

GNU LibreJS

for version 4.0.0, 13 April 2012

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This manual is for GNU LibreJS (version 4.0.0, 13 April 2012), a GNU IceCat extension to detect and block nonfree nontrivial JavaScript on webpages.

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LibreJS

This manual is for GNU LibreJS (version 4.0.0, 13 April 2012).

1 Overview

GNU LibreJS —an add-on for GNU IceCat and Mozilla Firefox— detects and blocks nonfree nontrivial JavaScript while allowing its execution on pages containing code that is either trivial and/or explicitly free.

Many websites run nontrivial JavaScript on your computer. Some use it for complex tasks; many use it gratuitously for minor jobs that could be done easily with plain HTML. Sometimes this JavaScript code is malicious. Either way, the JavaScript code is often nonfree. For explanation of the issue, see "The JavaScript Trap"(<http://www.gnu.org/philosophy/javascript-trap.html>).

If you care about freedom in your computing, and don't wish to let all and sundry make you run nonfree programs, now you can prevent it by using LibreJS.

2 Disclaimer

- LibreJS is not a security tool. Its goal is to detect nonfree nontrivial JavaScript, and it currently does not detect whether free or trivial code is malicious or not. Other free Mozilla extensions and add-ons may be available for this purpose.
- LibreJS is always a work in progress. If you find a bug, please report it to lduros@gnu.org.

3 Installation

You may install LibreJS directly using a generated ‘`librejs.xpi`’ file, or by building it from source.

3.1 Building the Package

After enabling the Add-on SDK, you should be able to use the `make` command to build LibreJS from source.

After running `make`, a new file, ‘`librejs.xpi`’ should be generated. This is the file that can be installed in a Mozilla browser.

3.2 Installing LibreJS

To install the add-on for all users, run:

```
sudo make install
```

or as root:

```
make install
```

Next time you open a Mozilla-browser as a user of your system, you should be notified that a new add-on (in this case, LibreJS) as been installed and whether to allow it to run or not.

4 How to Use

4.1 LibreJS in action

After installing the add-on, you will see the LibreJS widget in the add-on bar at the bottom of the browser window. After loading a page, left-click on the widget to view the deactivated JavaScript code from the page (both on page and external) and, if applicable, the scripts that were accepted.

4.2 Complaint Feature

It is very important to complain when a site has nonfree JavaScript code, especially if it won't work without that code. LibreJS makes it easy to complain by heuristically finding where to send the complaint.

When nonfree/nontrivial code is detected in a page, LibreJS attempts to find a relevant contact link or email for the website you are visiting. In order to do so, it will attempt to visit a few links from the current page (for instance, a link labeled “contact” on the same domain as the current page, ...)

LibreJS can currently detect and list contact pages with webforms, email addresses more likely to be owned by the maintainer of the site, Twitter and identi.ca links, phone numbers.

After LibreJS detects one or more of the above, a small tab will appear on the right of your screen with the LibreJS torch logo. When hovering over the tab, a large panel will slide in with the contact information. Ideally, at the top you will find the email address of the maintainer, labeled as the “Email you should use”.

When you complain to the website for their nonfree nontrivial JavaScript, provide them with the link to the JavaScript Trap essay so that they can get more information on what the issue is and how they can solve it on their own site.

4.3 Options

- LibreJS lets you whitelist domain names and subdomains to bypass the regular JavaScript check. This might be useful, for example, if you are running your own code in a local web server. In order to add a whitelisted domain or url, go to Tools >> Add-ons, or press **Control + Shift + A**. Inside the add-on window, click on “Extensions”, and in the list, where you see LibreJS, click on the “Preferences” button. You will see an input field labeled “Whitelist domain”. In the field, enter comma-separated domain names. Do not enter the protocol. For instance to whitelist all the pages of <http://www.gnu.org> and <https://gnu.org>, enter “gnu.org”. To allow all subdomains from gnu.org, enter: “*.gnu.org”. This will match such sites as <http://savannah.gnu.org> and <http://audio-video.gnu.org>.

