web\_apiweb\_api

<https://developer.mozilla.org/en-US/docs/Web/API>

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# console

<https://developer.mozilla.org/en-US/docs/Web/API/console>

The **console** object provides access to the browser's debugging console (e.g. the [Web console](https://firefox-source-docs.mozilla.org/devtools-user/web_console/index.html) in Firefox). The specifics of how it works varies from browser to browser, but there is a de facto set of features that are typically provided.

The console object can be accessed from any global object. [Window](https://developer.mozilla.org/en-US/docs/Web/API/Window) on browsing scopes and [WorkerGlobalScope](https://developer.mozilla.org/en-US/docs/Web/API/WorkerGlobalScope) as specific variants in workers via the property console. It's exposed as [Window.console](https://developer.mozilla.org/en-US/docs/Web/API/Window/console), and can be referenced as console. For example:

console.log("Failed to open the specified link");

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This page documents the [Methods](https://developer.mozilla.org/en-US/docs/Web/API/console#methods) available on the console object and gives a few [Usage](https://developer.mozilla.org/en-US/docs/Web/API/console#usage) examples.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/console#methods)

[console.assert()](https://developer.mozilla.org/en-US/docs/Web/API/console/assert)

Log a message and stack trace to console if the first argument is false.

[console.clear()](https://developer.mozilla.org/en-US/docs/Web/API/console/clear)

Clear the console.

[console.count()](https://developer.mozilla.org/en-US/docs/Web/API/console/count)

Log the number of times this line has been called with the given label.

[console.countReset()](https://developer.mozilla.org/en-US/docs/Web/API/console/countReset)

Resets the value of the counter with the given label.

[console.debug()](https://developer.mozilla.org/en-US/docs/Web/API/console/debug)

Outputs a message to the console with the log level debug.

[console.dir()](https://developer.mozilla.org/en-US/docs/Web/API/console/dir)

Displays an interactive listing of the properties of a specified JavaScript object. This listing lets you use disclosure triangles to examine the contents of child objects.

[console.dirxml()](https://developer.mozilla.org/en-US/docs/Web/API/console/dirxml)

Displays an XML/HTML Element representation of the specified object if possible or the JavaScript Object view if it is not possible.

[console.error()](https://developer.mozilla.org/en-US/docs/Web/API/console/error)

Outputs an error message. You may use [string substitution](https://developer.mozilla.org/en-US/docs/Web/API/console#using_string_substitutions) and additional arguments with this method.

console.exception() Non-standard Deprecated

An alias for error().

[console.group()](https://developer.mozilla.org/en-US/docs/Web/API/console/group)

Creates a new inline [group](https://developer.mozilla.org/en-US/docs/Web/API/console#using_groups_in_the_console), indenting all following output by another level. To move back out a level, call groupEnd().

[console.groupCollapsed()](https://developer.mozilla.org/en-US/docs/Web/API/console/groupCollapsed)

Creates a new inline [group](https://developer.mozilla.org/en-US/docs/Web/API/console#using_groups_in_the_console), indenting all following output by another level. However, unlike group() this starts with the inline group collapsed requiring the use of a disclosure button to expand it. To move back out a level, call groupEnd().

[console.groupEnd()](https://developer.mozilla.org/en-US/docs/Web/API/console/groupEnd)

Exits the current inline [group](https://developer.mozilla.org/en-US/docs/Web/API/console#using_groups_in_the_console).

[console.info()](https://developer.mozilla.org/en-US/docs/Web/API/console/info)

Informative logging of information. You may use [string substitution](https://developer.mozilla.org/en-US/docs/Web/API/console#using_string_substitutions) and additional arguments with this method.

[console.log()](https://developer.mozilla.org/en-US/docs/Web/API/console/log)

For general output of logging information. You may use [string substitution](https://developer.mozilla.org/en-US/docs/Web/API/console#using_string_substitutions) and additional arguments with this method.

[console.profile()](https://developer.mozilla.org/en-US/docs/Web/API/console/profile) Non-standard

Starts the browser's built-in profiler (for example, the [Firefox performance tool](https://firefox-source-docs.mozilla.org/devtools-user/performance/index.html)). You can specify an optional name for the profile.

[console.profileEnd()](https://developer.mozilla.org/en-US/docs/Web/API/console/profileEnd) Non-standard

Stops the profiler. You can see the resulting profile in the browser's performance tool (for example, the [Firefox performance tool](https://firefox-source-docs.mozilla.org/devtools-user/performance/index.html)).

[console.table()](https://developer.mozilla.org/en-US/docs/Web/API/console/table)

Displays tabular data as a table.

[console.time()](https://developer.mozilla.org/en-US/docs/Web/API/console/time)

Starts a [timer](https://developer.mozilla.org/en-US/docs/Web/API/console#timers) with a name specified as an input parameter. Up to 10,000 simultaneous timers can run on a given page.

[console.timeEnd()](https://developer.mozilla.org/en-US/docs/Web/API/console/timeEnd)

Stops the specified [timer](https://developer.mozilla.org/en-US/docs/Web/API/console#timers) and logs the elapsed time in milliseconds since it started.

[console.timeLog()](https://developer.mozilla.org/en-US/docs/Web/API/console/timeLog)

Logs the value of the specified [timer](https://developer.mozilla.org/en-US/docs/Web/API/console#timers) to the console.

[console.timeStamp()](https://developer.mozilla.org/en-US/docs/Web/API/console/timeStamp) Non-standard

Adds a marker to the browser performance tool's timeline ([Chrome](https://developer.chrome.com/docs/devtools/evaluate-performance/reference/) or [Firefox](https://profiler.firefox.com/docs/#/./guide-ui-tour-timeline)).

[console.trace()](https://developer.mozilla.org/en-US/docs/Web/API/console/trace)

Outputs a [stack trace](https://developer.mozilla.org/en-US/docs/Web/API/console#stack_traces).

[console.warn()](https://developer.mozilla.org/en-US/docs/Web/API/console/warn)

Outputs a warning message. You may use [string substitution](https://developer.mozilla.org/en-US/docs/Web/API/console#using_string_substitutions) and additional arguments with this method.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/console#examples)

### [Outputting text to the console](https://developer.mozilla.org/en-US/docs/Web/API/console#outputting_text_to_the_console)

The most frequently-used feature of the console is logging of text and other data. There are several categories of output you can generate, using the [console.log()](https://developer.mozilla.org/en-US/docs/Web/API/console/log), [console.info()](https://developer.mozilla.org/en-US/docs/Web/API/console/info), [console.warn()](https://developer.mozilla.org/en-US/docs/Web/API/console/warn), [console.error()](https://developer.mozilla.org/en-US/docs/Web/API/console/error), or [console.debug()](https://developer.mozilla.org/en-US/docs/Web/API/console/debug) methods. Each of these results in output styled differently in the log, and you can use the filtering controls provided by your browser to only view the kinds of output that interest you.

There are two ways to use each of the output methods; you can pass in a list of objects whose string representations get concatenated into one string, then output to the console, or you can pass in a string containing zero or more substitution strings followed by a list of objects to replace them.

#### Outputting a single object

The simplest way to use the logging methods is to output a single object:

const someObject = { str: "Some text", id: 5 };

console.log(someObject);

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The output looks something like this:

{str:"Some text", id:5}

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#### Outputting multiple objects

You can also output multiple objects by listing them when calling the logging method, like this:

const car = "Dodge Charger";

const someObject = { str: "Some text", id: 5 };

console.info("My first car was a", car, ". The object is:", someObject);

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The output will look like this:

My first car was a Dodge Charger. The object is: ({str:"Some text", id:5})

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#### Using string substitutions

When passing a string to one of the console object's methods that accepts a string (such as log()), you may use these substitution strings:

%o or %O

Outputs a JavaScript object. Clicking the object name opens more information about it in the inspector.

%d or %i

Outputs an integer. Number formatting is supported, for example console.log("Foo %.2d", 1.1) will output the number as two significant figures with a leading 0: Foo 01.

%s

Outputs a string.

%f

Outputs a floating-point value. Formatting is supported, for example console.log("Foo %.2f", 1.1) will output the number to 2 decimal places: Foo 1.10.

**Note:** Precision formatting doesn't work in Chrome.

Each of these pulls the next argument after the format string off the parameter list. For example:

for (let i = 0; i < 5; i++) {

console.log("Hello, %s. You've called me %d times.", "Bob", i + 1);

}

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The output looks like this:

Hello, Bob. You've called me 1 times.

Hello, Bob. You've called me 2 times.

Hello, Bob. You've called me 3 times.

Hello, Bob. You've called me 4 times.

Hello, Bob. You've called me 5 times.

#### Styling console output

You can use the %c directive to apply a CSS style to console output:

console.log(

"This is %cMy stylish message",

"color: yellow; font-style: italic; background-color: blue;padding: 2px"

);

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The text before the directive will not be affected, but the text after the directive will be styled using the CSS declarations in the parameter.

You may use %c multiple times:

console.log(

"Multiple styles: %cred %corange",

"color: red",

"color: orange",

"Additional unformatted message"

);

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The properties usable along with the %c syntax are as follows (at least, in Firefox — they may differ in other browsers):

* [background](https://developer.mozilla.org/en-US/docs/Web/CSS/background) and its longhand equivalents
* [border](https://developer.mozilla.org/en-US/docs/Web/CSS/border) and its longhand equivalents
* [border-radius](https://developer.mozilla.org/en-US/docs/Web/CSS/border-radius)
* [box-decoration-break](https://developer.mozilla.org/en-US/docs/Web/CSS/box-decoration-break)
* [box-shadow](https://developer.mozilla.org/en-US/docs/Web/CSS/box-shadow)
* [clear](https://developer.mozilla.org/en-US/docs/Web/CSS/clear) and [float](https://developer.mozilla.org/en-US/docs/Web/CSS/float)
* [color](https://developer.mozilla.org/en-US/docs/Web/CSS/color)
* [cursor](https://developer.mozilla.org/en-US/docs/Web/CSS/cursor)
* [display](https://developer.mozilla.org/en-US/docs/Web/CSS/display)
* [font](https://developer.mozilla.org/en-US/docs/Web/CSS/font) and its longhand equivalents
* [line-height](https://developer.mozilla.org/en-US/docs/Web/CSS/line-height)
* [margin](https://developer.mozilla.org/en-US/docs/Web/CSS/margin)
* [outline](https://developer.mozilla.org/en-US/docs/Web/CSS/outline) and its longhand equivalents
* [padding](https://developer.mozilla.org/en-US/docs/Web/CSS/padding)
* text-\* properties such as [text-transform](https://developer.mozilla.org/en-US/docs/Web/CSS/text-transform)
* [white-space](https://developer.mozilla.org/en-US/docs/Web/CSS/white-space)
* [word-spacing](https://developer.mozilla.org/en-US/docs/Web/CSS/word-spacing) and [word-break](https://developer.mozilla.org/en-US/docs/Web/CSS/word-break)
* [writing-mode](https://developer.mozilla.org/en-US/docs/Web/CSS/writing-mode)

**Note:** The console message behaves like an inline element by default. To see the effects of padding, margin, etc. you should set it to for example display: inline-block.

### [Using groups in the console](https://developer.mozilla.org/en-US/docs/Web/API/console#using_groups_in_the_console)

You can use nested groups to help organize your output by visually combining related material. To create a new nested block, call console.group(). The console.groupCollapsed() method is similar but creates the new block collapsed, requiring the use of a disclosure button to open it for reading.

