
Django-CSP Documentation

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django-csp adds Content-Security-Policy headers to Django applications.

Version 3.7

Code <https://github.com/mozilla/django-csp>

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Issues <https://github.com/mozilla/django-csp/issues>

Contents:

CHAPTER 1

Installing django-csp

First, install django-csp via pip or from source:

```
# pip
$ pip install django-csp
```

```
# source
$ git clone https://github.com/mozilla/django-csp.git
$ cd django-csp
$ python setup.py install
```

Now edit your project's settings module, to add the django-csp middleware to MIDDLEWARE, like so:

```
MIDDLEWARE = (
    # ...
    'csp.middleware.CSPMiddleware',
    # ...
)
```

That should do it! Go on to *configuring CSP*.

Configuring django-csp

Content-Security-Policy is a complicated header. There are many values you may need to tweak here.

Note: Note when a setting requires a tuple or list. Since Python strings are iterable, you may get very strange policies and errors.

It's worth reading the latest CSP spec and making sure you understand it before configuring django-csp.

2.1 Policy Settings

These settings affect the policy in the header. The defaults are in *italics*.

Note: The “special” source values of 'self', 'unsafe-inline', 'unsafe-eval', 'none' and hash-source ('sha256-...') must be quoted! e.g.: `CSP_DEFAULT_SRC = ('self',)`. Without quotes they will not work as intended.

CSP_DEFAULT_SRC Set the default-src directive. A tuple or list of values, e.g. `('self', 'cdn.example.net')`. *self*

CSP_SCRIPT_SRC Set the script-src directive. A tuple or list. *None*

CSP_SCRIPT_SRC_ATTR Set the script-src-attr directive. A tuple or list. *None*

CSP_SCRIPT_SRC_ELEM Set the script-src-elem directive. A tuple or list. *None*

CSP_IMG_SRC Set the img-src directive. A tuple or list. *None*

CSP_OBJECT_SRC Set the object-src directive. A tuple or list. *None*

CSP_PREFETCH_SRC Set the prefetch-src directive. A tuple or list. *None*

CSP_MEDIA_SRC Set the media-src directive. A tuple or list. *None*

CSP_FRAME_SRC Set the `frame-src` directive. A tuple or list. *None*

CSP_FONT_SRC Set the `font-src` directive. A tuple or list. *None*

CSP_CONNECT_SRC Set the `connect-src` directive. A tuple or list. *None*

CSP_STYLE_SRC Set the `style-src` directive. A tuple or list. *None*

CSP_STYLE_SRC_ATTR Set the `style-src-attr` directive. A tuple or list. *None*

CSP_STYLE_SRC_ELEM Set the `style-src-elem` directive. A tuple or list. *None*

CSP_BASE_URI Set the `base-uri` directive. A tuple or list. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_CHILD_SRC Set the `child-src` directive. A tuple or list. *None* Note: Deprecated in CSP v3. Use `frame-src` and `worker-src` instead.

CSP_FRAME_ANCESTORS Set the `frame-ancestors` directive. A tuple or list. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_NAVIGATE_TO Set the `navigate-to` directive. A tuple or list. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_FORM_ACTION Set the `FORM_ACTION` directive. A tuple or list. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_SANDBOX Set the `sandbox` directive. A tuple or list. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_REPORT_URI Set the `report-uri` directive. A tuple or list. Each URI can be a full or relative URI. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_REPORT_TO Set the `report-to` directive. A string describing a reporting group. *None* Note: This doesn't use `default-src` as a fall-back. See Section 1.2: <https://w3c.github.io/reporting/#group>

CSP_MANIFEST_SRC Set the `manifest-src` directive. A tuple or list. *None*

CSP_WORKER_SRC Set the `worker-src` directive. A tuple or list. *None*

CSP_PLUGIN_TYPES Set the `plugin-types` directive. A tuple or list. *None* Note: This doesn't use `default-src` as a fall-back.

CSP_REQUIRE_SRI_FOR Set the `require-sri-for` directive. A tuple or list. *None* Valid values: `script`, `style`, or `both`. See: [require-sri-for-known-tokens](#) Note: This doesn't use `default-src` as a fall-back.

