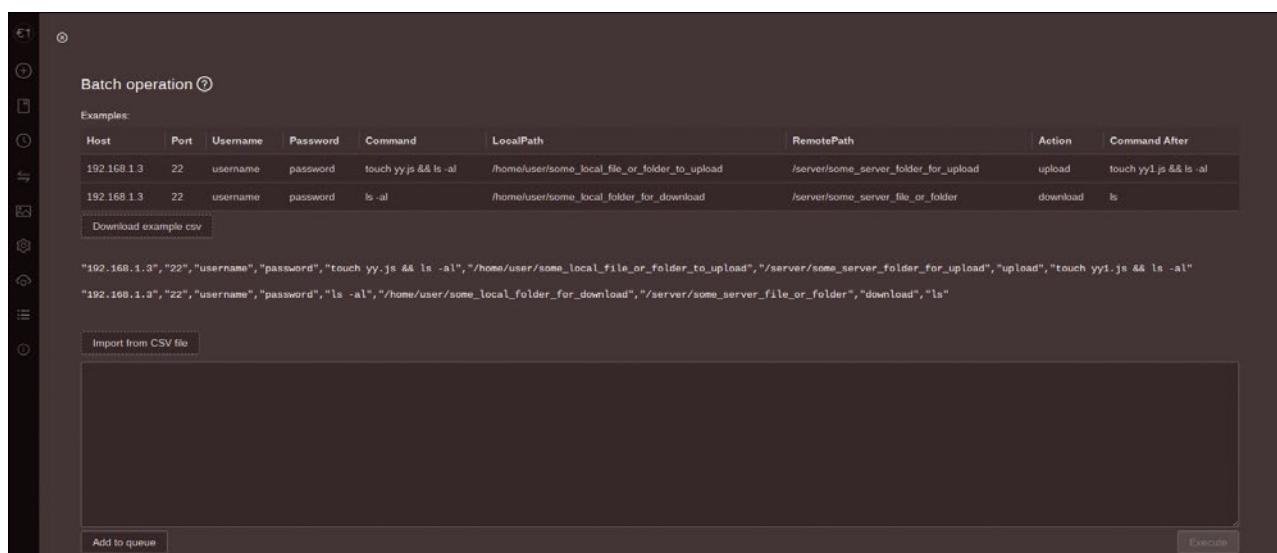
As I write, electerm is in early general release. I began working with the 1.39.88 release, and an upgrade came out just before I finished. At this stage, electerm's original features are its bookmark and batch files. Both do more than their counterparts elsewhere and are easier to use. However, electerm's most useful

accomplishment to date is the organization of related but traditionally separate functions – notably the terminal and file manager – into a single workflow. True, the organization is not yet complete, and sometimes takes a while to adjust to, but the trend is to bring the command line up to date. Desktops users just might find that electerm makes the command line a less fearsome place.

---

### Info

[1] electerm: [<https://github.com/electerm>]



**Figure 4:** Written to CSV files, electerm's batch files make scripting easy.



**Customizing web content with Tampermonkey**

# Monkey Business

Even small changes in a web page can improve the browsing experience. Your preferred web browser provides all the tools you need to inject JavaScript to adapt the page. You just need a browser with its debugging tools, some knowledge of scripting, and the browser extension Tampermonkey. By Reinhard E. Voglmaier

The browser has become a very important component for interacting with the Internet. In recent years, browsers have evolved from being just a tool for interacting with static HTML to a comprehensive part of the infrastructure. The modern browser is a kind of operating system within the operating system, with a complete SDK for JavaScript, HTML, and CSS, along with features such as a visual debugger, a code inspector, options for network and performance monitoring, and much more. One interesting feature is that you can modify pages already loaded into the browser with your own scripts. The ability to customize web pages is useful for:

- quick bug fixes for intranet applications,
- fixing annoying behaviors of websites or web applications,
- implementing security features for users in the enterprise,
- adding convenient new features to publicly available websites, such as automation tools or similar functionalities, and
- providing easy access to AI-based tools.

This flexibility and power push the browser far beyond its original role of simply rendering HTML.

## Before I Start ...

This article is intended for educational purposes only. My goal is to show you the power of the described technologies. All information you will find here is already available on the Internet – links are provided at

the end of this article. As with many tools used for programming, these tools can also be used for illegal activities. If you decide to experiment, it is up to you to obey all applicable laws and treat any websites in a way that is compliant with their intended use.

## Welcome to the DOM

One very exciting feature of today's web is the connection between the HTML document and the scripts contained in the document itself. You can consider this construct as similar to the chicken-and-egg question: The document contains the script and the script can modify the document, including the script itself. The technology that allows this is the DOM (Document Object Model) [1] [2]. When a web page is loaded, the browser constructs a DOM tree, which is a hierarchical representation of the document's content. This tree structure allows for efficient selection, addition, removal, and modification of elements on the web page. The DOM is not tied to any programming language; however, JavaScript is commonly used to interact with the DOM.

Style sheets (CSS) also are part of the DOM. A style sheet describes how the document will be displayed in the browser (the font, the colors, and so forth). The most interesting feature of the browser is that the user can inject code into the DOM. This code can interact with the HTML and CSS part of the document. This feature opens a world of possibilities.

## Extending the Browser

Integrating code into the DOM is easy. Consider the classic "Hello World" example to demonstrate this process. You need one file called `manifest.json` ([Listing 1](#)) and at least one program file. `manifest.json` outlines several details, such as the plugin's name, version, and, important to us, the URLs of the web pages where the plugin should be inserted (in this case, all URLs of the domain `perl.org`). The second file you need contains the script you wish to inject. The script is defined in the `js` parameter of the `manifest.json` file. In this example, the script is called `main.js` ([Listing 2](#)). The script is located in the same directory as the manifest file.

### Listing 1: manifest.json

```
{
  "manifest_version":2,
  "version":"1.0",
  "name":"Hello World",
  "content_scripts":[
    {
      "matches":["*://*.perl.org/*"],
      "js":["main.js"]
    }
  ]
}
```

### Listing 2: main.js

```
const btn = document.createElement('button');
btn.textContent = "Click me";
btn.onclick = function() {
  alert("Hello World!");
}
alert("JavaScript loaded!");
document.body.appendChild(btn);
```

The script doesn't do much, but it illustrates very well what is possible. You add a button to all pages matching the domain perl.org. You also define a new JavaScript function to be executed when the button is pressed. For simplicity, this function only executes the alert function.