To exit the current group, call console.groupEnd(). For example, given this code:

console.log("This is the outer level");

console.group("First group");

console.log("In the first group");

console.group("Second group");

console.log("In the second group");

console.warn("Still in the second group");

console.groupEnd();

console.log("Back to the first group");

console.groupEnd();

console.debug("Back to the outer level");

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The output looks like this:

### [Timers](https://developer.mozilla.org/en-US/docs/Web/API/console#timers)

You can start a timer to calculate the duration of a specific operation. To start one, call the console.time() method, giving it a name as the only parameter. To stop the timer, and to get the elapsed time in milliseconds, just call the console.timeEnd() method, again passing the timer's name as the parameter. Up to 10,000 timers can run simultaneously on a given page.

For example, given this code:

console.time("answer time");

alert("Click to continue");

console.timeLog("answer time");

alert("Do a bunch of other stuff…");

console.timeEnd("answer time");

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Will log the time needed by the user to dismiss the alert box, log the time to the console, wait for the user to dismiss the second alert, and then log the ending time to the console:

Notice that the timer's name is displayed both when the timer is started and when it's stopped.

**Note:** It's important to note that if you're using this to log the timing for network traffic, the timer will report the total time for the transaction, while the time listed in the network panel is just the amount of time required for the header. If you have response body logging enabled, the time listed for the response header and body combined should match what you see in the console output.

### [Stack traces](https://developer.mozilla.org/en-US/docs/Web/API/console#stack_traces)

The console object also supports outputting a stack trace; this will show you the call path taken to reach the point at which you call [console.trace()](https://developer.mozilla.org/en-US/docs/Web/API/console/trace). Given code like this:

function foo() {

function bar() {

console.trace();

}

bar();

}

foo();

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The output in the console looks something like this:

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/console#specifications)

| **Specification** |
| --- |
| [Console Standard # console-namespace](https://console.spec.whatwg.org/#console-namespace) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/console#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fconsole&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.console%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A39.316Z%0A%0A%3C%2Fdetails%3E&title=api.console+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| console | 1  Toggle history | 12  Toggle history | 4  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| [assert](https://developer.mozilla.org/en-US/docs/Web/API/console/assert) | 1  Toggle history | 12  Toggle history | 28  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 28  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 10.0.0  more  Toggle history |
| [clear](https://developer.mozilla.org/en-US/docs/Web/API/console/clear) | 25  Toggle history | 12  Toggle history | 39  Toggle history | 12  Toggle history | 7  Toggle history | 25  Toggle history | 39  Toggle history | 12  Toggle history | 7  Toggle history | 1.5  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| [count](https://developer.mozilla.org/en-US/docs/Web/API/console/count) | 1  Toggle history | 12  Toggle history | 30  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 30  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| [countReset](https://developer.mozilla.org/en-US/docs/Web/API/console/countReset) | 68  Toggle history | 79  Toggle history | 62  Toggle history | 55  Toggle history | 13  Toggle history | 68  Toggle history | 62  Toggle history | 48  Toggle history | 13  Toggle history | 10.0  Toggle history | 68  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| [debug](https://developer.mozilla.org/en-US/docs/Web/API/console/debug) | 1  Toggle history | 12  Toggle history | 5  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 5  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 8.0.0  footnote  Toggle history |
| Substitution strings | 1  footnote  Toggle history | 12  footnote  Toggle history | 9  Toggle history | 15  Toggle history | 4  Toggle history | 18  footnote  Toggle history | 9  Toggle history | 14  Toggle history | 3.2  Toggle history | 1.0  footnote  Toggle history | 37  footnote  Toggle history | 1.0  footnote  Toggle history | 8.10.0  Toggle history |
| [dir](https://developer.mozilla.org/en-US/docs/Web/API/console/dir) | 1  Toggle history | 12  Toggle history | 8  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 8  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| [dirxml](https://developer.mozilla.org/en-US/docs/Web/API/console/dirxml) | 1  Toggle history | 12  Toggle history | 39  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 39  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 9.3.0  more  Toggle history |
| [error](https://developer.mozilla.org/en-US/docs/Web/API/console/error) | 1  Toggle history | 12  Toggle history | 4  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| Substitution strings | 1  Toggle history | 12  footnote  Toggle history | 9  Toggle history | 15  Toggle history | 3  Toggle history | 18  Toggle history | 9  Toggle history | 14  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  footnote  Toggle history | 0.10.0  Toggle history |
| exception (an alias for error)  DeprecatedNon-standard | No  Toggle history | 13 – 79  Toggle history | 28  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | 28  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history |
| Substitution strings  DeprecatedNon-standard | No  Toggle history | 18 – 79  Toggle history | 28  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | 28  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history |
| [group](https://developer.mozilla.org/en-US/docs/Web/API/console/group) | 1  Toggle history | 12  Toggle history | 9  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 9  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 8.5.0  Toggle history |
| [groupCollapsed](https://developer.mozilla.org/en-US/docs/Web/API/console/groupCollapsed) | 6  Toggle history | 12  Toggle history | 9  Toggle history | 11  Toggle history | 5.1  Toggle history | 18  Toggle history | 9  Toggle history | 11  Toggle history | 5  Toggle history | 1.0  Toggle history | 3  Toggle history | 1.0  Toggle history | 8.5.0  footnote  Toggle history |
| [groupEnd](https://developer.mozilla.org/en-US/docs/Web/API/console/groupEnd) | 1  Toggle history | 12  Toggle history | 9  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 9  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 8.5.0  Toggle history |
| [info](https://developer.mozilla.org/en-US/docs/Web/API/console/info) | 1  Toggle history | 12  Toggle history | 4  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 0.10.0  footnote  Toggle history |
| Substitution strings | 1  Toggle history | 12  footnote  Toggle history | 9  Toggle history | 15  Toggle history | 3  Toggle history | 18  Toggle history | 9  Toggle history | 14  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  footnote  Toggle history | 0.10.0  Toggle history |
| [log](https://developer.mozilla.org/en-US/docs/Web/API/console/log) | 1  Toggle history | 12  Toggle history | 4  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| Substitution strings | 1  footnote  Toggle history | 12  footnote  Toggle history | 9  Toggle history | 15  Toggle history | 3  Toggle history | 18  footnote  Toggle history | 9  Toggle history | 14  Toggle history | 1  Toggle history | 1.0  footnote  Toggle history | 37  footnote  Toggle history | 1.0  footnote  Toggle history | 0.10.0  Toggle history |
| [profile](https://developer.mozilla.org/en-US/docs/Web/API/console/profile)  [Non-standard](https://developer.mozilla.org/en-US/docs/Web/API/console/profile) | 4  Toggle history | 12  Toggle history | 16  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 16  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | No  Toggle history | 8.0.0  disabled  Toggle history |
| [profileEnd](https://developer.mozilla.org/en-US/docs/Web/API/console/profileEnd)  [Non-standard](https://developer.mozilla.org/en-US/docs/Web/API/console/profileEnd) | 4  Toggle history | 12  Toggle history | 16  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 16  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | No  Toggle history | 8.0.0  disabled  Toggle history |
| [table](https://developer.mozilla.org/en-US/docs/Web/API/console/table) | 27  Toggle history | 13  Toggle history | 34  Toggle history | 11  Toggle history | 7  Toggle history | 27  Toggle history | 34  Toggle history | 11  Toggle history | 7  Toggle history | 1.5  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 10.0.0  Toggle history |
| [time](https://developer.mozilla.org/en-US/docs/Web/API/console/time) | 1  Toggle history | 12  Toggle history | 10  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 10  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| [timeEnd](https://developer.mozilla.org/en-US/docs/Web/API/console/timeEnd) | 1  Toggle history | 12  Toggle history | 10  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 10  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| [timeLog](https://developer.mozilla.org/en-US/docs/Web/API/console/timeLog) | 71  Toggle history | 79  Toggle history | 62  Toggle history | 60  Toggle history | 13  Toggle history | 71  Toggle history | 62  Toggle history | 50  Toggle history | 13  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.0  Toggle history | 10.7.0  Toggle history |
| [timeStamp](https://developer.mozilla.org/en-US/docs/Web/API/console/timeStamp)  [Non-standard](https://developer.mozilla.org/en-US/docs/Web/API/console/timeStamp) | 14  Toggle history | 12  Toggle history | 39  Toggle history | 15  Toggle history | 6  Toggle history | 18  Toggle history | 39  Toggle history | 14  Toggle history | 6  Toggle history | 1.0  Toggle history | 37  Toggle history | No  Toggle history | 8.0.0  disabled  Toggle history |
| [trace](https://developer.mozilla.org/en-US/docs/Web/API/console/trace) | 1  Toggle history | 12  Toggle history | 6  Toggle history | 11  Toggle history | 4  Toggle history | 18  Toggle history | 6  Toggle history | 11  Toggle history | 3.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| [warn](https://developer.mozilla.org/en-US/docs/Web/API/console/warn) | 1  Toggle history | 12  Toggle history | 4  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 0.10.0  footnote  Toggle history |
| Substitution strings | 1  Toggle history | 12  footnote  Toggle history | 9  Toggle history | 15  Toggle history | 3  Toggle history | 18  Toggle history | 9  Toggle history | 14  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  footnote  Toggle history | 0.10.0  Toggle history |
| Available in workers | 31  Toggle history | 12  Toggle history | 29  Toggle history | 12.1  Toggle history | 7  Toggle history | 31  Toggle history | 29  Toggle history | 12.1  Toggle history | 7  Toggle history | 2.0  Toggle history | 4.4.3  Toggle history | 1.0  Toggle history | 10.5.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

No support

No support

Non-standard. Check cross-browser support before using.

Deprecated. Not for use in new websites.

See implementation notes.

User must explicitly enable this feature.

Has more compatibility info.

## [Notes](https://developer.mozilla.org/en-US/docs/Web/API/console#notes)

* At least in Firefox, if a page defines a console object, that object overrides the one built into Firefox.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/console#see_also)

* [Firefox Developer Tools](https://firefox-source-docs.mozilla.org/devtools-user/index.html)
* [Web console](https://firefox-source-docs.mozilla.org/devtools-user/web_console/index.html) — how the Web console in Firefox handles console API calls
* [about:debugging](https://firefox-source-docs.mozilla.org/devtools-user/about_colon_debugging/index.html) — how to see console output when the debugging target is a mobile device

### [Other implementations](https://developer.mozilla.org/en-US/docs/Web/API/console#other_implementations)

* [Google Chrome DevTools](https://developer.chrome.com/docs/devtools/console/api/)
* [Microsoft Edge DevTools](https://docs.microsoft.com/archive/microsoft-edge/legacy/developer/)
* [Safari Web Inspector](https://developer.apple.com/library/archive/documentation/AppleApplications/Conceptual/Safari_Developer_Guide/Console/Console.html)

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* [Edit on **GitHub**](https://github.com/mdn/content/edit/main/files/en-us/web/api/console/index.md)
* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/console/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fconsole&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fconsole%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fconsole%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fconsole%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2F3a8ddeac2f0957b775b1c6c237f565b266c274c0%0A*+Document+last+modified%3A+2022-09-22T21%3A37%3A38.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 23, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/console/contributors.txt)

# atob

<https://developer.mozilla.org/en-US/docs/Web/API/atob>

The **atob()** function decodes a string of data which has been encoded using [Base64](https://developer.mozilla.org/en-US/docs/Glossary/Base64) encoding. You can use the [btoa()](https://developer.mozilla.org/en-US/docs/Web/API/btoa) method to encode and transmit data which may otherwise cause communication problems, then transmit it and use the atob() method to decode the data again. For example, you can encode, transmit, and decode control characters such as ASCII values 0 through 31.