CSP_UPGRADE_INSECURE_REQUESTS Include `upgrade-insecure-requests` directive. A boolean. *False* See: [upgrade-insecure-requests](#)

CSP_REQUIRE_TRUSTED_TYPES_FOR Include `require-trusted-types-for` directive. A tuple or list. *None* Valid values: `'script'` Note: This doesn't use `default-src` as a fall-back.

CSP_TRUSTED_TYPES Include `trusted-types` directive. A tuple of list. *This header is empty by default* Valid values: a list of allowed policy names that may include `default` and/or `'allow-duplicates'` Note: This doesn't use `default-src` as a fall-back.

CSP_BLOCK_ALL_MIXED_CONTENT Include `block-all-mixed-content` directive. A boolean. *False* See: [block-all-mixed-content](#)

CSP_INCLUDE_NONCE_IN Include dynamically generated nonce in all listed directives, e.g. `CSP_INCLUDE_NONCE_IN=['script-src']` will add `'nonce-<b64-value>'` to the `script-src` directive. A tuple or list. *None*

2.1.1 Changing the Policy

The policy can be changed on a per-view (or even per-request) basis. See the *decorator documentation* for more details.

2.2 Other Settings

These settings control the behavior of django-csp. Defaults are in *italics*.

CSP_REPORT_ONLY Send “report-only” headers instead of real headers. See the *spec* and the chapter on *reports* for more info. A boolean. *False*

CSP_EXCLUDE_URL_PREFIXES A **tuple** of URL prefixes. URLs beginning with any of these will not get the CSP headers. *()*

Warning: Excluding any path on your site will eliminate the benefits of CSP everywhere on your site. The typical browser security model for JavaScript considers all paths alike. A Cross-Site Scripting flaw on, e.g., *excluded-page/* can therefore be leveraged to access everything on the same origin.

Modifying the Policy with Decorators

Content Security Policies should be restricted and paranoid by default. You may, on some views, need to expand or change the policy. `django-csp` includes four decorators to help.

3.1 `@csp_exempt`

Using the `@csp_exempt` decorator disables the CSP header on a given view.

```
from csp.decorators import csp_exempt

# Will not have a CSP header.
@csp_exempt
def myview(request):
    return render(...)
```

You can manually set this on a per-response basis by setting the `_csp_exempt` attribute on the response to `True`:

```
# Also will not have a CSP header.
def myview(request):
    response = render(...)
    response._csp_exempt = True
    return response
```

3.2 `@csp_update`

The `@csp_update` header allows you to **append** values to the source lists specified in the settings. If there is no setting, the value passed to the decorator will be used verbatim.

Note: To quote the CSP spec: “There’s no inheritance; ... the default list is not used for that resource type” if it is set. E.g., the following will not allow images from ‘self’:

```
default-src 'self'; img-src imgsrv.com
```

The arguments to the decorator the same as the *settings* without the `CSP_` prefix, e.g. `IMG_SRC`. (They are also case-insensitive.) The values are either strings, lists or tuples.

```
from csp.decorators import csp_update

# Will allow images from imgsrv.com.
@csp_update(IMG_SRC='imgsrv.com')
def myview(request):
    return render(...)
```

3.3 @csp_replace

The `@csp_replace` decorator allows you to **replace** a source list specified in settings. If there is no setting, the value passed to the decorator will be used verbatim. (See the note under `@csp_update`.)

The arguments and values are the same as `@csp_update`:

```
from csp.decorators import csp_replace

# settings.CSP_IMG_SRC = ['imgsrv.com']
# Will allow images from imgsrv2.com, but not imgsrv.com.
@csp_replace(IMG_SRC='imgsrv2.com')
def myview(request):
    return render(...)
```

3.4 @csp

If you need to set the entire policy on a view, ignoring all the settings, you can use the `@csp` decorator. The arguments and values are as above:

```
from csp.decorators import csp

@csp(DEFAULT_SRC=["'self'"], IMG_SRC=['imgsrv.com'],
      SCRIPT_SRC=['scriptsrv.com', 'googleanalytics.com'])
def myview(request):
    return render(...)
```

Using the generated CSP nonce

When `CSP_INCLUDE_NONCE_IN` is configured, the nonce value is returned in the CSP header. To actually make the browser do anything with this value, you will need to include it in the attributes of the tags that you wish to mark as safe.