Now you just need to load the extension into your browser. Open the link `about:debugging#/runtime/this-firefox`. Click on the button *Load Temporary Add-on* and load the `manifest.json` file. From now on, all pages from the domain `per1.org` opened with this browser instance will contain a brand-new *Click me* button. You have successfully changed the DOM and added a function that is executed when the user clicks the *Click me* button. Look online if you're interested in learning more about creating extensions [3] [4].

## Permanence

So far, the plugin you created is only temporary. When you restart the browser, you have to load it again. With the help of the Node.js framework and a function called `web-ext`, you can create a permanent extension. Now that you understand the basic process, I'll show you an easier way to achieve the same result: using an extension such as Tampermonkey [51].

## How Tampermonkey Helps

Tampermonkey lets you permanently load a user-defined extension into your browser. You can use Tampermonkey to inject JavaScript code into the DOM to be executed in the context of the loaded web page. Tampermonkey is based upon Grease-monkey [6], which currently only

works in the Firefox browser. Tampermonkey, on the other hand, works with the most common web browsers, and it has a huge user community. The examples in this article were produced on the Firefox web browser on Linux Mint, but they work also on other browsers, as well as on other operating systems. You can also use different browser extensions if they are available for your browser.

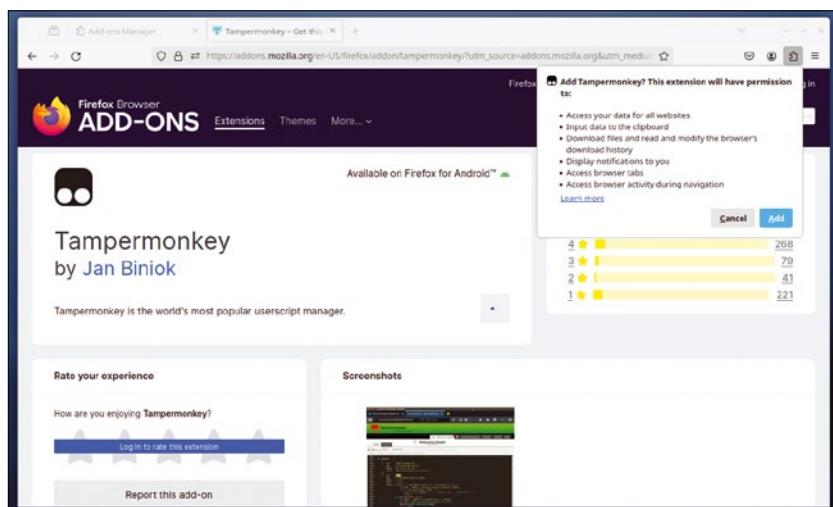
## Installing the Tampermonkey Extension

Tampermonkey is quite easy to install. In Firefox, select *Addons and themes* then choose *Extensions* in the menu on the left. Search for Tampermonkey, and click on the Tampermonkey icon to install. The provider of the extension asks you to accept the necessary conditions regarding privacy (**Figure 1**); you should read this text carefully then choose which permissions you give to the provider. Monitoring network traffic, you will notice that the provider of the extension is notified not only that you install his extension, but every time you use it. Once you accept these conditions, the extension will install.

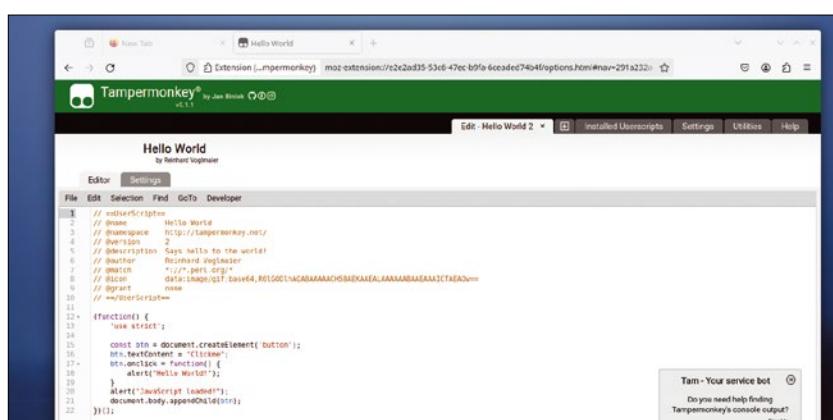
## Let's Play

When you open Tampermonkey for the first time, it kindly asks if you will allow sending anonymous statistics about its usage home to its developer. It is up to you whether you allow or disallow this. After that, you can write a new user script.

You can write a new user script. Click on **Create a new script** .... Tampermonkey creates a skeleton for your new user script and displays it in the Tampermonkey editor. You will find the same meta information you configured in the manifest file in the previous example. I will reuse the "Hello, World" example I created before as a plugin. In **Figure 2**, you see the script, which you just need to save using the menu that opens when you click on *File*. The result is the same as before, which gives a certain confidence that what you did before is working correctly.



**Figure 1:** Tampermonkey asks you to accept privacy conditions.



**Figure 2:** Execute a script with Tampermonkey

## Same Play with AI ...

For a more challenging example, there are people who prefer to access YouTube videos using the Invidious front end [7]. Of course, Google is not happy about the presence of an alternative open source front end for YouTube that doesn't allow Google's tracking, and they have demanded that the developers take down Invidious. Over the past few months, Google has been actively working to shut down Invidious, so by the time you read this, this example might not give the result shown here. In this case, though, I'm just using this example as a way of showing how to substitute links in the result list of a search engine with something different.

Suppose you don't want to take the time to write the code yourself. You can take your preferred AI chat tool (in this example, [www.phind.com](http://www.phind.com)) and ask the friendly bot to do the following: "Please write a user script that replaces YouTube with the site name `invidious.private.coffee` in all search results of DuckDuckGo." Phind delivers a neat little script ([Listing 3](#)) that contains all the information necessary to make Tampermonkey happy. Tampermonkey performs syntax checks and complains if it detects syntax errors. Save the script and perform a search with DuckDuckGo; for examples, look for Tampermonkey installation tutorials.

My first attempt at this hack didn't appear to work; all video links to YouTube were unchanged. It turns out timing is critical: when the script executed, the page was not completely loaded, therefore it was impossible to substitute the links contained in it. Adding a simple event listener fixed the problem:

```
window.addEventListener('load', replaceYouTubeLinks);
```

When I tried again, the search brought up links to Invidious instead of YouTube. The updated version of the script is in [Listing 4](#).