For use with Unicode or UTF-8 strings, see the note on "Unicode strings" in the page for [btoa()](https://developer.mozilla.org/en-US/docs/Web/API/btoa).

## [Syntax](https://developer.mozilla.org/en-US/docs/Web/API/atob#syntax)

atob(encodedData)

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### [Parameters](https://developer.mozilla.org/en-US/docs/Web/API/atob#parameters)

encodedData

A binary string (i.e., a string in which each character in the string is treated as a byte of binary data) containing base64-encoded data.

### [Return value](https://developer.mozilla.org/en-US/docs/Web/API/atob#return_value)

An ASCII string containing decoded data from encodedData.

### [Exceptions](https://developer.mozilla.org/en-US/docs/Web/API/atob#exceptions)

InvalidCharacterError [DOMException](https://developer.mozilla.org/en-US/docs/Web/API/DOMException)

Thrown if encodedData is not valid base64.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/atob#examples)

const encodedData = btoa("Hello, world"); // encode a string

const decodedData = atob(encodedData); // decode the string

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/atob#specifications)

| **Specification** |
| --- |
| [HTML Standard # dom-atob-dev](https://html.spec.whatwg.org/multipage/webappapis.html#dom-atob-dev) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/atob#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fatob&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.atob%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A39.147Z%0A%0A%3C%2Fdetails%3E&title=api.atob+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| atob | 4  Toggle history | 12  Toggle history | 1  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 16.0.0  Toggle history |
| Available in workers | 30  Toggle history | 12  Toggle history | 4  Toggle history | 17  Toggle history | 10  Toggle history | 30  Toggle history | 4  Toggle history | 18  Toggle history | 10  Toggle history | 2.0  Toggle history | 4.4  Toggle history | Yes  Toggle history | 16.0.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/atob#see_also)

* [A polyfill of atob](https://github.com/zloirock/core-js#base64-utility-methods) is available in [core-js](https://github.com/zloirock/core-js)
* [data URLs](https://developer.mozilla.org/en-US/docs/Web/HTTP/Basics_of_HTTP/Data_URLs)
* [btoa()](https://developer.mozilla.org/en-US/docs/Web/API/btoa)

### Found a problem with this page?

* [Edit on **GitHub**](https://github.com/mdn/content/edit/main/files/en-us/web/api/atob/index.md)
* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/atob/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fatob&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fatob%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fatob%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fatob%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2F02e1bfcad5fd0de845fb033d331c3c027afa2d6e%0A*+Document+last+modified%3A+2022-09-14T13%3A55%3A15.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 14, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/atob/contributors.txt)

# btoa

<https://developer.mozilla.org/en-US/docs/Web/API/btoa>

The **btoa()** method creates a [Base64](https://developer.mozilla.org/en-US/docs/Glossary/Base64)-encoded ASCII string from a binary string (i.e., a string in which each character in the string is treated as a byte of binary data).

You can use this method to encode data which may otherwise cause communication problems, transmit it, then use the [atob()](https://developer.mozilla.org/en-US/docs/Web/API/atob) method to decode the data again. For example, you can encode control characters such as ASCII values 0 through 31.

## [Syntax](https://developer.mozilla.org/en-US/docs/Web/API/btoa#syntax)

btoa(stringToEncode)

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### [Parameters](https://developer.mozilla.org/en-US/docs/Web/API/btoa#parameters)

stringToEncode

The binary string to encode.

### [Return value](https://developer.mozilla.org/en-US/docs/Web/API/btoa#return_value)

An ASCII string containing the Base64 representation of stringToEncode.

### [Exceptions](https://developer.mozilla.org/en-US/docs/Web/API/btoa#exceptions)

InvalidCharacterError [DOMException](https://developer.mozilla.org/en-US/docs/Web/API/DOMException)

The string contained a character that did not fit in a single byte. See "Unicode strings" below for more detail.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/btoa#examples)

const encodedData = btoa("Hello, world"); // encode a string

const decodedData = atob(encodedData); // decode the string

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## [Unicode strings](https://developer.mozilla.org/en-US/docs/Web/API/btoa#unicode_strings)

The btoa() function takes a JavaScript string as a parameter. In JavaScript strings are represented using the UTF-16 character encoding: in this encoding, strings are represented as a sequence of 16-bit (2 byte) units. Every ASCII character fits into the first byte of one of these units, but many other characters don't.

Base64, by design, expects binary data as its input. In terms of JavaScript strings, this means strings in which each character occupies only one byte. So if you pass a string into btoa() containing characters that occupy more than one byte, you will get an error, because this is not considered binary data:

const ok = "a";

console.log(ok.codePointAt(0).toString(16)); // 61: occupies < 1 byte

const notOK = "✓";

console.log(notOK.codePointAt(0).toString(16)); // 2713: occupies > 1 byte

console.log(btoa(ok)); // YQ==

console.log(btoa(notOK)); // error

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If you need to encode Unicode text as ASCII using btoa(), one option is to convert the string such that each 16-bit unit occupies only one byte. For example:

// convert a Unicode string to a string in which

// each 16-bit unit occupies only one byte

function toBinary(string) {

const codeUnits = Uint16Array.from(

{ length: string.length },

(element, index) => string.charCodeAt(index)

);

const charCodes = new Uint8Array(codeUnits.buffer);

let result = "";

charCodes.forEach((char) => {

result += String.fromCharCode(char);

});

return result;

}

// a string that contains characters occupying > 1 byte

const myString = "☸☹☺☻☼☾☿";

const converted = toBinary(myString);

const encoded = btoa(converted);

console.log(encoded); // OCY5JjomOyY8Jj4mPyY=

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If you do this, of course you'll have to reverse the conversion on the decoded string:

function fromBinary(binary) {

const bytes = Uint8Array.from({ length: binary.length }, (element, index) =>

string.charCodeAt(index)

);

const charCodes = new Uint16Array(bytes.buffer);

let result = "";

charCodes.forEach((char) => {

result += String.fromCharCode(char);

});

return result;

}

const decoded = atob(encoded);

const original = fromBinary(decoded);

console.log(original); // ☸☹☺☻☼☾☿

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See also the example utf8\_to\_b64 and b64\_to\_utf8 functions in the [Solution #1 – escaping the string before encoding it](https://developer.mozilla.org/en-US/docs/Glossary/Base64#solution_1_%E2%80%93_escaping_the_string_before_encoding_it) section of the [Base64](https://developer.mozilla.org/en-US/docs/Glossary/Base64) glossary entry.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/btoa#specifications)

| **Specification** |
| --- |
| [HTML Standard # dom-btoa-dev](https://html.spec.whatwg.org/multipage/webappapis.html#dom-btoa-dev) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/btoa#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fbtoa&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.btoa%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A39.145Z%0A%0A%3C%2Fdetails%3E&title=api.btoa+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| btoa | 4  Toggle history | 12  Toggle history | 1  Toggle history | 10.5  Toggle history | 3  Toggle history | 18  Toggle history | 4  Toggle history | 11  Toggle history | 1  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 16.0.0  Toggle history |
| Available in workers | 30  Toggle history | 12  Toggle history | 4  Toggle history | 17  Toggle history | 10  Toggle history | 30  Toggle history | 4  Toggle history | 18  Toggle history | 10  Toggle history | 2.0  Toggle history | 4.4  Toggle history | Yes  Toggle history | 16.0.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/btoa#see_also)

* [A polyfill of btoa](https://github.com/zloirock/core-js#base64-utility-methods) is available in [core-js](https://github.com/zloirock/core-js)
* [data URLs](https://developer.mozilla.org/en-US/docs/Web/HTTP/Basics_of_HTTP/Data_URLs)
* [atob()](https://developer.mozilla.org/en-US/docs/Web/API/atob)
* [Base64](https://developer.mozilla.org/en-US/docs/Glossary/Base64)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/btoa/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fbtoa&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fbtoa%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Fbtoa%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fbtoa%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Fb6012a068940cd3b9fdae6ce44ed66e998060863%0A*+Document+last+modified%3A+2022-09-23T07%3A48%3A20.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 23, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/btoa/contributors.txt)

# Fetch API

<https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API>

The Fetch API provides an interface for fetching resources (including across the network). It will seem familiar to anyone who has used [XMLHttpRequest](https://developer.mozilla.org/en-US/docs/Web/API/XMLHttpRequest), but the new API provides a more powerful and flexible feature set.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

## [Concepts and usage](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#concepts_and_usage)

Fetch provides a generic definition of [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) and [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) objects (and other things involved with network requests). This will allow them to be used wherever they are needed in the future, whether it's for service workers, Cache API, and other similar things that handle or modify requests and responses, or any kind of use case that might require you to generate your responses programmatically (that is, the use of computer program or personal programming instructions).

It also defines related concepts such as CORS and the HTTP Origin header semantics, supplanting their separate definitions elsewhere.

For making a request and fetching a resource, use the [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) method. It is implemented in multiple interfaces, specifically [Window](https://developer.mozilla.org/en-US/docs/Web/API/Window) and [WorkerGlobalScope](https://developer.mozilla.org/en-US/docs/Web/API/WorkerGlobalScope). This makes it available in pretty much any context you might want to fetch resources in.

The fetch() method takes one mandatory argument, the path to the resource you want to fetch. It returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that resolves to the [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) to that request — as soon as the server responds with headers — **even if the server response is an HTTP error status**. You can also optionally pass in an init options object as the second argument (see [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request)).

Once a [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) is retrieved, there are a number of methods available to define what the body content is and how it should be handled.

You can create a request and response directly using the [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) and [Response()](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response) constructors, but it's uncommon to do this directly. Instead, these are more likely to be created as results of other API actions (for example, [FetchEvent.respondWith()](https://developer.mozilla.org/en-US/docs/Web/API/FetchEvent/respondWith) from service workers).

### [Differences from jQuery](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#differences_from_jquery)

The fetch specification differs from jQuery.ajax() in three main ways:

* The Promise returned from fetch() **won't reject on HTTP error status** even if the response is an HTTP 404 or 500. Instead, it will resolve normally (with ok status set to false), and it will only reject on network failure or if anything prevented the request from completing.
* fetch() **won't send cross-origin cookies** unless you set the credentials [init option](https://developer.mozilla.org/en-US/docs/Web/API/fetch#parameters) (to include).
  + In [April 2018](https://github.com/whatwg/fetch/pull/585), the spec changed the default credentials policy to 'same-origin'. The following browsers shipped an outdated native fetch, and were updated in these versions: Firefox 61.0b13, Safari 12, Chrome 68.
  + If you are targeting older versions of these browsers, be sure to include credentials: 'same-origin' [init option](https://developer.mozilla.org/en-US/docs/Web/API/fetch#parameters) on all API requests that may be affected by cookies/user login state.

**Note:** Find out more about using the Fetch API features in [Using Fetch](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch), and study concepts in [Fetch basic concepts](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Basic_concepts).

### [Aborting a fetch](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#aborting_a_fetch)

To abort incomplete fetch(), and even XMLHttpRequest, operations, use the [AbortController](https://developer.mozilla.org/en-US/docs/Web/API/AbortController) and [AbortSignal](https://developer.mozilla.org/en-US/docs/Web/API/AbortSignal) interfaces.

## [Fetch Interfaces](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#fetch_interfaces)

[fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch)

The fetch() method used to fetch a resource.

[Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers)

Represents response/request headers, allowing you to query them and take different actions depending on the results.