4.1 Middleware

Installing the middleware creates a lazily evaluated property `csp_nonce` and attaches it to all incoming requests.

```
MIDDLEWARE_CLASSES = (  
    #...  
    'csp.middleware.CSPMiddleware',  
    #...  
)
```

This value can be accessed directly on the request object in any view or template and manually appended to any script element like so -

```
<script nonce="{{request.csp_nonce}}">  
    var hello="world";  
</script>
```

Assuming the `CSP_INCLUDE_NONCE_IN` list contains the `script-src` directive, this will result in the above script being allowed.

4.2 Context Processor

This library contains an optional context processor, adding `csp.context_processors.nonce` to your configured context processors exposes a variable called `CSP_NONCE` into the global template context. This is simple shorthand for `request.csp_nonce`, but can be useful if you have many occurrences of script tags.

```
<script nonce="{{CSP_NONCE}}">
    var hello="world";
</script>
```

4.3 Django Template Tag/Jinja Extension

Note: If you're making use of `csp.extensions.NoncedScript` you need to have `jinja2>=2.9.6` installed, so please make sure to either use `django-csp[jinja2]` in your requirements or define it yourself.

Since it can be easy to forget to include the `nonce` property in a script tag, there is also a `script` template tag available for both Django templates and Jinja environments.

This tag will output a properly nonced script every time. For the sake of syntax highlighting, you can wrap the content inside of the `script` tag in `<script>` html tags, which will be subsequently removed in the rendered output. Any valid script tag attributes can be specified and will be forwarded into the rendered html.

Django:

```
{% load csp %}
{% script type="application/javascript" async=False %}
    <script>
        var hello='world';
    </script>
{% endscript %}
```

Jinja:

(assumes `csp.extensions.NoncedScript` is added to the `jinja` extensions setting)

```
{% script type="application/javascript" async=False %}
    <script>
        var hello='world';
    </script>
{% endscript %}
```

Will output -

```
<script nonce='123456' type="application/javascript" async=false>var hello='world';</
↪script>
```

Implementing Trusted Types with CSP

5.1 DOM Cross-site Scripting

Cross-site scripting (XSS) is one of the most prevalent vulnerabilities on the web. Nonce-based CSP is used to prevent server-side XSS. Trusted Types are used to prevent client-side or [DOM-XSS](#). Trusted Types rely on the browser to enforce the policy that is provided to it. Currently, Trusted Types are supported on Chrome 83 and Android Webview. Many browsers are in the process of adding support. Check back for updated [compatibility](#).

Follow the simple steps below to make your web application Trusted Types compliant.

5.2 Step 1: Enable Trusted Types and Report Only Mode

Trusted Types require data to be processed before being sent to a risky “sink” where DOM XSS might occur, such as when assigning to `Element.innerHTML` or calling `document.write`. When enforced, Trusted Types will tell the browser to block any data that is not properly processed. In order to avoid this, you must fix offending parts of your code. To see where adjustments will be required, turn on trusted types and report only mode.

Configure `django-csp` so that `CSP_REQUIRE_TRUSTED_TYPES_FOR` is set to `'script'`.

Configure `django-csp` so that `CSP_REPORT_ONLY` is set to `True`.

Configure `django-csp` so that `CSP_REPORT_URI` is set to an app or CSP report processing service that you control.

Now trusted types violations will be reported to your `CSP_REPORT_URI` without blocking any of your application’s functionalities.

5.3 Step 2: Fixing Trusted Types Violations

There are four ways to resolve trusted types violations. They are explained here in order of preference.

5.3.1 Rewrite the Code

It may be possible for your code to be rewritten without using dangerous functions. For example, instead of dynamically placing an image using the dangerous `innerHTML` sink, the image could be created with `document.createElement` and placed using the `appendChild` function.

Rewriting may be possible for any of the dangerous sinks, which are listed here.