5 JavaScript Detection

LibreJS considers JavaScript on a page as nontrivial if:

- it makes an AJAX request or is loaded along with scripts that make an AJAX request,
- it loads external scripts dynamically or is loaded along with scripts that do,
- it defines functions or methods and either loads an external script (from HTML) or is loaded as one,
- it uses dynamic JavaScript constructs that are difficult to analyze without interpreting the program or is loaded along with scripts that use such constructs. These constructs are:
 - using the `eval` function,
 - calling methods with the square bracket notation,
 - using any other construct than a string literal with certain methods (`Obj.write`, `Obj.createElement`, ...).

In practice, the JavaScript code in your page may be found trivial by LibreJS if, as a whole:

- it does not define functions and it does not load external scripts (with the HTML `src` attribute in a `<script>` tag);
- it does not make AJAX calls;
- it does not load external scripts with dynamic constructs;
- it does not use constructs that may be used to do any of the above in a non-obvious way (use of the `eval()` method, use of square bracket method calls, use of concatenation with certain constructs or method calls, ...)

However, in some instances, you may be required by LibreJS to add a stylized comment to JavaScript code that may be otherwise trivial.

When an external file defines a function/method, it becomes available to all other external scripts. That is the case if another script defines a function that makes AJAX calls, when an external script loads other scripts dynamically (which in turn could also make AJAX calls, ...), or when a script is written with constructs that may do any of these.

For instance, if your page contains the following:

```
<script src="jquery.js"></script>
<script>
$.doSomething();
</script>
```

While `$.doSomething();` may seem trivial, you will nevertheless have to add a stylized license comment on your main HTML page because the external script (in this case jQuery) has been found to define methods that make AJAX calls. `$.doSomething()` might make an AJAX call, and LibreJS does not check for that. The rule of thumb is that when you use a library or code that handles AJAX, JSON, JSONP, the loading of scripts dynamically, you should have license mentions for all your JavaScript files and for your main page regardless. In practice this is a case that happens very often with code that uses libraries.

In practice also, the JavaScript code in an external file (an external `.js` file loaded on your page) may be found trivial if it does not define functions/methods.

And in the same manner it will be considered nontrivial if AJAX calls, dynamic script loading, or non-obvious dynamic JavaScript constructs are used in another script.

6 Free Licenses Detection

6.1 Detected Free Licenses

In order for a file to be detected as free, the license notice should appear in a JavaScript file above all code, at the very top of the file.

For inline JavaScript code inside `<script>` tags in HTML pages, the license notice should appear once per page as a comment inside a `<script>` tag, before all the code in that script. When the only inline JavaScript code is within element attributes (`onload`, `onclick`), place the license notice in an otherwise empty `<script>` at the top of the page. This is sometimes needed when an external script performs AJAX calls or embeds scripts dynamically, and the only inline JavaScript is an event attribute making a method call, e.g.: `<body onload=''methodCall('remote-data.xml');''>`

Currently LibreJS checks for the following licenses:

- Apache License, Version 2.0 <http://www.apache.org/licenses/LICENSE-2.0>
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6.2 Undetected Free Licenses

If you are using a free license that isn't detected by LibreJS and isn't listed in the previous section, please send a message to lduros@gnu.org regarding this license, where code released under this license can be found, and where to find the license text and information.

Many free licenses are listed in this page: <http://www.gnu.org/licenses/license-list.html>

7 Setting Your JavaScript Free

Do you own or maintain a website? If so, you can take a stand for user freedom. All you need to do is to release your JavaScript code under a free license that will be easily identified by users while visiting your pages. If you are already using a free library or made a JavaScript app from scratch, it might only take a few minutes!

All JavaScript code on a page (inline, on-page, and external) shares a common scope, and thus is generally either rejected or accepted as a whole by LibreJS. If some JavaScript code is found to be nontrivial and nonfree, then most of the time, all the the rest is discarded as well.

On your website, by taking a look at your HTML source, you can identify distinct pieces of JavaScript that might be free and some other that are nonfree.

Tip: By running LibreJS on your page, you will get a list of all the JavaScript that was blocked while loading. This can help give you an overview of the JavaScript in your page.