[Request](https://developer.mozilla.org/en-US/docs/Web/API/Request)

Represents a resource request.

[Response](https://developer.mozilla.org/en-US/docs/Web/API/Response)

Represents the response to a request.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#specifications)

| **Specification** |
| --- |
| [Fetch Standard # fetch-method](https://fetch.spec.whatwg.org/#fetch-method) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#browser_compatibility)

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|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| fetch | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  footnote  Toggle history | 18.0.0  more  Toggle history |
| Support for blob: and data: | 48  Toggle history | 79  Toggle history | 39  Toggle history | 35  Toggle history | 10.1  Toggle history | 48  Toggle history | 39  Toggle history | 35  Toggle history | 10.3  Toggle history | 5.0  Toggle history | 43  Toggle history | 1.9  Toggle history | ?  Toggle history |
| init.referrerPolicy parameter | 52  Toggle history | 79  Toggle history | 52  Toggle history | 39  Toggle history | 11.1  Toggle history | 52  Toggle history | 52  Toggle history | 41  Toggle history | No  Toggle history | 6.0  Toggle history | 52  Toggle history | No  Toggle history | ?  Toggle history |
| init.signal parameter | 66  Toggle history | 16  Toggle history | 57  Toggle history | 53  Toggle history | 11.1  Toggle history | 66  Toggle history | 57  Toggle history | 47  Toggle history | 11.3  Toggle history | 9.0  Toggle history | 66  Toggle history | 1.11  Toggle history | 18.0.0  more  Toggle history |
| Available in workers | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | Yes  Toggle history | ?  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

See implementation notes.

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API#see_also)

* [Using Fetch](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch)
* [ServiceWorker API](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API)
* [HTTP access control (CORS)](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS)
* [HTTP](https://developer.mozilla.org/en-US/docs/Web/HTTP)
* [Fetch polyfill](https://github.com/github/fetch)
* [Fetch basic concepts](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Basic_concepts)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/fetch_api/index.md?plain=1)
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# Using the Fetch API

<https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch>

The [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API) provides a JavaScript interface for accessing and manipulating parts of the [protocol](https://developer.mozilla.org/en-US/docs/Glossary/Protocol), such as requests and responses. It also provides a global [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) method that provides an easy, logical way to fetch resources asynchronously across the network.

This kind of functionality was previously achieved using [XMLHttpRequest](https://developer.mozilla.org/en-US/docs/Web/API/XMLHttpRequest). Fetch provides a better alternative that can be easily used by other technologies such as [Service Workers](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API). Fetch also provides a single logical place to define other HTTP-related concepts such as [CORS](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS) and extensions to HTTP.

The fetch specification differs from jQuery.ajax() in the following significant ways:

* The Promise returned from fetch() **won't reject on HTTP error status** even if the response is an HTTP 404 or 500. Instead, as soon as the server responds with headers, the Promise will resolve normally (with the [ok](https://developer.mozilla.org/en-US/docs/Web/API/Response/ok) property of the response set to false if the response isn't in the range 200–299), and it will only reject on network failure or if anything prevented the request from completing.
* Unless fetch() is called with the [credentials](https://developer.mozilla.org/en-US/docs/Web/API/fetch#credentials) option set to include, fetch():
  + won't send cookies in cross-origin requests
  + won't set any cookies sent back in cross-origin responses
  + As of August 2018, the default credentials policy changed to same-origin. Firefox was also modified in version 61.0b13)

A basic fetch request is really simple to set up. Have a look at the following code:

fetch('http://example.com/movies.json')

.then((response) => response.json())

.then((data) => console.log(data));

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Here we are fetching a JSON file across the network and printing it to the console. The simplest use of fetch() takes one argument — the path to the resource you want to fetch — and does not directly return the JSON response body but instead returns a promise that resolves with a [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object.

The [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object, in turn, does not directly contain the actual JSON response body but is instead a representation of the entire HTTP response. So, to extract the JSON body content from the [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object, we use the [json()](https://developer.mozilla.org/en-US/docs/Web/API/Response/json) method, which returns a second promise that resolves with the result of parsing the response body text as JSON.

**Note:** See the [Body](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#body) section for similar methods to extract other types of body content.

Fetch requests are controlled by the connect-src directive of [Content Security Policy](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Content-Security-Policy) rather than the directive of the resources it's retrieving.

## [Supplying request options](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#supplying_request_options)

The fetch() method can optionally accept a second parameter, an init object that allows you to control a number of different settings:

See [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) for the full options available, and more details.

// Example POST method implementation:

async function postData(url = '', data = {}) {

// Default options are marked with \*

const response = await fetch(url, {

method: 'POST', // \*GET, POST, PUT, DELETE, etc.

mode: 'cors', // no-cors, \*cors, same-origin

cache: 'no-cache', // \*default, no-cache, reload, force-cache, only-if-cached

credentials: 'same-origin', // include, \*same-origin, omit

headers: {

'Content-Type': 'application/json'

// 'Content-Type': 'application/x-www-form-urlencoded',

},

redirect: 'follow', // manual, \*follow, error

referrerPolicy: 'no-referrer', // no-referrer, \*no-referrer-when-downgrade, origin, origin-when-cross-origin, same-origin, strict-origin, strict-origin-when-cross-origin, unsafe-url

body: JSON.stringify(data) // body data type must match "Content-Type" header

});

return response.json(); // parses JSON response into native JavaScript objects

}

postData('https://example.com/answer', { answer: 42 })

.then((data) => {

console.log(data); // JSON data parsed by `data.json()` call

});

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Note that mode: "no-cors" only allows a limited set of headers in the request:

* Accept
* Accept-Language
* Content-Language
* Content-Type with a value of application/x-www-form-urlencoded, multipart/form-data, or text/plain

## [Sending a request with credentials included](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#sending_a_request_with_credentials_included)

To cause browsers to send a request with credentials included on both same-origin and cross-origin calls, add credentials: 'include' to the init object you pass to the fetch() method.

fetch('https://example.com', {

credentials: 'include'

});

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**Note:** Access-Control-Allow-Origin is prohibited from using a wildcard for requests with credentials: 'include'. In such cases, the exact origin must be provided; even if you are using a CORS unblocker extension, the requests will still fail.

**Note:** Browsers should not send credentials in preflight requests irrespective of this setting. For more information see: [CORS > Requests with credentials](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS#requests_with_credentials).

If you only want to send credentials if the request URL is on the same origin as the calling script, add credentials: 'same-origin'.

// The calling script is on the origin 'https://example.com'

fetch('https://example.com', {

credentials: 'same-origin'

});

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To instead ensure browsers don't include credentials in the request, use credentials: 'omit'.

fetch('https://example.com', {

credentials: 'omit'

})

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## [Uploading JSON data](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#uploading_json_data)

Use [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) to POST JSON-encoded data.

const data = { username: 'example' };

fetch('https://example.com/profile', {

method: 'POST', // or 'PUT'

headers: {

'Content-Type': 'application/json',

},

body: JSON.stringify(data),

})

.then((response) => response.json())

.then((data) => {

console.log('Success:', data);

})

.catch((error) => {

console.error('Error:', error);

});

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## [Uploading a file](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#uploading_a_file)

Files can be uploaded using an HTML <input type="file" /> input element, [FormData()](https://developer.mozilla.org/en-US/docs/Web/API/FormData/FormData) and [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch).

const formData = new FormData();

const fileField = document.querySelector('input[type="file"]');

formData.append('username', 'abc123');

formData.append('avatar', fileField.files[0]);

fetch('https://example.com/profile/avatar', {

method: 'PUT',

body: formData

})

.then((response) => response.json())

.then((result) => {

console.log('Success:', result);

})

.catch((error) => {

console.error('Error:', error);

});

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## [Uploading multiple files](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#uploading_multiple_files)

Files can be uploaded using an HTML <input type="file" multiple /> input element, [FormData()](https://developer.mozilla.org/en-US/docs/Web/API/FormData/FormData) and [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch).

const formData = new FormData();

const photos = document.querySelector('input[type="file"][multiple]');

formData.append('title', 'My Vegas Vacation');

let i = 0;

for (const photo of photos.files) {

formData.append(`photos\_${i}`, photo);

i++;

}

fetch('https://example.com/posts', {

method: 'POST',

body: formData,

})

.then((response) => response.json())

.then((result) => {

console.log('Success:', result);

})

.catch((error) => {

console.error('Error:', error);

});

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## [Processing a text file line by line](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#processing_a_text_file_line_by_line)

The chunks that are read from a response are not broken neatly at line boundaries and are Uint8Arrays, not strings. If you want to fetch a text file and process it line by line, it is up to you to handle these complications. The following example shows one way to do this by creating a line iterator (for simplicity, it assumes the text is UTF-8, and doesn't handle fetch errors).

async function\* makeTextFileLineIterator(fileURL) {

const utf8Decoder = new TextDecoder('utf-8');

const response = await fetch(fileURL);

const reader = response.body.getReader();

let { value: chunk, done: readerDone } = await reader.read();

chunk = chunk ? utf8Decoder.decode(chunk) : '';

const re = /\n|\r|\r\n/gm;

let startIndex = 0;

let result;

while (true) {

let result = re.exec(chunk);

if (!result) {

if (readerDone) break;

let remainder = chunk.substr(startIndex);

({ value: chunk, done: readerDone } = await reader.read());

chunk = remainder + (chunk ? utf8Decoder.decode(chunk) : '');

startIndex = re.lastIndex = 0;

continue;

}

yield chunk.substring(startIndex, result.index);

startIndex = re.lastIndex;

}

if (startIndex < chunk.length) {

// Last line didn't end in a newline char

yield chunk.substr(startIndex);

}

}

async function run() {

for await (const line of makeTextFileLineIterator(urlOfFile)) {

processLine(line);

}

}

run();

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## [Checking that the fetch was successful](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#checking_that_the_fetch_was_successful)

A [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) promise will reject with a [TypeError](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypeError) when a network error is encountered or CORS is misconfigured on the server-side, although this usually means permission issues or similar — a 404 does not constitute a network error, for example. An accurate check for a successful fetch() would include checking that the promise resolved, then checking that the [Response.ok](https://developer.mozilla.org/en-US/docs/Web/API/Response/ok) property has a value of true. The code would look something like this:

fetch('flowers.jpg')

.then((response) => {

if (!response.ok) {

throw new Error('Network response was not OK');

}

return response.blob();

})

.then((myBlob) => {

myImage.src = URL.createObjectURL(myBlob);

})

.catch((error) => {

console.error('There has been a problem with your fetch operation:', error);

});

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## [Supplying your own request object](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#supplying_your_own_request_object)

Instead of passing a path to the resource you want to request into the fetch() call, you can create a request object using the [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) constructor, and pass that in as a fetch() method argument:

const myHeaders = new Headers();

const myRequest = new Request('flowers.jpg', {

method: 'GET',

headers: myHeaders,

mode: 'cors',

cache: 'default',

});

fetch(myRequest)

.then((response) => response.blob())

.then((myBlob) => {

myImage.src = URL.createObjectURL(myBlob);

});

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Request() accepts exactly the same parameters as the fetch() method. You can even pass in an existing request object to create a copy of it:

const anotherRequest = new Request(myRequest, myInit);

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This is pretty useful, as request and response bodies can only be used once. Making a copy like this allows you to effectively use the request/response again while varying the init options if desired. The copy must be made before the body is read.

**Note:** There is also a [clone()](https://developer.mozilla.org/en-US/docs/Web/API/Request/clone) method that creates a copy. Both methods of creating a copy will fail if the body of the original request or response has already been read, but reading the body of a cloned response or request will not cause it to be marked as read in the original.