You can even substitute links to a function that is executed when the user clicks it. For example, this function could consult a blacklist of links that should be avoided and inform the user if a match is found. Again, ask your preferred AI chatbot to deliver you the code.

Please allow me one comment: Your browser, JavaScript, and Tampermonkey are very powerful tools. You

should know what you are doing – otherwise things could get complicated very fast.

## Another Way

In the world of programming, the saying goes, "There is more than one way to do it!" I will show you a third way to get a script up and running. If you open the Tampermonkey extension,

### **Listing 3: Substitute YouTube Links**

```
// ==UserScript==
// @name      Replace YouTube Links on DuckDuckGo
// @namespace  http://tampermonkey.net/
// @version    0.1
// @description Replaces YouTube links with invidious.private.coffee in DuckDuckGo search results
// @author    Your Name
// @match     https://*.duckduckgo.com/*
// @grant     none
// ==/UserScript==
(function() {
  'use strict';
  // Function to replace YouTube URLs with invidious.private.coffee
  function replaceYouTubeLinks() {
    const links = document.querySelectorAll('a[href*="www.youtube.com"]');
    links.forEach(link => {
      link.href = link.href.replace("www.youtube.com", "invidious.private.coffee");
    });
  }
})();
```

### **Listing 4: Substitute YouTube Links 2.0**

```
// ==UserScript==
// @name      Replace YouTube Links on DuckDuckGo
// @namespace  http://tampermonkey.net/
// @version    0.2
// @description Replaces YouTube links with invidious.private.coffee in DuckDuckGo search results
// @author    Your Name
// @match     https://*.duckduckgo.com/*
// @grant     none
// ==/UserScript==
(function() {
  'use strict';
  // Function to replace YouTube URLs with invidious.private.coffee
  function replaceYouTubeLinks() {
    const links = document.querySelectorAll('a[href*="www.youtube.com"]');
    links.forEach(link => {
      link.href = link.href.replace("www.youtube.com", "invidious.private.coffee");
    });
  }
  // wait until the page has been loaded
  window.addEventListener('load', replaceYouTubeLinks);
})();
```

you will see in the menu the option *Find New Scripts*. This option opens a new menu containing links that bring you to websites offering tons of ready-to-use user scripts. You can perform a search to look for a script that fits your needs. But be prepared: These scripts might or might not work. Someone could have written the script for a different extension, such as Greasemonkey, or for a different version of the extension you are using. Also, as the previous example showed, timing could have an impact on the operations. You should therefore understand what you are doing before you use one of these scripts.

## Explore the DOM

When you look at the text you get from a web server, you're sure to be

confused by the complexity of some pages. The browser's SDK can help. In Firebox, go to the element on the web page you're planning to change and right-click with your mouse. A menu opens; the last choice in the menu is *Inspect*. Click on *Inspect* and the interface to this SDK opens (**Figure 3**). When you hover your mouse over the HTML code on the page itself, the corresponding element is highlighted. This feature helps you to find the element in the DOM you want to change.

## Test Your Code

The browser SDK helps you test your code. Consider the "Hello, World" example. Open the SDK by pressing *F12*. Once the SDK is open, click on the *Console* tab. In the console, you can now

enter the code you want to test. Start typing in the program from **Listing 2**. As you type in the line `const btn = document.createElement('button');`, you will notice (after you enter the dot after `document`) that the SDK offers you auto-completion, which is very helpful. Once you finish the definition of the button, you can explore what you created using JavaScript or insert the newly created button on the web page using the line: `"document.body.appendChild(btn);"` (**Figure 4**). Your newly created button will pop up on the web page.

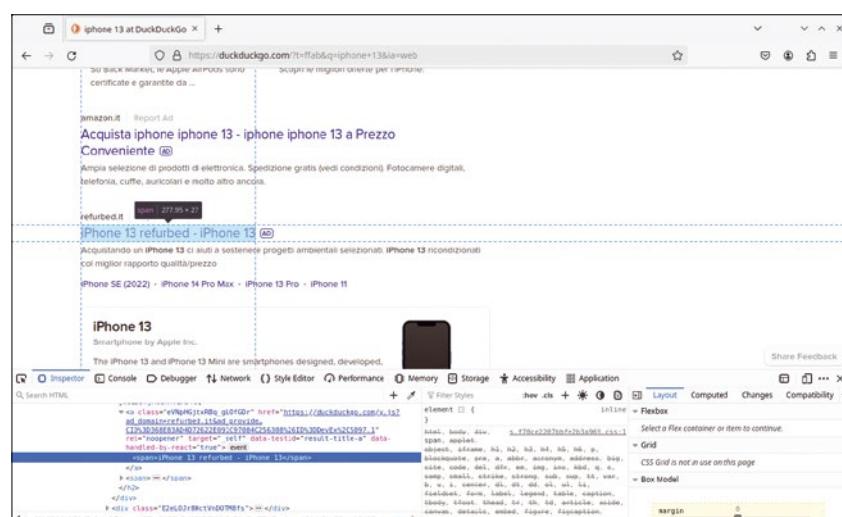
## 3D Furniture Models

Modeling your home can be a little tricky. You will find some excellent open source programs that will help you, such as Blender. But also, many furniture vendors provide 3D models of their products. IKEA, for example, offers a lot of products as 3D models together with an online tool to visualize them.

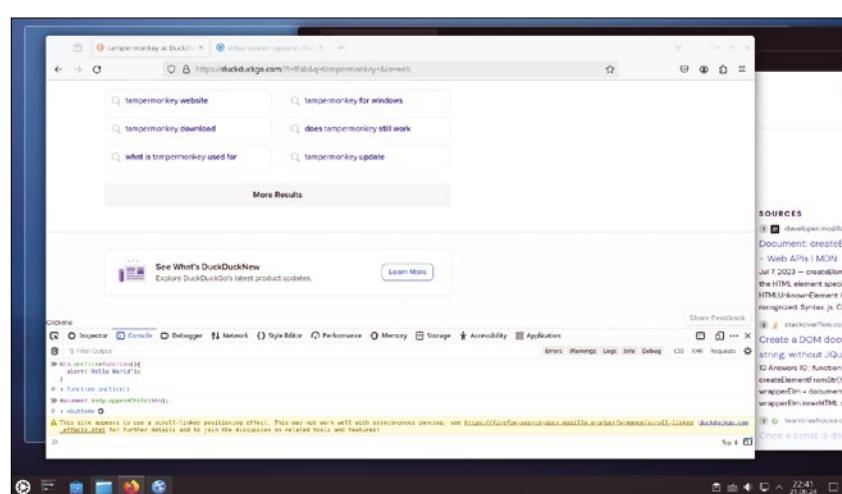
If you explore the DOM for these pages, you will find that a little JavaScript program (**Listing 5**) is used to open a 3D file with the extension `.glb` – a royalty-free method of encoding 3D data. A tool such as Blender can easily use this data to help you model your home. Look at the web page of an IKEA product with 3D modeling and you will discover that the *View in 3D* button calls a script that contains, as a parameter, the 3D model you would like to download.