- **Script manipulation:**

- **`<script src>` and setting text content of `<script>` elements.**

- * Tip: Avoid creating scripts at run time
- * Tip: Create a policy with a URL stringifier to verify scripts are from a trusted origin

- **Generating HTML from a string:**

- **`innerHTML`, `outerHTML`, `insertAdjacentHTML`, `<iframe>` `srcdoc`, `document.write`, `document.w`**

- * Tip: Use `textContent` instead of inner HTML
- * Tip: Use a templating library that supports Trusted Types
- * Tip: Use `createElement` and `appendChild` as explained above

- **Executing plugin content:**

- **`<embed src>`, `<object data>` and `<object codebase>`**

- * Tip: Consider limiting plugin content by setting `“CSP_OBJECT_SRC”` to *none*

- **Runtime JavaScript code compilation:**

- **`eval`, `setTimeout`, `setInterval`, and `new Function()`**

- * Tip: Avoid using `eval` entirely
- * Tip: Avoid passing strings to runtime compiled functions

5.3.2 Use a Library

When code cannot be rewritten to avoid dangerous sinks, Trusted Types require that data be processed before being passed to a dangerous sink. Processed data is wrapped in a `TrustedHTML`, `TrustedScript`, or `TrustedScriptURL` object to certify that it has been sanitized or otherwise assured to be safe in the given context. Some libraries will process data and return Trusted Types objects for you. For example, [DOMPurify](#) supports Trusted Types.

Note: Libraries are preferred to writing your own sanitation policies since they are generally more comprehensive, secure, and well reviewed.

5.3.3 Create Trusted Types Policies

Where code cannot be rewritten and an existing library cannot be used, you will have to create Trusted Types objects yourself. This is done using policies. Different policies can be created for use in different contexts. Policies produce Trusted Types after enforcing security rules on their input based on the sink context. Each policy should be given a distinct name.

Here is an example policy that sanitizes HTML by escaping the `<` character.

```
if (window.trustedTypes && trustedTypes.createPolicy) {
  const escapeHTMLPolicy = trustedTypes.createPolicy('myEscapePolicy', {
    createHTML: string => string.replace(/\</g, '&lt;');
  });
}
```

Here is an example of how that policy can be used.

```
const escaped = escapeHTMLPolicy.createHTML('<img src=x onerror=alert(1)>');
console.log(escaped instanceof TrustedHTML);
el.innerHTML = escaped;
```

Note: Keep in mind that you are creating your own security rules with policies. Your application is only protected from DOM XSS if you use strict sanitation rules that consider which sink is accepting the data.

5.3.4 Use a Default Policy

In the event that you don't have control over the offending code, you can use a default policy. This may happen if you are loading a third party library that is not Trusted Types compliant. A default policy is defined the same way as any other Trusted Types policy. In order to be used by the browser as the default policy it must be named *default*.

The policy called *default* will be used wherever a string is sent to a dangerous sink that requires Trusted Types.

5.4 Step 3: Enforce Trusted Types

Once you have addressed all of the Trusted Types violations present in your application, you can begin enforcing Trusted Types to prevent DOM XSS.

Configure django-csp so that `CSP_REPORT_ONLY` is set to *False*.

Note: To learn more about trusted types or learn how to limit policy creation with `CSP_TRUSTED_TYPES` take a look at the complete [spec](#) or the [article](#) this guide is based on.

CSP Violation Reports

When something on a page violates the Content-Security-Policy, and the policy defines a `report-uri` directive, the user agent may POST a [report](#). Reports are JSON blobs containing information about how the policy was violated.

Note: `django-csp` no longer handles report processing itself, so you will need to stand up your own app to receive them, or else make use of a third-party report processing service.

6.1 Throttling the number of reports

To throttle the number of requests made to your `report-uri` endpoint, you can use `csp.contrib.rate_limiting.RateLimitedCSPMiddleware` instead of `csp.middleware.CSPMiddleware` and set the `CSP_REPORT_PERCENTAGE` option:

CSP_REPORT_PERCENTAGE Percentage of requests that should see the `report-uri` directive. Use this to throttle the number of CSP violation reports made to your `CSP_REPORT_URI`. A **float** between 0 and 1 (0 = no reports at all). Ignored if `CSP_REPORT_URI` isn't set.

Patches are more than welcome! You can find the issue tracker [on GitHub](#) and we'd love pull requests.

7.1 Style

Patches should follow [PEP8](#) and should not introduce any new violations as detected by the [flake8](#) tool.

7.2 Tests

Patches fixing bugs should include regression tests (ideally tests that fail without the rest of the patch). Patches adding new features should test those features thoroughly.

To run the tests, install the requirements (probably into a [virtualenv](#)):

```
pip install -e .  
pip install -e .[tests]
```

Then just [py.test](#) to run the tests:

```
py.test
```


CHAPTER 8

Indices and tables

- `genindex`
- `modindex`
- `search`