## [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#headers)

The [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) interface allows you to create your own headers object via the [Headers()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/Headers) constructor. A headers object is a simple multi-map of names to values:

const content = 'Hello World';

const myHeaders = new Headers();

myHeaders.append('Content-Type', 'text/plain');

myHeaders.append('Content-Length', content.length.toString());

myHeaders.append('X-Custom-Header', 'ProcessThisImmediately');

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The same can be achieved by passing an array of arrays or an object literal to the constructor:

const myHeaders = new Headers({

'Content-Type': 'text/plain',

'Content-Length': content.length.toString(),

'X-Custom-Header': 'ProcessThisImmediately'

});

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The contents can be queried and retrieved:

console.log(myHeaders.has('Content-Type')); // true

console.log(myHeaders.has('Set-Cookie')); // false

myHeaders.set('Content-Type', 'text/html');

myHeaders.append('X-Custom-Header', 'AnotherValue');

console.log(myHeaders.get('Content-Length')); // 11

console.log(myHeaders.get('X-Custom-Header')); // ['ProcessThisImmediately', 'AnotherValue']

myHeaders.delete('X-Custom-Header');

console.log(myHeaders.get('X-Custom-Header')); // null

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Some of these operations are only useful in [ServiceWorkers](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API), but they provide a much nicer API for manipulating headers.

All of the Headers methods throw a TypeError if a header name is used that is not a valid HTTP Header name. The mutation operations will throw a TypeError if there is an immutable guard ([see below](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#guard)). Otherwise, they fail silently. For example:

const myResponse = Response.error();

try {

myResponse.headers.set('Origin', 'http://mybank.com');

} catch (e) {

console.log('Cannot pretend to be a bank!');

}

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A good use case for headers is checking whether the content type is correct before you process it further. For example:

fetch(myRequest)

.then((response) => {

const contentType = response.headers.get('content-type');

if (!contentType || !contentType.includes('application/json')) {

throw new TypeError("Oops, we haven't got JSON!");

}

return response.json();

})

.then((data) => {

/\* process your data further \*/

})

.catch((error) => console.error(error));

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### [Guard](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#guard)

Since headers can be sent in requests and received in responses, and have various limitations about what information can and should be mutable, headers' objects have a guard property. This is not exposed to the Web, but it affects which mutation operations are allowed on the headers object.

Possible guard values are:

* none: default.
* request: guard for a headers object obtained from a request ([Request.headers](https://developer.mozilla.org/en-US/docs/Web/API/Request/headers)).
* request-no-cors: guard for a headers object obtained from a request created with [Request.mode](https://developer.mozilla.org/en-US/docs/Web/API/Request/mode) no-cors.
* response: guard for a headers object obtained from a response ([Response.headers](https://developer.mozilla.org/en-US/docs/Web/API/Response/headers)).
* immutable: guard that renders a headers object read-only; mostly used for ServiceWorkers.

**Note:** You may not append or set the Content-Length header on a guarded headers object for a response. Similarly, inserting Set-Cookie into a response header is not allowed: ServiceWorkers are not allowed to set cookies via synthesized responses.

## [Response objects](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#response_objects)

As you have seen above, [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) instances are returned when fetch() promises are resolved.

The most common response properties you'll use are:

* [Response.status](https://developer.mozilla.org/en-US/docs/Web/API/Response/status) — An integer (default value 200) containing the response status code.
* [Response.statusText](https://developer.mozilla.org/en-US/docs/Web/API/Response/statusText) — A string (default value ""), which corresponds to the HTTP status code message. Note that HTTP/2 [does not support](https://fetch.spec.whatwg.org/#concept-response-status-message) status messages.
* [Response.ok](https://developer.mozilla.org/en-US/docs/Web/API/Response/ok) — seen in use above, this is a shorthand for checking that status is in the range 200-299 inclusive. This returns a boolean value.

They can also be created programmatically via JavaScript, but this is only really useful in [ServiceWorkers](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API), when you are providing a custom response to a received request using a [respondWith()](https://developer.mozilla.org/en-US/docs/Web/API/FetchEvent/respondWith) method:

const myBody = new Blob();

addEventListener('fetch', (event) => {

// ServiceWorker intercepting a fetch

event.respondWith(

new Response(myBody, {

headers: { 'Content-Type': 'text/plain' }

})

);

});

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The [Response()](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response) constructor takes two optional arguments — a body for the response, and an init object (similar to the one that [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) accepts.)

**Note:** The static method [error()](https://developer.mozilla.org/en-US/docs/Web/API/Response/error) returns an error response. Similarly, [redirect()](https://developer.mozilla.org/en-US/docs/Web/API/Response/redirect) returns a response resulting in a redirect to a specified URL. These are also only relevant to Service Workers.

## [Body](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#body)

Both requests and responses may contain body data. A body is an instance of any of the following types:

* [ArrayBuffer](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/ArrayBuffer)
* [TypedArray](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypedArray) (Uint8Array and friends)
* [DataView](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/DataView)
* [Blob](https://developer.mozilla.org/en-US/docs/Web/API/Blob)
* [File](https://developer.mozilla.org/en-US/docs/Web/API/File)
* [String](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/String), or a string literal
* [URLSearchParams](https://developer.mozilla.org/en-US/docs/Web/API/URLSearchParams)
* [FormData](https://developer.mozilla.org/en-US/docs/Web/API/FormData)

The [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) and [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) interfaces share the following methods to extract a body. These all return a promise that is eventually resolved with the actual content.

* [Request.arrayBuffer()](https://developer.mozilla.org/en-US/docs/Web/API/Request/arrayBuffer) / [Response.arrayBuffer()](https://developer.mozilla.org/en-US/docs/Web/API/Response/arrayBuffer)
* [Request.blob()](https://developer.mozilla.org/en-US/docs/Web/API/Request/blob) / [Response.blob()](https://developer.mozilla.org/en-US/docs/Web/API/Response/blob)
* [Request.formData()](https://developer.mozilla.org/en-US/docs/Web/API/Request/formData) / [Response.formData()](https://developer.mozilla.org/en-US/docs/Web/API/Response/formData)
* [Request.json()](https://developer.mozilla.org/en-US/docs/Web/API/Request/json) / [Response.json()](https://developer.mozilla.org/en-US/docs/Web/API/Response/json)
* [Request.text()](https://developer.mozilla.org/en-US/docs/Web/API/Request/text) / [Response.text()](https://developer.mozilla.org/en-US/docs/Web/API/Response/text)

This makes usage of non-textual data much easier than it was with XHR.

Request bodies can be set by passing body parameters:

const form = new FormData(document.getElementById('login-form'));

fetch('/login', {

method: 'POST',

body: form

});

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Both request and response (and by extension the fetch() function), will try to intelligently determine the content type. A request will also automatically set a Content-Type header if none is set in the dictionary.

## [Feature detection](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#feature_detection)

Fetch API support can be detected by checking for the existence of [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers), [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request), [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) or [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) on the [Window](https://developer.mozilla.org/en-US/docs/Web/API/Window) or [Worker](https://developer.mozilla.org/en-US/docs/Web/API/Worker) scope. For example:

if (window.fetch) {

// run my fetch request here

} else {

// do something with XMLHttpRequest?

}

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#specifications)

| **Specification** |
| --- |
| [Fetch Standard # fetch-method](https://fetch.spec.whatwg.org/#fetch-method) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FFetch_API%2FUsing_Fetch&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.fetch%60%0A*+Report+started%3A+2022-09-24T08%3A32%3A35.334Z%0A%0A%3C%2Fdetails%3E&title=api.fetch+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| fetch | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  footnote  Toggle history | 18.0.0  more  Toggle history |
| Support for blob: and data: | 48  Toggle history | 79  Toggle history | 39  Toggle history | 35  Toggle history | 10.1  Toggle history | 48  Toggle history | 39  Toggle history | 35  Toggle history | 10.3  Toggle history | 5.0  Toggle history | 43  Toggle history | 1.9  Toggle history | ?  Toggle history |
| init.referrerPolicy parameter | 52  Toggle history | 79  Toggle history | 52  Toggle history | 39  Toggle history | 11.1  Toggle history | 52  Toggle history | 52  Toggle history | 41  Toggle history | No  Toggle history | 6.0  Toggle history | 52  Toggle history | No  Toggle history | ?  Toggle history |
| init.signal parameter | 66  Toggle history | 16  Toggle history | 57  Toggle history | 53  Toggle history | 11.1  Toggle history | 66  Toggle history | 57  Toggle history | 47  Toggle history | 11.3  Toggle history | 9.0  Toggle history | 66  Toggle history | 1.11  Toggle history | 18.0.0  more  Toggle history |
| Available in workers | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | Yes  Toggle history | ?  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

See implementation notes.

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Using_Fetch#see_also)

* [ServiceWorker API](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API)
* [HTTP access control (CORS)](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS)
* [HTTP](https://developer.mozilla.org/en-US/docs/Web/HTTP)
* [Fetch polyfill](https://github.com/github/fetch)
* [Fetch examples on GitHub](https://github.com/mdn/dom-examples/tree/main/fetch)

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# Fetch basic concepts

<https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Basic_concepts>

The [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API) provides an interface for fetching resources (including across the network). It will seem familiar to anyone who has used [XMLHttpRequest](https://developer.mozilla.org/en-US/docs/Web/API/XMLHttpRequest), but it provides a more powerful and flexible feature set. This article explains some of the basic concepts of the Fetch API.

**Note:** This article will be added to over time. If you find a Fetch concept that you feel needs explaining better, let someone know on the [MDN discussion forum](https://discourse.mozilla.org/c/mdn/236), or [MDN Web Docs room](https://chat.mozilla.org/#/room/#mdn:mozilla.org) on [Matrix](https://wiki.mozilla.org/Matrix).

## [In a nutshell](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Basic_concepts#in_a_nutshell)

At the heart of Fetch are the Interface abstractions of HTTP [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request)s, [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response)s, and [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers), along with a [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) method for initiating asynchronous resource requests. Because the main components of HTTP are abstracted as JavaScript objects, it is easy for other APIs to make use of such functionality.

[Service Workers](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API) is an example of an API that makes heavy use of Fetch.

Fetch takes the asynchronous nature of such requests one step further. The API is completely [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise)-based.

## [Guard](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Basic_concepts#guard)

Guard is a feature of [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) objects, with possible values of immutable, request, request-no-cors, response, or none, depending on where the header is used.

When a new [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object is created using the [Headers()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/Headers) [constructor](https://developer.mozilla.org/en-US/docs/Glossary/Constructor), its guard is set to none (the default). When a [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) or [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object is created, it has an associated [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object whose guard is set as summarized below:

| **new object's type** | **creating constructor** | **guard setting of associated**[**Headers**](https://developer.mozilla.org/en-US/docs/Web/API/Headers)**object** |
| --- | --- | --- |
| [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) | [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) | request |
| [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) with [mode](https://developer.mozilla.org/en-US/docs/Web/API/Request/mode) of no-cors | request-no-cors |
| [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) | [Response()](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response) | response |
| [error()](https://developer.mozilla.org/en-US/docs/Web/API/Response/error) or [redirect()](https://developer.mozilla.org/en-US/docs/Web/API/Response/redirect) methods | immutable |

A header's guard affects the [set()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/set), [delete()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/delete), and [append()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append) methods which change the header's contents. A [TypeError](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypeError) is thrown if you try to modify a [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object whose guard is immutable. However, the operation will work if

* guard is request and the header name isn't a [forbidden header name](https://developer.mozilla.org/en-US/docs/Glossary/Forbidden_header_name) .
* guard is request-no-cors and the header name/value is a [simple header](https://developer.mozilla.org/en-US/docs/Glossary/Simple_header) .
* guard is response and the header name isn't a [forbidden response header name](https://developer.mozilla.org/en-US/docs/Glossary/Forbidden_response_header_name) .