With this information, you can easily download the model. You can then import the model directly into Blender. However it is not very convenient to have to right-click on the HTML area of the SDK in order to find out the URL of the `.glb` file. A little user script can assist you. You know the name of the function and can search for it in the DOM with the help of the function `document.querySelector`. Once you find the function, you just need to use the URL in its parameters to discover where to get the 3D model.

Now that you know how to get the URL of the 3D model, you just need to create a clickable button that will let you download this URL (**Figure 5**). You can use the JavaScript function



**Figure 3:** Inspecting an HTML page using the browser's built-in SDK.



**Figure 4:** Executing the JavaScript example in the console.

"createElement('button')" for this step. The user script that performs this miracle is available on GitHub [8]. I recommend that you download the script and read it carefully – you will learn a lot from a very short bit of code.

## Cybersecurity

Downloading a user script you found on the Internet into Tampermonkey can be quite dangerous. As I have mentioned before, the user scripts you install can run on every page you load into your browser. Every script can control all communication between your browser and the contacted servers. They act on your behalf and can do things on your behalf that you might not even notice. Obviously, the same holds for every extension you install into your browser. Therefore, it is important to only install scripts you trust, as well as to install only browser extensions you trust. Extensions should only be installed from the official distribution of your browser provider. You will find statements on the Internet telling you that tools such as Tampermonkey allow people with no coding experience to use powerful scripts. That is not a good idea at all. Install user scripts only if you completely understand what these scripts are doing. Do not use scripts that contain code you do not fully understand. Script code performing harmful operations on your behalf could be obfuscated in a way that is difficult to perceive unless you look carefully and know what you are looking at. The most secure scripts are those you develop and test yourself. The same suggestion holds for extensions.

Instead of trusting the scripts on the distribution site of your browser, why not create your own extension? It is easier than you may think. You can write the code in JavaScript, just as you do with user scripts.

You could also choose to use Tampermonkey in a sandbox for development purposes, once you have developed a robust user script, and then convert the whole application to the form of an extension.

BTW: I hope you do not perform online banking with your regular browser and instead use a specially hardened browser for this purpose.

## Law and Ethics

Before concluding this article, I want to invite you to consider a few things. Your web browser is obviously your property, whereas the web server you are contacting with your browser belongs to someone else. I am not a lawyer, and the law in the field of informatics is rather complex. I think that processing data you obtained from the Internet on your browser is one thing. Constructing a web page to hack into a web server or modifying a page to present to another user – or to masquerade as the original web server – is something entirely different. It is your responsibility to act in accordance with applicable legislation.

I have no idea how copyright applies to websites. In many cases, a copyright notice is listed somewhere on the site with terms of usage. I suggest considering one ethical perspective. Some sites rely on ads; without them, these sites could not stay online. Consider

### **Listing 5:** Fetching 3D Models

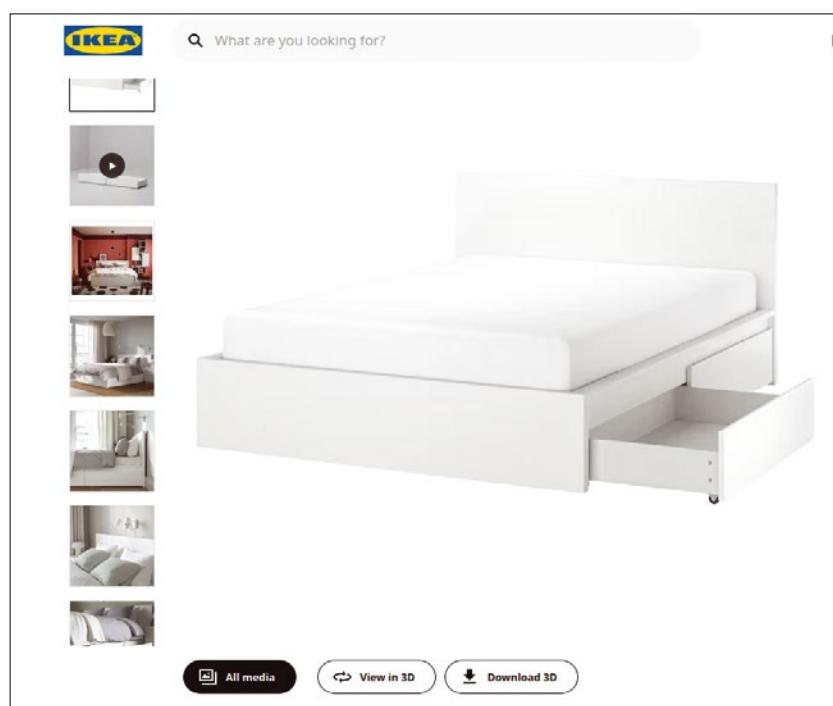
```
<script type="application/json" id="pip-xr-viewer-model">
{"productId": "<productId>",
 "productName": "<productName>",
 "url": "<Url 3D Model>"}
</script>
```

this when trying to implement functionalities such as ad blockers.

## Conclusions

Using Tampermonkey to write user scripts for web pages is a great way to enhance and personalize the browsing experience. The most interesting advantages are:

- Enhancing web pages – Tampermonkey enables users to modify the content of web pages to add custom functionality ranging from simple DOM manipulations to making AJAX calls. This flexibility allows for a wide array of enhancements, such as cleaning up websites, adding export to PDF buttons, displaying word counts, and much more.
- Customization and personalization – By creating and utilizing user scripts, individuals can tailor



**Figure 5:** Downloading a 3D model: The button in the lower right labeled Download 3D was added by the script.

their browsing experience to meet a specific need. Whether that need is improving the usability of frequently visited sites or adding new functionalities, Tampermonkey scripts can significantly enhance the overall web-browsing experience.