Imagine a page that would contain several pieces of JavaScript from various sources:

- On top, within the `<head>` tag, it may have a link to a jQuery library file,
- under, some JavaScript code that you have written,
- at the bottom a JavaScript-based Facebook widget,
- and an Analytics tracker.
- JavaScript that is already free First, you must ensure that the library is free. If the file contains a copyright and a license notice, you may not need to look further. But if no mention of the license is made or if it is too brief, you may have to look for a COPYING or LICENSE file within the original library source package or on the official website of the library.
- Your own JavaScript The free license given to your code should be compatible with the rest of the JavaScript on a page. A good way to check is to read up on them: <http://www.gnu.org/licenses/license-list.html>
- Nonfree JavaScript More likely than not, some of the JavaScript on your page will be nonfree. This might be the case with an Analytics tracker, social media widgets, and code that runs ads. Removing these pieces of code from your site is required in order to have the rest accepted as free. There are often alternatives to nonfree libraries or to third-party services:
 - If you have used nonfree third-party code as the base to write your own code, try to find a free alternative.
 - If you are using a third-party service such as an Analytics service, replace it with a free alternative such as Piwik.
 - And if you really cannot find free JavaScript that has already been developed, write it yourself! Who knows, your own solution might be the start of a brilliant project!

7.1 Adding a stylized comment in your JavaScript files and on your page

Once you have identified all JavaScript and replaced or removed the nonfree ones, you can start adding explicit license notices in your JavaScript files and on your pages. Starting from the external files is probably easier. You can use long license notices.

See a “Convention for releasing free JavaScript programs” in the JavaScript Trap <http://www.gnu.org/philosophy/javascript-trap.html>

Adding this notice will ensure LibreJS will find the JavaScript file to be free. The `@licstart` and `@licend` lines at the beginning and end of the stylized comment are necessary to make a clear statement that the *entire code* in the file is free. This means that you must ensure no nonfree code was carelessly appended at the end of the file.

For the main HTML page, what the license notice will cover is the JavaScript contained in all `<script>` with on-page code and the inline

JavaScript (in event attributes such as `onload`, `onclick`, etc, ...). Since external files have their own stylized comment, they are not covered by the notice in the main HTML page. Make sure to identify all the licenses available. LibreJS will only ensure it matches a notice of an allowed license once, so the order does not matter, but the responsibility is on you to make sure all code is under the free licenses mentioned between `@licstart` and `@licend`.

You should make *only* one `@licstart @licend` comment in your page, since it pertains to the entire code on page across all `<script>` tags and inline html attributes.

7.2 JavaScript Web Labels

You can also choose to publish license information about your external JavaScript files using the JavaScript Web Labels method. Extensive information on JavaScript Web Label is detailed at the following URL: <http://www.gnu.org/licenses/javascript-labels.html>

The JavaScript Web Labels allow you to easily provide –in the same time– information for LibreJS and for your users. All it requires is to create a page listing JavaScript files and the canonical urls of their free licenses.

Appendix A Installation Requirements

A.1 Mozilla Browser

You will need one of the many flavors of the Mozilla browser to use LibreJS. It can be installed on the following:

GNU IceCat, Mozilla Firefox, Trisquel Abrowser, Debian Iceweasel.

While LibreJS works on these browsers starting from version 4, we recommend you use the latest version of your Mozilla browser. LibreJS has been tested extensively on multiple GNU/Linux distributions, but it is also compatible with other operating systems running a version of the Mozilla browser.

A.2 Mozilla's Add-on SDK

LibreJS uses the Mozilla Add-on SDK (Software Development Kit), a powerful set of APIs and tools to create add-ons for Mozilla browsers.

You do not need the Add-on SDK to use LibreJS xpi file or to install it using the packaged version, but it is required in order to package the LibreJS source code into an xpi file using **make**. If you would like to run the tests for LibreJS or make changes to the source files, you will need the Add-on SDK as well. For the “make” command to work properly, you must have the **cfx** command available on your system from the command line.

The latest tarball for the Add-on SDK is available at:

<https://ftp.mozilla.org/pub/mozilla.org/labs/jetpack/jetpack-sdk-latest.tar.gz>

Instructions on how to get it working are available here:

<https://addons.mozilla.org/en-US/developers/docs/sdk/latest/dev-guide/tutorials/installat>

In order to use **make** with LibreJS source, however, it is ideal to have **cfx** available at all times and for all users.

An easy way to do this is to extract the contents of the tarball and to place the files inside ‘/usr/lib/addon-sdk’ and then creating a symbolic link in ‘/usr/bin’, as follows:

```
sudo ln -s /usr/lib/addon-sdk/bin/cfx /usr/bin/cfx
```

The **cfx** command will then be available to all users.