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# Cross-global fetch usage

<https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Cross-global_fetch_usage>

This article explains an edge case that occurs with fetch (and potentially other APIs exhibiting the same kind of resource retrieval behavior). When a cross-origin fetch involving a relative URL is initiated from an [<iframe>](https://developer.mozilla.org/en-US/docs/Web/HTML/Element/iframe), the relative URL used to be resolved against the current global location, rather than the iframe's location.

## [The edge case](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Cross-global_fetch_usage#the_edge_case)

Many sites will never come up against this edge case. To see it:

* You need a same-origin iframe
* That same-origin iframe needs to have a location with a different base URL
* You have to use the fetch function cross-global, e.g. frame.contentWindow.fetch()
* The URL passed to fetch needs to be relative

## [The problem](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Cross-global_fetch_usage#the_problem)

In the past we would resolve the relative URL against the current global, for example:

let absolute = new URL(relative, window.location.href)

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This is not a problem as such. It is just that different APIs that exhibit this kind of behavior were doing it inconsistently with the behavior defined in the spec, which could lead to problems further down the line.

## [The solution](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Cross-global_fetch_usage#the_solution)

In Firefox 60 onwards, Mozilla resolves the relative URL against the global that owns the fetch() function being used (see [bug 1432272](https://bugzilla.mozilla.org/show_bug.cgi?id=1432272)). So in the case described above, it is resolved against the iframe's location:

let absolute = new URL(relative, frame.contentWindow.location.href)

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There is a lot of discussion in progress about getting new specs to align with this behavior change, to mitigate potential problems going forward.

### Found a problem with this page?

* [Edit on **GitHub**](https://github.com/mdn/content/edit/main/files/en-us/web/api/fetch_api/cross-global_fetch_usage/index.md)
* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/fetch_api/cross-global_fetch_usage/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FFetch_API%2FCross-global_fetch_usage&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Ffetch_api%2Fcross-global_fetch_usage%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FFetch_API%2FCross-global_fetch_usage%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Ffetch_api%2Fcross-global_fetch_usage%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2F1511e914c6b1ce6f88056bfefd48a6aa585cebce%0A*+Document+last+modified%3A+2022-09-09T05%3A10%3A34.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 9, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API/Cross-global_fetch_usage/contributors.txt)

# Headers

<https://developer.mozilla.org/en-US/docs/Web/API/Headers>

The **Headers** interface of the [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API) allows you to perform various actions on [HTTP request and response headers](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers). These actions include retrieving, setting, adding to, and removing headers from the list of the request's headers.

A Headers object has an associated header list, which is initially empty and consists of zero or more name and value pairs. You can add to this using methods like [append()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append) (see [Examples](https://developer.mozilla.org/en-US/docs/Web/API/Headers#examples).) In all methods of this interface, header names are matched by case-insensitive byte sequence.

For security reasons, some headers can only be controlled by the user agent. These headers include the [forbidden header names](https://developer.mozilla.org/en-US/docs/Glossary/Forbidden_header_name) and [forbidden response header names](https://developer.mozilla.org/en-US/docs/Glossary/Forbidden_response_header_name).

A Headers object also has an associated guard, which takes a value of immutable, request, request-no-cors, response, or none. This affects whether the [set()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/set), [delete()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/delete), and [append()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append) methods will mutate the header. For more information see [Guard](https://developer.mozilla.org/en-US/docs/Glossary/Guard).

You can retrieve a Headers object via the [Request.headers](https://developer.mozilla.org/en-US/docs/Web/API/Request/headers) and [Response.headers](https://developer.mozilla.org/en-US/docs/Web/API/Response/headers) properties, and create a new Headers object using the [Headers()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/Headers) constructor.

An object implementing Headers can directly be used in a [for...of](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Statements/for...of) structure, instead of [entries()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/entries): for (const p of myHeaders) is equivalent to for (const p of myHeaders.entries()).

**Note:** you can find out more about the available headers by reading our [HTTP headers](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers) reference.

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/Headers#constructor)

[Headers()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/Headers)

Creates a new Headers object.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/Headers#methods)

[Headers.append()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append)

Appends a new value onto an existing header inside a Headers object, or adds the header if it does not already exist.

[Headers.delete()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/delete)

Deletes a header from a Headers object.

[Headers.entries()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/entries)

Returns an [iterator](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Iteration_protocols) allowing to go through all key/value pairs contained in this object.

[Headers.forEach()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/forEach)

Executes a provided function once for each key/value pair in this Headers object.

[Headers.get()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/get)

Returns a [String](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/String) sequence of all the values of a header within a Headers object with a given name.

[Headers.has()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/has)

Returns a boolean stating whether a Headers object contains a certain header.

[Headers.keys()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/keys)

Returns an [iterator](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Iteration_protocols) allowing you to go through all keys of the key/value pairs contained in this object.

[Headers.set()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/set)

Sets a new value for an existing header inside a Headers object, or adds the header if it does not already exist.

[Headers.values()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/values)

Returns an [iterator](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Iteration_protocols) allowing you to go through all values of the key/value pairs contained in this object.

**Note:** To be clear, the difference between [Headers.set()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/set) and [Headers.append()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append) is that if the specified header does already exist and does accept multiple values, [Headers.set()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/set) will overwrite the existing value with the new one, whereas [Headers.append()](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append) will append the new value onto the end of the set of values. See their dedicated pages for example code.

**Note:** All of the Headers methods will throw a [TypeError](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypeError) if you try to pass in a reference to a name that isn't a [valid HTTP Header name](https://fetch.spec.whatwg.org/#concept-header-name). The mutation operations will throw a TypeError if the header has an immutable [Guard](https://developer.mozilla.org/en-US/docs/Glossary/Guard). In any other failure case they fail silently.

**Note:** When Header values are iterated over, they are automatically sorted in lexicographical order, and values from duplicate header names are combined.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/Headers#examples)

In the following snippet, we create a new header using the Headers() constructor, add a new header to it using append(), then return that header value using get():

const myHeaders = new Headers();

myHeaders.append('Content-Type', 'text/xml');

myHeaders.get('Content-Type') // should return 'text/xml'

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The same can be achieved by passing an array of arrays or an object literal to the constructor:

let myHeaders = new Headers({

'Content-Type': 'text/xml'

});

// or, using an array of arrays:

myHeaders = new Headers([

['Content-Type', 'text/xml']

]);

myHeaders.get('Content-Type') // should return 'text/xml'

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Headers#specifications)

| **Specification** |
| --- |
| [Fetch Standard # headers-class](https://fetch.spec.whatwg.org/#headers-class) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Headers#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FHeaders&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.Headers%60%0A*+Report+started%3A+2022-09-24T08%3A34%3A04.650Z%0A%0A%3C%2Fdetails%3E&title=api.Headers+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| Headers | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | 18.0.0  more  Toggle history |
| @@iterator | 42  Toggle history | 16  Toggle history | 44  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [Headers() constructor](https://developer.mozilla.org/en-US/docs/Web/API/Headers/Headers) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [append](https://developer.mozilla.org/en-US/docs/Web/API/Headers/append) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [delete](https://developer.mozilla.org/en-US/docs/Web/API/Headers/delete) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [entries](https://developer.mozilla.org/en-US/docs/Web/API/Headers/entries) | 42  Toggle history | 16  Toggle history | 44  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| forEach | 42  Toggle history | 14  Toggle history | 47  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 47  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [get](https://developer.mozilla.org/en-US/docs/Web/API/Headers/get) | 42  footnote  Toggle history | 14  Toggle history | 39  footnote  Toggle history | 29  footnote  Toggle history | 10.1  Toggle history | 42  footnote  Toggle history | 44  footnote  Toggle history | 29  footnote  Toggle history | 10.3  Toggle history | 4.0  footnote  Toggle history | 42  footnote  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [has](https://developer.mozilla.org/en-US/docs/Web/API/Headers/has) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [keys](https://developer.mozilla.org/en-US/docs/Web/API/Headers/keys) | 42  Toggle history | 16  Toggle history | 44  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| Lexicographical sorting, and values from duplicate header names combined when iterated. | 57  Toggle history | 79  Toggle history | 44  Toggle history | 44  Toggle history | No  Toggle history | 57  Toggle history | 44  Toggle history | 43  Toggle history | No  Toggle history | 7.0  Toggle history | 57  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [set](https://developer.mozilla.org/en-US/docs/Web/API/Headers/set) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [values](https://developer.mozilla.org/en-US/docs/Web/API/Headers/values) | 42  Toggle history | 16  Toggle history | 44  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 44  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

See implementation notes.

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Headers#see_also)

* [ServiceWorker API](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API)
* [HTTP access control (CORS)](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS)
* [HTTP](https://developer.mozilla.org/en-US/docs/Web/HTTP)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/headers/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FHeaders&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fheaders%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FHeaders%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fheaders%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Fff3545b816d9a945d3793ecc330a3b6cbdc59c1c%0A*+Document+last+modified%3A+2022-09-11T06%3A43%3A56.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

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# Request

<https://developer.mozilla.org/en-US/docs/Web/API/Request>

The **Request** interface of the [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API) represents a resource request.

You can create a new Request object using the [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) constructor, but you are more likely to encounter a Request object being returned as the result of another API operation, such as a service worker [FetchEvent.request](https://developer.mozilla.org/en-US/docs/Web/API/FetchEvent/request).

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/Request#constructor)

[Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request)

Creates a new Request object.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/Request#properties)

[Request.body](https://developer.mozilla.org/en-US/docs/Web/API/Request/body) Read only

A [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) of the body contents.

[Request.bodyUsed](https://developer.mozilla.org/en-US/docs/Web/API/Request/bodyUsed) Read only

Stores true or false to indicate whether or not the body has been used in a request yet.

[Request.cache](https://developer.mozilla.org/en-US/docs/Web/API/Request/cache) Read only

Contains the cache mode of the request (e.g., default, reload, no-cache).

[Request.credentials](https://developer.mozilla.org/en-US/docs/Web/API/Request/credentials) Read only

Contains the credentials of the request (e.g., omit, same-origin, include). The default is same-origin.

[Request.destination](https://developer.mozilla.org/en-US/docs/Web/API/Request/destination) Read only

Returns a string describing the request's destination. This is a string indicating the type of content being requested.

[Request.headers](https://developer.mozilla.org/en-US/docs/Web/API/Request/headers) Read only

Contains the associated [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object of the request.

[Request.integrity](https://developer.mozilla.org/en-US/docs/Web/API/Request/integrity) Read only

Contains the [subresource integrity](https://developer.mozilla.org/en-US/docs/Web/Security/Subresource_Integrity) value of the request (e.g., sha256-BpfBw7ivV8q2jLiT13fxDYAe2tJllusRSZ273h2nFSE=).

[Request.method](https://developer.mozilla.org/en-US/docs/Web/API/Request/method) Read only

Contains the request's method (GET, POST, etc.)

[Request.mode](https://developer.mozilla.org/en-US/docs/Web/API/Request/mode) Read only

Contains the mode of the request (e.g., cors, no-cors, same-origin, navigate.)