- Learning opportunity – Writing user scripts with Tampermonkey can serve as an excellent learning opportunity for both beginners and experienced programmers. Tampermonkey provides insights into web-page structures, JavaScript, and the DOM.

Obviously all this comes with a price: security. You must trust the supplier of the Tampermonkey extension. Alternatively, you can use open source extensions such as Violentmonkey [9]. You could also choose to write your own extension, which is not very difficult. The same holds for the scripts. You can develop your

own, let AI tools help you in writing scripts, or download entire scripts from trusted Internet sources. Tampermonkey stands out as a valuable tool for enhancing the web browsing experience through user scripts. Ease of use makes Tampermonkey accessible to a wide audience. However, users should remain mindful of legal issues and security considerations when employing custom scripts.

#### Info

- [1] The DOM W3 Schools: [\[https://www.w3schools.com/js/js\\_htmldom.asp\]](https://www.w3schools.com/js/js_htmldom.asp)
- [2] Introduction to the DOM: [\[https://developer.mozilla.org/en-US/docs/Web/API/Document\\_Object\\_Model/Introduction\]](https://developer.mozilla.org/en-US/docs/Web/API/Document_Object_Model/Introduction)
- [3] Firefox Extension Workshop: [\[https://extensionworkshop.com/\]](https://extensionworkshop.com/)
- [4] How to Write Your Own Browser Extension: [\[https://www.freecodecamp.org/news/write-your-own-browser-extensions/\]](https://www.freecodecamp.org/news/write-your-own-browser-extensions/)

#### [5] Tampermonkey:

[\[https://www.tampermonkey.net/\]](https://www.tampermonkey.net/)

#### [6] Greasemonkey: [\[https://github.com/greasemonkey/greasemonkey\]](https://github.com/greasemonkey/greasemonkey)

#### [7] Invidious: [\[https://invidious.io/\]](https://invidious.io/)

#### [8] IKEA 3D Model Downloader: [\[https://github.com/apinanaivot/IKEA-3D-Model-Download-Button\]](https://github.com/apinanaivot/IKEA-3D-Model-Download-Button)

#### [9] Violentmonkey: [\[https://violentmonkey.github.io/\]](https://violentmonkey.github.io/)

#### Author

Reinhard E. Voglmaier discovered his love for computer science while writing his diploma thesis at the Max Planck Institute for Extraterrestrial Physics in Germany. He started his career as IT project manager and subsequently took on the role of intranet manager in a pharmaceutical company, overseeing web services and addressing cybersecurity concerns. Following his retirement, he continues to lead the expert charter GRC in Digital Health for ISACA Germany and is engaged in a computer linguistics project at the University of Innsbruck.

# IT Highlights at a Glance



## ADMIN UPDATE

Issue 415 • February 5, 2025

### CLOUDFEST March 17-20, 2025 | Europa-Park Germany

#### This Week's Feature

**Data Deduplication on Windows Server 2022**  
Data deduplication tools boost efficiency, storage management by improving storage utilization and saving network bandwidth, backup and replication processes.

#### News and Resources

- Sysdig Launches Open Source Stratosphere for Cloud Observability
- OpenVox Automation Framework Announced
- Red Hat Releases Kubernetes-Native Connectivity Link

#### In Case You Missed It

##### Integrate Remote Cloud Storage

You don't need native clients for every single service just to back up or synchronize your data in the cloud; Rclone helps you handle these tasks across multiple cloud accounts at the command line or in a graphical front end.

##### Automated Health Checks

The open source Dradis framework facilitates creating plans for carrying out team pentests and standardizing reports from different tools to create summary

## LINUX UPDATE

No. 397 • February 6, 2025

### HETZNER

OBJECT STORAGE  
BUILD TO GROW WITH YOUR NEEDS  
SCALE UP NOW!

#### Bringing Privacy to Social Media

The LibFederated browser extension redirects YouTube, Instagram, Reddit, TikTok, and other services to alternative, privacy-friendly front ends.

#### In the News

- System76 Refreshes Meerkat Mini PC
- First Release Candidate for Linux Kernel 6.14 Now Available

#### In Case You Missed It

- Simplify VPN Management  
WireGuard is a less complex VPN solution compared to OpenVPN and IPsec. WireGuard Easy simplifies the process even further by allowing you to operate a VPN and manage clients through a user-friendly web interface.
- Tools for Enumerating Resources  
A cyberattack unfolds in stages. The enumeration phase is when the attacker looks for holes in the target system. Tools like feroxbuster and nmap bring the power of automation to the search.

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## The bauh package manager

# All-Rounder

The bauh package manager provides a single interface to manage all of your Linux software.

Despite a few issues, bauh goes a long way in simplifying package management. By Bruce Byfield

**Ever since package managers** added automatic dependency resolution, installing software in Linux has been easy. The greatest difficulties arose from attempts to use different package formats, such as Debian's Alien. These attempts were never fully successful and were widely ignored. However, with the popularity of universal formats such as AppImage, Snap, Flatpak, and web applications, package management has become more complex, with each format using its own commands for administration. Formerly known as fpakman, bauh [1] is designed to simplify package management by using a single interface for all formats. In addition, bauh is one of the easiest interfaces available for package management either on the desktop or at the command line, despite the fact that some of the interface's details need to be improved.

Currently at release 0.10.7, bauh has far to go before general release. As I write, it supports Arch, AppImage, Snap, Flatpak, and native web applications, covering the most popular formats, but likely others will be added as development continues.

Also, for some reason, the top half of

package release numbers are obscured in bauh's tables, but other columns are perfectly legible (**Figure 1**). In addition, a few of the buttons on the right side of the main window seem redundant (possibly to accommodate varying user preferences) while, in an effort to avoid jargon, the functions of some fields are obscure. Fortunately, though, such problems do not stop bauh from being already functional. Package installation and removal are already implemented. In addition, bauh can also use Timeshift for backup before making changes and can be installed in the system tray. Bauh already supports custom themes. Written in Qt, bauh supports all these features with a responsiveness that makes it usable even in the early release stage.

## Installing and Configuring bauh

You can install bauh for an individual account or for the entire system. It has yet to be included in the repositories of most distributions. However, bauh's GitHub page [2] includes detailed installation instructions for Arch Linux, Debian, and Ubuntu

directly, and for Python 3's pip installer. Judging by the extra actions listed on the project page for each distribution, the Arch version appears to be the most advanced. But considering the dozen required and the dozen optional dependencies, the easiest way to install bauh is with AppImage, although you may need to uninstall AppImageLauncher first.

