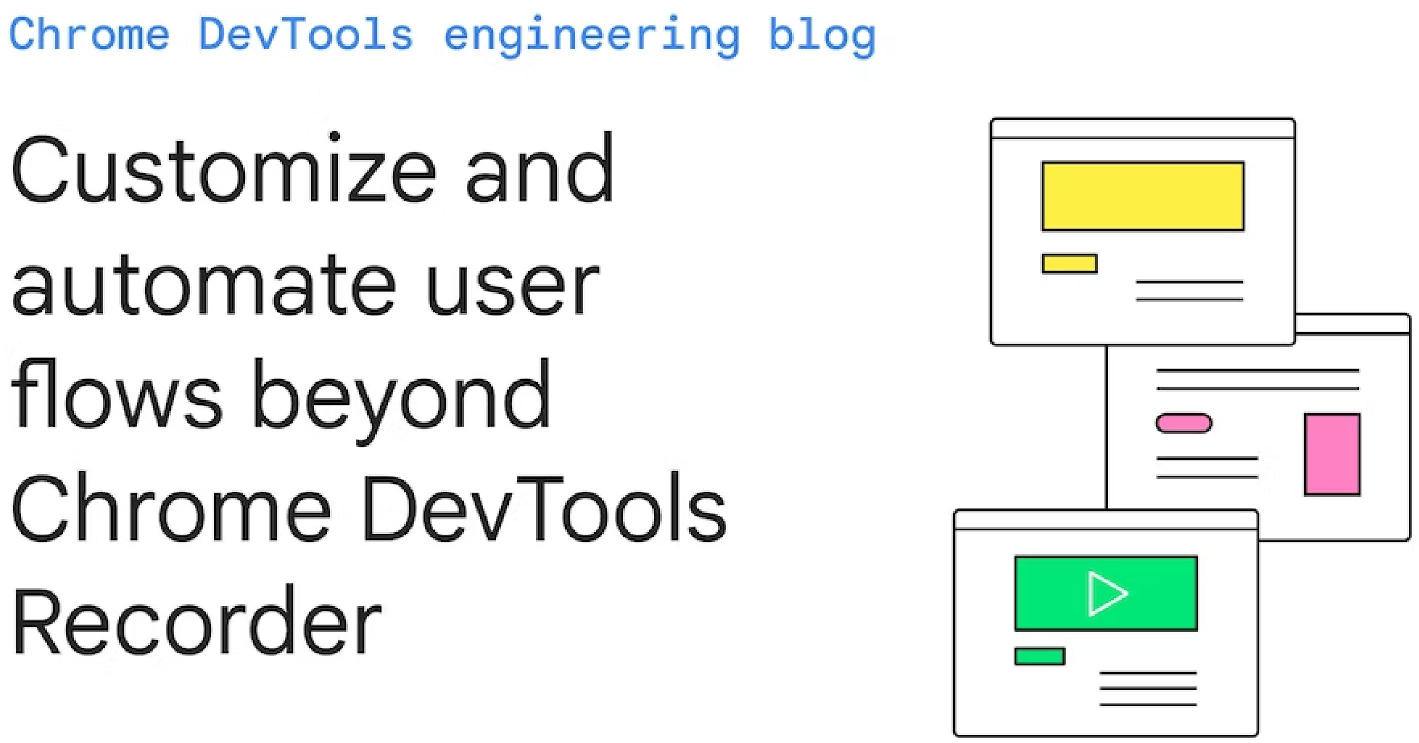
Chrome DevTools engineering blog
Customize and automate user flows beyond Chrome DevTools Recorder

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Let’s admit it, writing automated tests is not the most fun thing in a developer’s life. As developers, we want to write features, fix bugs, and improve the world! However, when we don’t have automated testing in our workflows, in the long term, things can get quite “buggy”. So, we also think that writing automated tests is important.