[Request.priority](https://developer.mozilla.org/en-US/docs/Web/API/Request/priority) Read only Experimental

Contains the request's priority hint (e.g., high, low, auto).

[Request.redirect](https://developer.mozilla.org/en-US/docs/Web/API/Request/redirect) Read only

Contains the mode for how redirects are handled. It may be one of follow, error, or manual.

[Request.referrer](https://developer.mozilla.org/en-US/docs/Web/API/Request/referrer) Read only

Contains the referrer of the request (e.g., client).

[Request.referrerPolicy](https://developer.mozilla.org/en-US/docs/Web/API/Request/referrerPolicy) Read only

Contains the referrer policy of the request (e.g., no-referrer).

[Request.url](https://developer.mozilla.org/en-US/docs/Web/API/Request/url) Read only

Contains the URL of the request.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/Request#methods)

[Request.arrayBuffer()](https://developer.mozilla.org/en-US/docs/Web/API/Request/arrayBuffer)

Returns a promise that resolves with an [ArrayBuffer](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/ArrayBuffer) representation of the request body.

[Request.blob()](https://developer.mozilla.org/en-US/docs/Web/API/Request/blob)

Returns a promise that resolves with a [Blob](https://developer.mozilla.org/en-US/docs/Web/API/Blob) representation of the request body.

[Request.clone()](https://developer.mozilla.org/en-US/docs/Web/API/Request/clone)

Creates a copy of the current Request object.

[Request.formData()](https://developer.mozilla.org/en-US/docs/Web/API/Request/formData)

Returns a promise that resolves with a [FormData](https://developer.mozilla.org/en-US/docs/Web/API/FormData) representation of the request body.

[Request.json()](https://developer.mozilla.org/en-US/docs/Web/API/Request/json)

Returns a promise that resolves with the result of parsing the request body as [JSON](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/JSON).

[Request.text()](https://developer.mozilla.org/en-US/docs/Web/API/Request/text)

Returns a promise that resolves with a text representation of the request body.

**Note:** The request body functions can be run only once; subsequent calls will resolve with empty strings/ArrayBuffers.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/Request#examples)

In the following snippet, we create a new request using the Request() constructor (for an image file in the same directory as the script), then return some property values of the request:

const request = new Request('https://www.mozilla.org/favicon.ico');

const url = request.url;

const method = request.method;

const credentials = request.credentials;

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You could then fetch this request by passing the Request object in as a parameter to a [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) call, for example:

fetch(request)

.then((response) => response.blob())

.then((blob) => {

image.src = URL.createObjectURL(blob);

});

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In the following snippet, we create a new request using the Request() constructor with some initial data and body content for an API request which need a body payload:

const request = new Request('https://example.com', {method: 'POST', body: '{"foo": "bar"}'});

const url = request.url;

const method = request.method;

const credentials = request.credentials;

const bodyUsed = request.bodyUsed;

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**Note:** The body can only be a [Blob](https://developer.mozilla.org/en-US/docs/Web/API/Blob), an [ArrayBuffer](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/ArrayBuffer), a [TypedArray](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypedArray), a [DataView](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/DataView), a [FormData](https://developer.mozilla.org/en-US/docs/Web/API/FormData), a [URLSearchParams](https://developer.mozilla.org/en-US/docs/Web/API/URLSearchParams), a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream), or a [String](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/String) object, as well as a string literal, so for adding a JSON object to the payload you need to stringify that object.

You could then fetch this API request by passing the Request object in as a parameter to a [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) call, for example and get the response:

fetch(request)

.then((response) => {

if (response.status === 200) {

return response.json();

} else {

throw new Error('Something went wrong on API server!');

}

})

.then((response) => {

console.debug(response);

// …

}).catch((error) => {

console.error(error);

});

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Request#specifications)

| **Specification** |
| --- |
| [Fetch Standard # request-class](https://fetch.spec.whatwg.org/#request-class) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Request#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FRequest&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.Request%60%0A*+Report+started%3A+2022-09-24T08%3A34%3A55.775Z%0A%0A%3C%2Fdetails%3E&title=api.Request+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| Request | 42  more  Toggle history | 14  Toggle history | 39  Toggle history | 29  more  Toggle history | 10.1  Toggle history | 42  more  Toggle history | 39  Toggle history | 29  more  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  more  Toggle history | 1.0  Toggle history | 18.0.0  more  Toggle history |
| [Request() constructor](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) | 40  footnote  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  footnote  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  footnote  Toggle history | 40  footnote  Toggle history | 1.0  footnote  Toggle history | ?  Toggle history |
| cross-origin referrer stripped out and navigate mode converted to same-origin when constructor created from existing Request object. | 69  Toggle history | 15  Toggle history | 54  Toggle history | 56  Toggle history | 10.1  Toggle history | 69  Toggle history | 54  Toggle history | 48  Toggle history | 10.3  Toggle history | 10.0  Toggle history | 69  Toggle history | No  Toggle history | ?  Toggle history |
| init.referrer parameter | 47  Toggle history | 15  Toggle history | 47  Toggle history | 34  Toggle history | 10.1  Toggle history | 47  Toggle history | 47  Toggle history | 34  Toggle history | 10.3  Toggle history | 5.0  Toggle history | 47  Toggle history | No  Toggle history | ?  Toggle history |
| navigate mode | 49  Toggle history | 15  Toggle history | 46  Toggle history | 36  Toggle history | 10.1  Toggle history | 49  Toggle history | 46  Toggle history | No  Toggle history | 10.3  Toggle history | 5.0  Toggle history | No  Toggle history | 1.7  Toggle history | ?  Toggle history |
| Send ReadableStream in request body  Experimental | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | 1.7  Toggle history | ?  Toggle history |
| Consume response body as a ReadableStream | 43  Toggle history | 79  Toggle history | 65  Toggle history | 30  Toggle history | No  Toggle history | 43  Toggle history | 65  Toggle history | No  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [arrayBuffer](https://developer.mozilla.org/en-US/docs/Web/API/Request/arrayBuffer) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [blob](https://developer.mozilla.org/en-US/docs/Web/API/Request/blob) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [body](https://developer.mozilla.org/en-US/docs/Web/API/Request/body) | 105  Toggle history | 105  Toggle history | No  footnote  Toggle history | 91  Toggle history | 11.1  Toggle history | 105  Toggle history | No  footnote  Toggle history | No  Toggle history | 11.3  Toggle history | No  Toggle history | 105  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [bodyUsed](https://developer.mozilla.org/en-US/docs/Web/API/Request/bodyUsed) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [cache](https://developer.mozilla.org/en-US/docs/Web/API/Request/cache) | 64  Toggle history | 14  Toggle history | 48  Toggle history | 51  Toggle history | 10.1  Toggle history | 64  Toggle history | 48  Toggle history | 47  Toggle history | 10.3  Toggle history | 9.0  Toggle history | 64  Toggle history | No  Toggle history | ?  Toggle history |
| only-if-cached  Experimental | No  Toggle history | No  Toggle history | 50  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | ?  Toggle history |
| [clone](https://developer.mozilla.org/en-US/docs/Web/API/Request/clone) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [credentials](https://developer.mozilla.org/en-US/docs/Web/API/Request/credentials) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | No  Toggle history | ?  Toggle history |
| Default value same-origin | 72  Toggle history | 18  Toggle history | 61  Toggle history | 55  Toggle history | 12.1  Toggle history | 72  Toggle history | 61  Toggle history | No  Toggle history | 12.2  Toggle history | 11.0  Toggle history | 72  Toggle history | No  Toggle history | ?  Toggle history |
| [destination](https://developer.mozilla.org/en-US/docs/Web/API/Request/destination) | 65  Toggle history | 14  Toggle history | 61  Toggle history | 52  Toggle history | 10.1  Toggle history | 65  Toggle history | 61  Toggle history | 47  Toggle history | 10.3  Toggle history | 9.0  Toggle history | 65  Toggle history | No  Toggle history | ?  Toggle history |
| [formData](https://developer.mozilla.org/en-US/docs/Web/API/Request/formData) | 60  Toggle history | 79  Toggle history | 39  Toggle history | 47  Toggle history | 14.1  more  Toggle history | 60  Toggle history | 39  Toggle history | 44  Toggle history | 14.5  more  Toggle history | 8.0  Toggle history | 60  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [headers](https://developer.mozilla.org/en-US/docs/Web/API/Request/headers) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [integrity](https://developer.mozilla.org/en-US/docs/Web/API/Request/integrity) | 46  Toggle history | 14  Toggle history | 51  Toggle history | 33  Toggle history | 10.1  Toggle history | 46  Toggle history | 51  Toggle history | 33  Toggle history | 10.3  Toggle history | 5.0  Toggle history | 46  Toggle history | No  Toggle history | ?  Toggle history |
| isHistoryNavigation | 69  Toggle history | 79  Toggle history | No  Toggle history | 56  Toggle history | No  Toggle history | 69  Toggle history | No  Toggle history | 48  Toggle history | No  Toggle history | 10.0  Toggle history | 69  Toggle history | No  Toggle history | ?  Toggle history |
| [json](https://developer.mozilla.org/en-US/docs/Web/API/Request/json) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [keepalive](https://developer.mozilla.org/en-US/docs/Web/API/Request/keepalive) | 66  Toggle history | 15  Toggle history | No  Toggle history | 43  Toggle history | 13  Toggle history | 66  Toggle history | No  Toggle history | 43  Toggle history | 13  Toggle history | 9.0  Toggle history | 66  Toggle history | No  Toggle history | ?  Toggle history |
| [method](https://developer.mozilla.org/en-US/docs/Web/API/Request/method) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [mode](https://developer.mozilla.org/en-US/docs/Web/API/Request/mode) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | No  Toggle history | ?  Toggle history |
| navigate mode | 49  Toggle history | 18  Toggle history | 46  Toggle history | 36  Toggle history | 10.1  Toggle history | 49  Toggle history | No  Toggle history | No  Toggle history | 10.3  Toggle history | 5.0  Toggle history | No  Toggle history | No  Toggle history | ?  Toggle history |
| priority  Experimental | 101  Toggle history | 101  Toggle history | No  Toggle history | No  Toggle history | No  Toggle history | 101  Toggle history | No  Toggle history | 70  Toggle history | No  Toggle history | No  Toggle history | 101  Toggle history | No  Toggle history | ?  Toggle history |
| [redirect](https://developer.mozilla.org/en-US/docs/Web/API/Request/redirect) | 46  Toggle history | 14  Toggle history | 43  Toggle history | 33  Toggle history | 10.1  Toggle history | 46  Toggle history | 43  Toggle history | 33  Toggle history | 10.3  Toggle history | 5.0  Toggle history | 46  Toggle history | 1.0  footnote  Toggle history | ?  Toggle history |
| [referrer](https://developer.mozilla.org/en-US/docs/Web/API/Request/referrer) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [referrerPolicy](https://developer.mozilla.org/en-US/docs/Web/API/Request/referrerPolicy) | 52  Toggle history | 14  Toggle history | 47  Toggle history | 39  Toggle history | 10.1  Toggle history | 52  Toggle history | 47  Toggle history | 41  Toggle history | 10.3  Toggle history | 7.2  Toggle history | 52  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [signal](https://developer.mozilla.org/en-US/docs/Web/API/Request/signal) | 66  Toggle history | 16  Toggle history | 57  Toggle history | 53  Toggle history | 12.1  Toggle history | 66  Toggle history | 57  Toggle history | 47  Toggle history | 12.2  Toggle history | 9.0  Toggle history | 66  Toggle history | 1.11  Toggle history | ?  Toggle history |
| [text](https://developer.mozilla.org/en-US/docs/Web/API/Request/text) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [url](https://developer.mozilla.org/en-US/docs/Web/API/Request/url) | 40  footnote  Toggle history | 14  Toggle history | 39  Toggle history | 27  footnote  Toggle history | 10.1  Toggle history | 40  footnote  Toggle history | 39  Toggle history | 27  footnote  Toggle history | 10.3  Toggle history | 4.0  footnote  Toggle history | 40  footnote  Toggle history | 1.0  Toggle history | ?  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

No support

No support

Experimental. Expect behavior to change in the future.