After the basic installation, bauh can be customized by editing the configuration file for either the system or the current account (**Figure 2**). Several other options are detailed on the GitHub page:

- Each packaging format can be set to not display.
- The priority for each source can be changed. These sources depend on the distribution.
- Custom themes can be created.
- Icons can be added to the system tray.

Some of these customizations are also available as command-line options (see below). Users may find the default options satisfactory, especially in their first explorations of bauh.

If you decide to keep bauh, you can upgrade from the user interface.

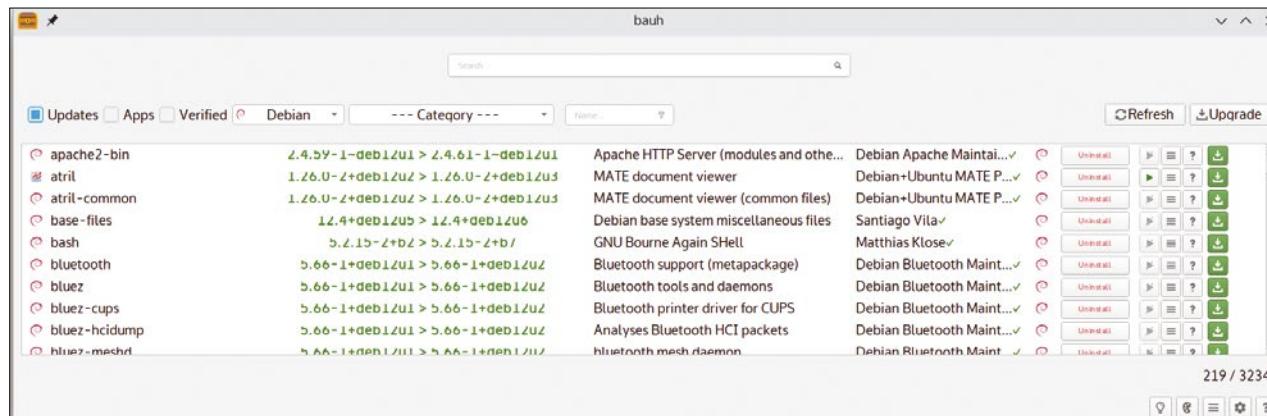


Figure 1: Bauh's interface has a few problems, but they do not affect functionality.

## Post-Installation Orientation and Setup

The first time bauh runs, it takes a few seconds to initialize. During this process, it collects and categorizes all the packages installed on the system and displays its findings in the main window. The default display shows the packages with available updates, but it can be filtered at the top left of the window in several other ways, such as by apps, category, or package type. A search field and a *Refresh* button are also available. On the bottom right, you'll find a variety of buttons which are not arranged in any obvious order (from left to right, they are *Suggestions*, *Themes*, *History*, *Settings*, and *Credits*).

Before you begin using bauh, you may want to do some configuration, although it is ready to use with the defaults. *Suggestions* provides mostly websites for creating web applications, but it also includes games, emulators, and a few standard multimedia apps ranging from Audacity

```
home > bb > .config > bauh > config.yml
1  backup:
2    downgrade: null
3  enabled: true
4  install: null
5  mode: incremental
6  remove_method: self
7  type: rsync
8  uninstall: null
9  upgrade: null
10 boot:
11   load_apps: true
12 disk:
13   trim:
14     after_upgrade: false
15 download:
16   check_ssl: true
17   icons: true
18   multithreaded: false
19   multithreaded_client: null
20 gems: null
21 locale: null
22 memory_cache:
23   data_expiration: 3600
24   icon_expiration: 300
25 store_root_password: true
26 suggestions:
27   by_type: 15
28   enabled: true
29 system:
30   notifications: true
31   single_dependency_checking: false
32 ui:
33   auto_scale: false
34   hdpi: false
35   qt_style: fusion
36   scale_factor: 1.0
37   system_theme: false
38 table:
39   max_displayed: 50
40   theme: light
41 tray:
42   default_icon: null
43   update_icon: null
44 updates:
45   ask_for_reboot: true
46   check_interval: 5
47
```

**Figure 2:** Bauh's configuration file, showing the default values.

to Krita – a total of 53 overall. *Settings* is more practical. From its tabs, you can set the types of packages that your bauh instance supports, as well as its general behavior, such as whether the system should reboot after each installation, the scale of the interface, or how bauh behaves when installed to the system tray. There is also has a separate tab for how each package type behaves, although settings are sometimes labeled obscurely. For instance, the tab for Debian packages has settings whose exact meaning is sometimes poorly labeled:

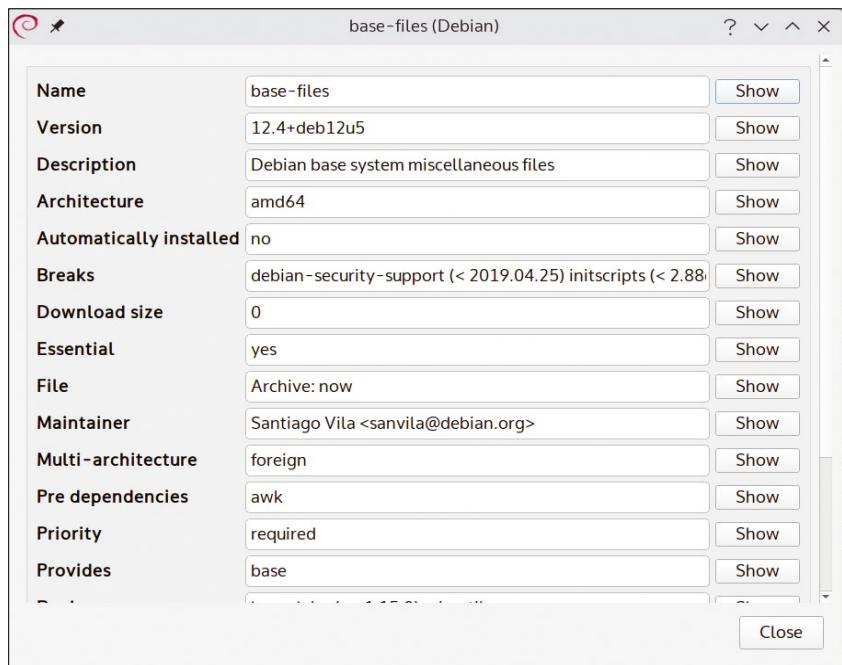
- Software settings set by default to *Auto*, which is not defined but probably means those listed in */etc/app*
- An option for complete removal of software (i.e., Apt's *purge* option) set to *No*
- The time between synchronization of the local system with repositories (judging from the configuration file, probably in seconds)
- App cache expiration, presumably for bauh itself and in seconds
- Suggestions expiration, presumably in seconds

The settings do have help icons, but because online help is not implemented, they are only a promise of future explanations. For now, some of the settings should

probably be done manually rather than automatically.