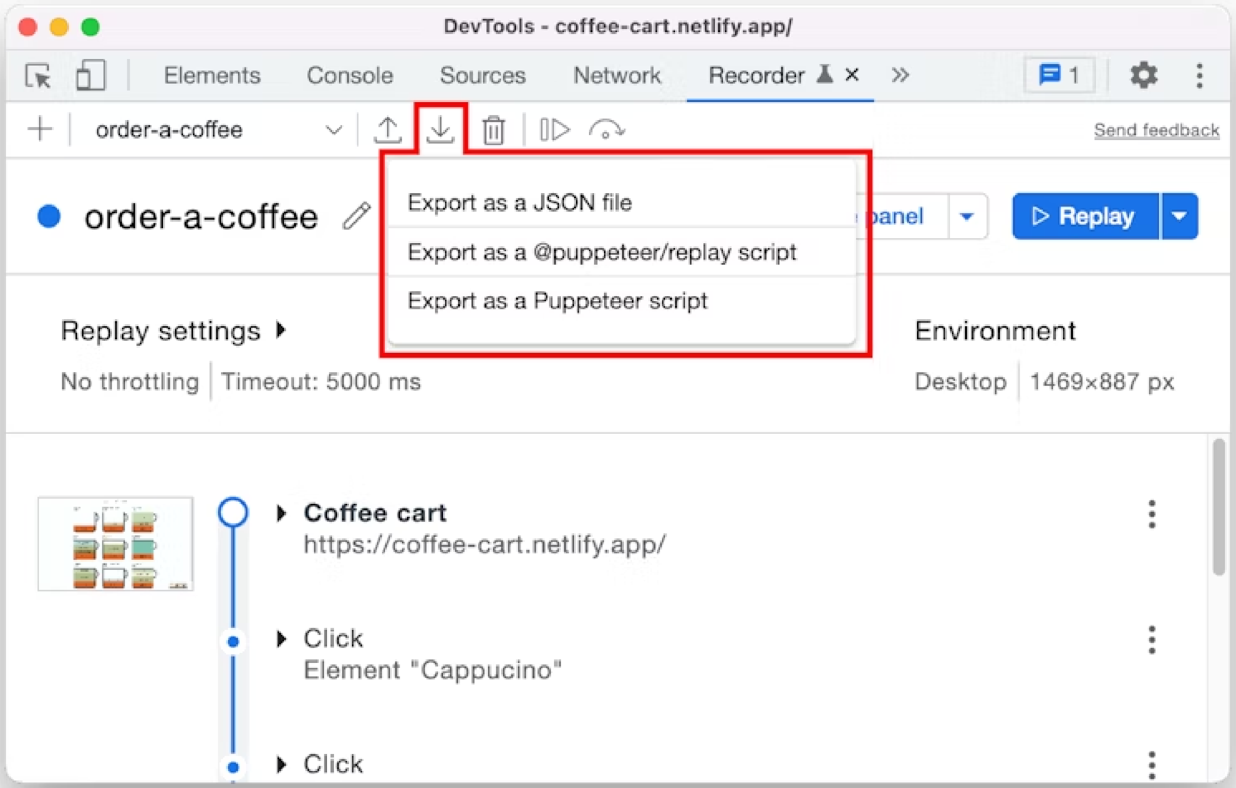
With the Recorder panel in Chrome DevTools, you can record and replay user flows, export them to various formats (for example, test scripts) through different third-party extensions and libraries, customize the user flows with Puppeteer Replay library, and integrate them with your existing workflows.

In this blog post, we’re going to discuss:

This blog post assumes you already know the basics of Recorder. If you are new to Recorder, follow this short introductory tutorial and video guide to get started.

Export user flows and replay programmatically

By default, the Recorder gives you the ability to export these recordings as a Puppeteer or Puppeteer Replay script, or as a plain JSON file.



Once you export the user flows as JSON files, you have the option to import it back to the Recorder panel and replay it, or to use external libraries to replay it. Puppeteer Replay library is one of the libraries available.

Let's say you save your JSON user flows in the `recordings` folder (for example, demo project), you can use the following command to execute one or more user flows:

```
# replay one user flow
npx @puppeteer/replay ./recordings/order-a-coffee.json

# replay all user flows under recordings folder
npx @puppeteer/replay ./recordings/*.json
```

Optionally, you can add an npm script for running the recordings; add this line to the `scripts` field in the `package.json`:

```
"replay-all": "replay recordings"
```

With that, you can run `npm run replay-all` in the command line to replay all recordings.

User flows replay without UI by default (also known as headless mode). If you would like to see the UI, set the `PUPPETEER_HEADLESS` environment variable to false before running the command.

```
PUPPETEER_HEADLESS=false npm run replay-all
```

Replay with third-party libraries

There are some third-party libraries you can use to replay beyond the Chrome browser. Here is the full list of libraries.

```
npm install -g testcafe

# replay with selected browsers
testcafe safari ./recordings/order-one-coffee.json
testcafe firefox ./recordings/order-one-coffee.json
testcafe chrome ./recordings/order-one-coffee.json

# replay with all browsers
testcafe all ./recordings/order-one-coffee.json
```

On the other hand, Saucelabs is a cloud-based test platform. It supports replaying JSON user flows with different browsers and versions on the cloud.

Here is an example configuration file in Saucelabs. Check out the demo repository.

```
apiVersion: v1alpha
kind: puppeteer-replay
suites:
  - name: "order a coffee"
    recordings: [ "recordings/order-a-coffee.json" ]
…
```

Export user flows with different extensions

Apart from the default options, you can also install extensions to export user flows to different formats.