The Add-on SDK is released under the Mozilla Public License 2.0.

Appendix B LibreJS Internals

LibreJS intercepts http responses and rewrites their contents after analyzing JavaScript within them. It does not remove script nodes and attributes from the page, but instead “deactivate” them by modifying the type and src attributes on script elements and by moving the contents of inline JavaScript attributes such as onClick into harmless attributes.

LibreJS detects the most common cases using the http response method described above, but in extremely rare cases, or when running code locally, LibreJS cannot detect JavaScript during the response stage.

To remedy this issue and as a final safeguard, LibreJS takes a look at the scripts that are about to be executed while the browser engine is parsing the page. If the script is not found in a list of accepted scripts populated earlier, the execution will be prevented. This is to ensure content types that are not regular html (binhex with html in it, ...) and JavaScript do not fall through the cracks and get executed.

Appendix C Tests

In order to better understand how LibreJS works, you can try to visit these pages with LibreJS installed and enabled and see how they are being processed:

- <http://lduros.net/assets/librejs/tests/trivial-inline-trivial-external/>
This page contains trivial on-page JavaScript code, and an external script that contains trivial JavaScript code. Therefore, all JavaScript is being executed.
- <http://lduros.net/assets/librejs/tests/trivial-inline-nontrivial-external/>
The on-page script here is trivial and uses a built-in method, but the external script in this page is nontrivial (defines a function.) The external script is blocked, the inline script is executed.
- <http://lduros.net/assets/librejs/tests/nontrivial-inline-trivial-external/>
This page contains nontrivial code on page, and trivial code in its external page. All JavaScript is *removed* from the page, and the external script is never analyzed, since the nontrivial conditions are already met in the page.
- <http://lduros.net/assets/librejs/tests/free-inline-free-external/> This page contains free on-page (GPL 3) JavaScript, and free external Javascript. Therefore all JavaScript is being executed.
- <http://lduros.net/assets/librejs/tests/free-inline-nonfree-nontrivial-external/>
This page contains free on-page JavaScript. The external script contains nonfree nontrivial JavaScript (AJAX request). The free code that is inline is executed, but the external file is blocked.
- <http://lduros.net/assets/librejs/tests/intrinsec-event/> This page contains trivial on-page code, with an intrinsec event in an html attribute (onload). All JavaScript is being executed.
- <http://lduros.net/assets/librejs/tests/trivial-inline-free-external-defines-function/>
This page contains on-page trivial JavaScript (only makes a window alert and loads an external script using the html <script> tag with the src attribute. The external script is free (GPL v3), and since it is only nontrivial because it defines a function, the on-page trivial code is allowed to use it. All JavaScript is being executed.
- <http://lduros.net/assets/librejs/tests/trivial-inline-free-external-writes-script/>
This page contains trivial on-page JavaScript code, and loads an external script that is free. Since no function is defined, the external script is being analyzed. The external script is free. Trivial here is not allowed because the external script, although free, writes a script. The inline trivial script should also have a free license notice for it to be interpreted.
- <http://lduros.net/assets/librejs/tests/shelltypist/demo/real-life-example-with-jquery-f>
This is a real-life example of a small jQuery plugin. The on-page JavaScript code has a free license. The jQuery external file has a free licensed. The shelltypist.js file has a free license as well. All licenses are defined between @licstart and @licend. All JavaScript is executed.
- <http://lduros.net/assets/librejs/tests/shelltypist/demo/same-page-without-free-license.f>
This is the same page than the previous example, except it does not have a free license for the main HTML page on-page script. While the actual code there is trivial, since

jQuery defines methods that make use of AJAX, trivial code is not allowed, and no JavaScript is executed.

- <http://lduros.net/assets/librejs/tests/test-labels/> This page contains JavaScript (jQuery minified) that does not have proper license information in the file, as it has no `@licstart @licend` comment. It would be considered nonfree, however, the page itself uses the JavaScript Web Labels method. On the page itself, you will find a link labeled “JavaScript License Information”, which leads to a page that contains a properly formatted table with the required data on the external JavaScript file. LibreJS visits this link and determines the version of jQuery linked from the original page is the one listed there, and flags it as free. All JavaScript is executed (and the title should turn green.)

Appendix D GNU Free Documentation License

Version 1.3, 3 November 2008

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