## Working with Packages in bauh

After so much configuration, working with packages in bauh is straightforward. Because bauh uses intelligent defaults, it is ready to use immediately. Whether in the main or *Suggestions* window, installing or uninstalling is as simple as selecting a package and then clicking the *Install* or *Uninstall* button on the right (**Figure 3**). If you are uncertain what an installed package does – which is perfectly possible, considering that a Linux system may have several thousand packages – you can click one button to view it or another button to read a technical summary (**Figure 4**). Usefully, you can install still another button to ignore updates for a package, read a history if it is a Flatpak package, or remove it completely if it is a Debian package. Packages can be installed for the system or a single account, but as an added security measure, even installation for a single account requires a password.



The screenshot shows a window titled "base-files (Debian)". It contains a table with the following data:

Name	base-files	Show
Version	12.4+deb12u5	Show
Description	Debian base system miscellaneous files	Show
Architecture	amd64	Show
Automatically installed	no	Show
Breaks	debian-security-support (< 2019.04.25) initscripts (< 2.88)	Show
Download size	0	Show
Essential	yes	Show
File	Archive: now	Show
Maintainer	Santiago Vila <sanvila@debian.org>	Show
Multi-architecture	foreign	Show
Pre dependencies	awk	Show
Priority	required	Show
Provides	base	Show

**Figure 4:** A detailed summary of each package is available in bauh.

icon, bauh can be run with selected features. You might want to add `--logs` the first few times you run bauh and are still discovering your preferences or `--tray` to try running it from the system tray. Also, you can run only portions of bauh, with the self-explanatory `--settings` or `--suggestions` options, while `--reset` removes all configuration options and cached data. With `--offline`, you can do some operations such

as removing a package without an Internet connection.

## Future Development

With support for Arch, Debian, and universal packages, bauh is off to a good start. However, the lack of support for RPM packages seems an oversight. Currently, the ability to downgrade and to record a history of operations are mentioned on the

project page, but these options are not implemented for all package types. Perhaps most importantly, developers are increasingly using additional installation methods for developing applications such as Git, Homebrew, and pip. As bauh moves nearer to its general release, some of Apt's features might also benefit users.

However, this wish list is overly impatient. Even with its present half-finished interface, bauh goes a long way toward re-simplifying package management. For that alone, bauh is a welcome addition to a modern Linux distribution. ■

---

### Info

- [1] bauh: [<https://github.com/vinifmor/bauh?tab=readme-ov-file>]
  - [2] GitHub: [<https://github.com/vinifmor/bauh?tab=readme-ov-file#installation>]
- 

### Author

**Bruce Byfield** is a computer journalist and a freelance writer and editor specializing in free and open source software. In addition to his writing projects, he also teaches live and e-learning courses. In his spare time, Bruce writes about Northwest Coast art (<http://brucebyfield.wordpress.com>). He is also co-founder of Prentice Pieces, a blog about writing and fantasy at <https://prenticepieces.com/>. ■



## Installing modern commands with tasksel

# Modern Times

Many traditional commands now have modern replacements. With tasksel, you can install all of them in a single step. By Bruce Byfield

**Many basic Linux commands** date back to the beginnings of Unix. In over 50 years, many have changed only in minor ways, such as supporting terabytes as a measurement of memory. Yet distributions continue to include these traditional commands by default, because they are familiar and good enough for most purposes. In the past decade or so, replacement commands have started to appear. A few are official updates, such as Debian's apt (which tidies apt-get) or Fedora's dnf (which is meant to replace yum and its obscure code). These updates replace older software seamlessly, but many other replacement commands remain an option. Any day now, I expect a new distribution to appear that installs some of the modern replacements by default, but I finally got tired of waiting. I devised my own simple hack to provide a thoroughly modern set of commands with the help of Debian's tasksel [1] and its beginner-friendly recipes.

**Table 1** shows a list of some of the modern replacements that users might want to use, along with their chief advantages. **Table 1** is by no means complete, so anyone interested in modernizing their systems should explore the commands listed as well as similar ones in order to evaluate them. For many modern commands, GitHub is the place to start to learn more. Besides the advantages listed in **Table 1**, many of the commands listed share common traits. For example, many color code their output so that directories and different types of files are identifiable at a glance – a feature that was obviously not possible before color monitors, but is now commonplace. Many commands, too, edit output and documentation for clarity and conciseness, as well as to reflect

today's hardware and use cases. Some, too, provide line graphics despite running from the command line, making them more accessible.

Most are drop-in replacements, except for options designed for use with obsolete commands and the limited memory of antique computers.