For example, you can record and export the user flows as WebPageTest custom script. With the script, you can test the performance of multi-step user flows through your applications. Writing those scripts, however, can sometimes be challenging.

Additionally, if you already have testing tools in place, there are extensions to export user flows to different test scripts such as Cypress, Nightwatch, WebdriverIO, Testing Library, and more. Here is the full list. This could help you and your team start writing tests quicker.

Transform to different test scripts programmatically

For example, use the @cypress/chrome-recorder libraries to export user flows to Cypress tests.

```
npm install -g @cypress/chrome-recorder
npx @cypress/chrome-recorder ./recordings/*.json
```

Build your own extensions or libraries

Behind the scenes, all extensions and libraries are built on top of the Puppeteer Replay library. Apart from allowing you to replay user flows, Puppeteer Replay offers APIs letting you customize or transform user flows replay.

Customize user flows replay

Let’s build a screenshot plugin. For each user flow, we want:

- To take a screenshot at the end of every step and save it to the `_screenshots` folder.
- To output a message when the user flow execution is completed.

Here is the code snippet. You can download this demo and play with it too.

```
/* screenshot-plugin.mjs */

import { mkdirSync } from "fs";
import { PuppeteerRunnerExtension } from "@puppeteer/replay";

// create folder if not exist
let screenshotFolder = "_screenshots";
```

```
  async afterEachStep(step, flow) {
    await super.afterEachStep(step, flow);
    this.count = this.count + 1;

    const path = `${screenshotFolder}/${flow.title}-${this.count}.png`;
    await this.page.screenshot({ path });

    console.log(`Saved screenshot as ${path}`);
  }

  async afterAllSteps(step, flow) {
    await super.afterAllSteps(step, flow);
    console.log("Operation completed successfully.");
  }
}
```

The code is pretty expressive itself. We extend the `PuppeteerRunnerExtension` API to save the screenshot after each step, and to log a message after all the steps.

Save the file, then we can run user flows with this extension using the following command:

```
# replay one user flow with plugin
npx @puppeteer/replay --extension ./screenshot-plugin.mjs  ./recordings/order

# replay all user flows with plugin under recordings folder
npx @puppeteer/replay --extension ./screenshot-plugin.mjs ./recordings/*.json
```

Here is the output:

```
Operation completed successfully.
```

Transform user flows

Another way to customize the user flow is to transform it into different formats (for example,Cypress, or Nightwatch test scripts).

For example, your user flow contains a step to navigate to an url. Here is what the JSON file looks like:

```
{
  "title": "order-a-coffee",
  "steps": [
    {
      "type": "navigate",
      "url": "https://coffee-cart.netlify.app/"
    },
    …
  ]
}
```

You can create a stringify plugin to transform the step to JavaScript. You can also view other existing libraries to see how they do it.

For example, the following code snippet shows how WebdriverIO transforms the navigation step:

```
        return out.appendLine(`await browser.url(${formatAsJSLiteral(step.url
        …
  }
```

When you run the plugin with the user flows, the navigation line translates into `await browser.url('https://coffee-cart.netlify.app/')`.

Publish Chrome extensions

Once you customize and transform the user flows, you can package them as a Chrome extension and publish to the Chrome Web Store.

Check out this demo and instructions to learn how to debug locally and publish a Chrome extension.

Integrate with your CI/CD pipeline

There are multiple ways to do this and there are many tools out there. Here is an example of automating this process with GitHub Actions:

```
# .github/node.js.yml

name: Replay recordings

on:
  push:
    branches: [ "main" ]
  schedule:
    - cron: '30 12 * * *' # daily 12:30pm
    steps:
    - uses: actions/checkout@v3
    - name: Use Node.js
      uses: actions/setup-node@v3
      with:
        node-version: 18.x
        cache: 'npm'
    - run: npm install puppeteer
    - run: npm run replay-all
    - run: npm run start
```

In this example, we will replay the user flows when:

- new changes push to the `main` branch
- every day at 12:30pm

Apart from GitHub Actions, you can integrate with your favorite cloud providers too. Go to this demo to see how you can use Google Cloud Run Job to execute up to 10,000 user flows in parallel!

Conclusion

In this blog post, we've discussed the different options to export user flows as JSON files, customize replays with `PuppeteerReplayExtension`, transform user flows with `PuppeteerStringifyExtension`, and integrate them in your CI workflows.

I hope this blog post has given you some ideas about how you can use the Recorder panel and the tools provided to make it easier to integrate a testing workflow into your projects. Can't wait to see what you'll build!

edge web platform APIs, and find issues on your site before your users do!

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