**Table 1: A Partial List of Modern Commands**

Traditional Command	Modern Command	Function	Modern Advantage
apt, apt-get	nala	Debian package manager	<ul style="list-style-type: none"> <li>• Color functions</li> <li>• Concise output</li> <li>• Finds fastest mirror</li> <li>• Undo</li> <li>• Parallel download</li> <li>• Fast</li> <li>• Choice of interfaces</li> <li>• Extensible</li> </ul>
bash	kitty	Terminal	<ul style="list-style-type: none"> <li>• Displays line numbers</li> <li>• Navigate to favorite directories with a few keystrokes</li> <li>• Works with all major shells</li> <li>• Interactive directory selection</li> </ul>
cat	bat	File pager	<ul style="list-style-type: none"> <li>• Simpler interface</li> <li>• Interactive help</li> <li>• Customized config file with common commands</li> <li>• Works with JSON data</li> </ul>
cd	zoxide	Change directory	<ul style="list-style-type: none"> <li>• Displays multiple devices</li> <li>• Can select devices to display</li> <li>• Sorts multiple displays</li> <li>• Can display JSON data</li> </ul>
curl	curlie	Data transfer from URLs	<ul style="list-style-type: none"> <li>• Displays line numbers</li> <li>• More organized displays</li> <li>• Side-by-side view</li> <li>• Compares directories</li> </ul>
df	duf	Checks disk space	<ul style="list-style-type: none"> <li>• Supports regular expressions and glob</li> <li>• File type search path</li> <li>• Works with .gitignore files</li> <li>• Can run command after file located</li> </ul>
diff	delta	File comparison	<ul style="list-style-type: none"> <li>• Faster</li> <li>• Searches on compressed files</li> <li>• Simple, customizable interface</li> </ul>
find	fd (fd-find)	Searches files and directories	<ul style="list-style-type: none"> <li>• Smart result prioritization</li> <li>• Track command exit status, timestamp, and execution directory</li> <li>• Extensible</li> </ul>
grep	rigrep	Plain text search	<ul style="list-style-type: none"> <li>• Visual representation of directories</li> <li>• Select directories to display by number of files</li> <li>• Filter by device, last modification</li> </ul>
history	mcfly	Records commands run	<ul style="list-style-type: none"> <li>• Custom configuration file</li> <li>• Custom display</li> </ul>
ls	tree	Displays files, directories	<ul style="list-style-type: none"> <li>• Simple customizable displays</li> <li>• Find and change to directory</li> <li>• Optional panels</li> <li>• File previews</li> <li>• Apply command on multiple files</li> <li>• Check Git status</li> </ul>
	lsd		<ul style="list-style-type: none"> <li>• Concise</li> <li>• Examples</li> <li>• Graphs results</li> </ul>
	broot		
man	tldr	Documentation	
ping	gping	Tests availability of hosts	

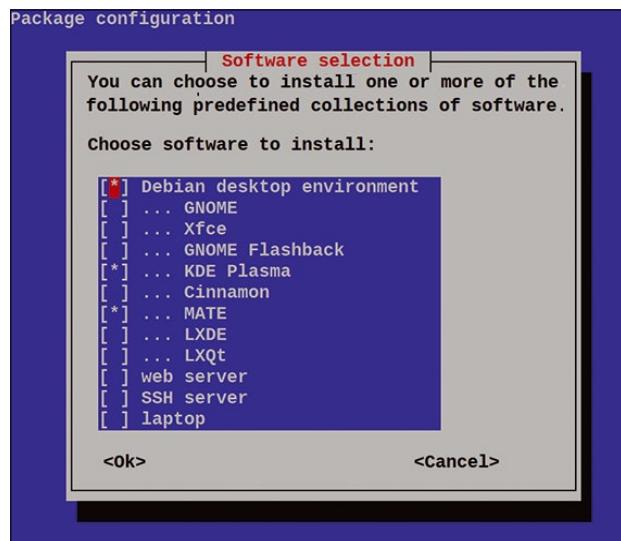
## Working with tasksel

After selecting the modernized commands you want to install, you need to prepare a recipe for tasksel (aka task selection). Several decades old itself, tasksel is a little-known part of Debian's elaborate package management system, along with dpkg and apt. Most Debian-based distributions use tasksel in their installer, where you may have seen it flash by on the screen in the final stages of an installation, but not all distros install tasksel by default. Ubuntu, for instance, does not. However, tasksel is generally available in repositories and has several uses besides in the installer. To start with, a recipe can be saved to reduce the time to customize a new installation. In addition, admins can use tasksel packages when installing multiple systems to ensure that each system is identical to the others. Moreover, if a minimal net install is made, then tasksel can be used to ensure that all installed packages are known to the admin – a basic requirement for security.

Running tasksel requires root privileges. The bare command opens a command-line interface (**Figure 1**) that lists the recipes used during installation. Using

```
tasksel --list-task
```

displays the same information, prefacing installed tasks with an i, and uninstalled tasks with a u



**Figure 1:** The tasksel command-line interface.

(**Figure 2**). The standard recipe is used only by the installer, while the *laptop* package consists of utilities that are useful on a laptop, such as wireless tools and Bluetooth. Because tasksel has not been updated since it started to use meta-packages some years ago, the --task-packages option only gives the meta-packages' names, which is not very useful. However, if you install apt-rdepends, you can see a package's dependencies and recommendations. You may also use the --test (-t) option before actually installing. Note that in Ubuntu, either option only shows Debian packages; to see Ubuntu's tasksel packages requires the workaround of entering

```
apt install task-name^
```

(note the caret at the end) for the list of Ubuntu-specific packages, such as *kubuntu-full* and *ubuntu-mate-desktop*.

Debian distributions install with many tasksel recipes enabled. However, you can also easily create your own tasksel recipe. Each recipe contains the fields shown in the example in **Table 2**. Save the recipe to /usr/share/tasksel/descs/ or /usr/local/share/tasksel/descs/ with a .desc extension. These directories can have subfolders to organize the tasksel recipes. For example, Ubuntu has subfolders for tasksel recipes

from Debian and Ubuntu-specific tasksel recipes. After saving the file, to enable it, run as root

**Table 2: A Sample Recipe**

Task:	Modern commands
Relevance:	1//Priority. 1 is high, 9 low
Description:	This task provides a variety of modern commands.
Key:	// The software needed to install. Usually blank.
Packages:	list mcfly fd-find tree

```
tasksel install TASKSEL-NAME
```

To uninstall, run

```
tasksel remove TASKSEL-NAME
```

When you are sure you want the modern command to replace the traditional one, you might make the modern command an alias for the traditional command. For instance, using

```
alias tree='ls'
```

## Alternatives

As an alternative, you could write a Bash script that combines tasksel and alias. I chose to present the procedure as I have because it is the easiest and least intimidating option for inexperienced users. More experienced users might consider the more long-term project of creating a custom install disc, using tasksel to do unattended installations. While tasksel itself is getting old, it is still an easy way to set up a system exactly as you want it with a minimum of effort.

### Info

[1] tasksel: [[https://wiki.debian.org/tasksel#Sample\\_use](https://wiki.debian.org/tasksel#Sample_use)]

```
root@ilvarness:~# tasksel --list-tasks
i desktop          Debian desktop environment
u gnome-desktop   GNOME
u xfce-desktop    Xfce
u gnome-flashback-desktop   GNOME Flashback
i kde-desktop     KDE Plasma
u cinnamon-desktop Cinnamon
i mate-desktop    MATE
u lxde-desktop   LXDE
u lxqt-desktop   LXQt
u web-server      web server
u ssh-server     SSH server
u laptop          laptop
```

**Figure 2:** Using tasksel from the command prompt.

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