See implementation notes.

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Request#see_also)

* [ServiceWorker API](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API)
* [HTTP access control (CORS)](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS)
* [HTTP](https://developer.mozilla.org/en-US/docs/Web/HTTP)

### Found a problem with this page?

* [Edit on **GitHub**](https://github.com/mdn/content/edit/main/files/en-us/web/api/request/index.md)
* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/request/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FRequest&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Frequest%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FRequest%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Frequest%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Fe0e09b1df51489867f2e74c18586d168ba5e00d1%0A*+Document+last+modified%3A+2022-09-09T05%3A18%3A40.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 9, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/Request/contributors.txt)

# Response

<https://developer.mozilla.org/en-US/docs/Web/API/Response>

The **Response** interface of the [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API) represents the response to a request.

You can create a new Response object using the [Response()](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response) constructor, but you are more likely to encounter a Response object being returned as the result of another API operation—for example, a service worker [FetchEvent.respondWith](https://developer.mozilla.org/en-US/docs/Web/API/FetchEvent/respondWith), or a simple [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch).

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/Response#constructor)

[Response()](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response)

Creates a new Response object.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/Response#properties)

[Response.body](https://developer.mozilla.org/en-US/docs/Web/API/Response/body) Read only

A [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) of the body contents.

[Response.bodyUsed](https://developer.mozilla.org/en-US/docs/Web/API/Response/bodyUsed) Read only

Stores a boolean value that declares whether the body has been used in a response yet.

[Response.headers](https://developer.mozilla.org/en-US/docs/Web/API/Response/headers) Read only

The [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object associated with the response.

[Response.ok](https://developer.mozilla.org/en-US/docs/Web/API/Response/ok) Read only

A boolean indicating whether the response was successful (status in the range 200–299) or not.

[Response.redirected](https://developer.mozilla.org/en-US/docs/Web/API/Response/redirected) Read only

Indicates whether or not the response is the result of a redirect (that is, its URL list has more than one entry).

[Response.status](https://developer.mozilla.org/en-US/docs/Web/API/Response/status) Read only

The status code of the response. (This will be 200 for a success).

[Response.statusText](https://developer.mozilla.org/en-US/docs/Web/API/Response/statusText) Read only

The status message corresponding to the status code. (e.g., OK for 200).

Response.trailers

A [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) resolving to a [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object, associated with the response with [Response.headers](https://developer.mozilla.org/en-US/docs/Web/API/Response/headers) for values of the HTTP [Trailer](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Trailer) header.

[Response.type](https://developer.mozilla.org/en-US/docs/Web/API/Response/type) Read only

The type of the response (e.g., basic, cors).

[Response.url](https://developer.mozilla.org/en-US/docs/Web/API/Response/url) Read only

The URL of the response.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/Response#methods)

[Response.arrayBuffer()](https://developer.mozilla.org/en-US/docs/Web/API/Response/arrayBuffer)

Returns a promise that resolves with an [ArrayBuffer](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/ArrayBuffer) representation of the response body.

[Response.blob()](https://developer.mozilla.org/en-US/docs/Web/API/Response/blob)

Returns a promise that resolves with a [Blob](https://developer.mozilla.org/en-US/docs/Web/API/Blob) representation of the response body.

[Response.clone()](https://developer.mozilla.org/en-US/docs/Web/API/Response/clone)

Creates a clone of a Response object.

[Response.error()](https://developer.mozilla.org/en-US/docs/Web/API/Response/error)

Returns a new Response object associated with a network error.

[Response.formData()](https://developer.mozilla.org/en-US/docs/Web/API/Response/formData)

Returns a promise that resolves with a [FormData](https://developer.mozilla.org/en-US/docs/Web/API/FormData) representation of the response body.

[Response.json()](https://developer.mozilla.org/en-US/docs/Web/API/Response/json)

Returns a promise that resolves with the result of parsing the response body text as [JSON](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/JSON).

[Response.redirect()](https://developer.mozilla.org/en-US/docs/Web/API/Response/redirect)

Creates a new response with a different URL.

[Response.text()](https://developer.mozilla.org/en-US/docs/Web/API/Response/text)

Returns a promise that resolves with a text representation of the response body.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/Response#examples)

### [Fetching an image](https://developer.mozilla.org/en-US/docs/Web/API/Response#fetching_an_image)

In our [basic fetch example](https://github.com/mdn/dom-examples/tree/main/fetch/basic-fetch) ([run example live](https://mdn.github.io/dom-examples/fetch/basic-fetch/)) we use a simple fetch() call to grab an image and display it in an [<img>](https://developer.mozilla.org/en-US/docs/Web/HTML/Element/img) element. The fetch() call returns a promise, which resolves to the Response object associated with the resource fetch operation.

You'll notice that since we are requesting an image, we need to run [Response.blob](https://developer.mozilla.org/en-US/docs/Web/API/Response/blob) to give the response its correct MIME type.

const image = document.querySelector('.my-image');

fetch('flowers.jpg')

.then((response) => response.blob())

.then((blob) => {

const objectURL = URL.createObjectURL(blob);

image.src = objectURL;

});

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You can also use the [Response()](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response) constructor to create your own custom Response object:

const response = new Response();

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### [An Ajax Call](https://developer.mozilla.org/en-US/docs/Web/API/Response#an_ajax_call)

Here we call a PHP program file that generates a JSON string, displaying the result as a JSON value, including simple error handling.

// Function to do an Ajax call

const doAjax = async () => {

const response = await fetch('Ajax.php'); // Generate the Response object

if (response.ok) {

const jsonValue = await response.json(); // Get JSON value from the response body

return Promise.resolve(jsonValue);

} else {

return Promise.reject('\*\*\* PHP file not found');

}

}

// Call the function and output value or error message to console

doAjax().then(console.log).catch(console.log);

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Response#specifications)

| **Specification** |
| --- |
| [Fetch Standard # response-class](https://fetch.spec.whatwg.org/#response-class) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Response#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FResponse&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.Response%60%0A*+Report+started%3A+2022-09-24T08%3A35%3A15.219Z%0A%0A%3C%2Fdetails%3E&title=api.Response+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| Response | 42  more  Toggle history | 14  Toggle history | 39  Toggle history | 29  more  Toggle history | 10.1  Toggle history | 42  more  Toggle history | 39  Toggle history | 29  more  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  more  Toggle history | 1.0  Toggle history | 18.0.0  more  Toggle history |
| [Response() constructor](https://developer.mozilla.org/en-US/docs/Web/API/Response/Response) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| body parameter accepts ReadableByteStream | 52  Toggle history | 79  Toggle history | No  Toggle history | 39  Toggle history | No  Toggle history | 52  Toggle history | No  Toggle history | 41  Toggle history | 10.3  Toggle history | 6.0  Toggle history | 52  Toggle history | 1.0  Toggle history | ?  Toggle history |
| body parameter is optional | 40  Toggle history | 79  Toggle history | 59  Toggle history | 27  Toggle history | No  Toggle history | 40  Toggle history | 59  Toggle history | 27  Toggle history | No  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [arrayBuffer](https://developer.mozilla.org/en-US/docs/Web/API/Response/arrayBuffer) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [blob](https://developer.mozilla.org/en-US/docs/Web/API/Response/blob) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [body](https://developer.mozilla.org/en-US/docs/Web/API/Response/body) | 43  Toggle history | 14  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [bodyUsed](https://developer.mozilla.org/en-US/docs/Web/API/Response/bodyUsed) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [clone](https://developer.mozilla.org/en-US/docs/Web/API/Response/clone) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [error](https://developer.mozilla.org/en-US/docs/Web/API/Response/error) | 43  Toggle history | 16  Toggle history | 39  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 39  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [formData](https://developer.mozilla.org/en-US/docs/Web/API/Response/formData) | 60  Toggle history | 79  Toggle history | 39  Toggle history | 47  Toggle history | 14.1  more  Toggle history | 60  Toggle history | 39  Toggle history | 44  Toggle history | 14.5  more  Toggle history | 8.0  Toggle history | 60  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [headers](https://developer.mozilla.org/en-US/docs/Web/API/Response/headers) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [json](https://developer.mozilla.org/en-US/docs/Web/API/Response/json) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [ok](https://developer.mozilla.org/en-US/docs/Web/API/Response/ok) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [redirect](https://developer.mozilla.org/en-US/docs/Web/API/Response/redirect) | 44  Toggle history | 16  Toggle history | 39  Toggle history | 31  Toggle history | 10.1  Toggle history | 44  Toggle history | 39  Toggle history | 32  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 44  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [redirected](https://developer.mozilla.org/en-US/docs/Web/API/Response/redirected) | 57  Toggle history | 16  Toggle history | 49  Toggle history | 44  Toggle history | 10.1  Toggle history | 57  Toggle history | 49  Toggle history | 43  Toggle history | 10.3  Toggle history | 8.0  Toggle history | 60  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [status](https://developer.mozilla.org/en-US/docs/Web/API/Response/status) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [statusText](https://developer.mozilla.org/en-US/docs/Web/API/Response/statusText) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [text](https://developer.mozilla.org/en-US/docs/Web/API/Response/text) | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  Toggle history | ?  Toggle history |
| [type](https://developer.mozilla.org/en-US/docs/Web/API/Response/type) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | No  Toggle history | ?  Toggle history |
| [url](https://developer.mozilla.org/en-US/docs/Web/API/Response/url) | 40  Toggle history | 14  Toggle history | 39  Toggle history | 27  Toggle history | 10.1  Toggle history | 40  Toggle history | 39  Toggle history | 27  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 40  Toggle history | 1.0  Toggle history | ?  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

No support

No support

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Response#see_also)

* [ServiceWorker API](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API)
* [HTTP access control (CORS)](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS)
* [HTTP](https://developer.mozilla.org/en-US/docs/Web/HTTP)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/response/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FResponse&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fresponse%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FResponse%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fresponse%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Fe0e09b1df51489867f2e74c18586d168ba5e00d1%0A*+Document+last+modified%3A+2022-09-09T05%3A18%3A40.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 9, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/Response/contributors.txt)

# fetch()

<https://developer.mozilla.org/en-US/docs/Web/API/fetch>

The global **fetch()** method starts the process of fetching a resource from the network, returning a promise which is fulfilled once the response is available.

The promise resolves to the [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object representing the response to your request.

A [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) promise only rejects when a network error is encountered (which is usually when there's a permissions issue or similar). A [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) promise does not reject on HTTP errors (404, etc.). Instead, a then() handler must check the [Response.ok](https://developer.mozilla.org/en-US/docs/Web/API/Response/ok) and/or [Response.status](https://developer.mozilla.org/en-US/docs/Web/API/Response/status) properties.

WindowOrWorkerGlobalScope is implemented by both [Window](https://developer.mozilla.org/en-US/docs/Web/API/Window) and [WorkerGlobalScope](https://developer.mozilla.org/en-US/docs/Web/API/WorkerGlobalScope), which means that the fetch() method is available in pretty much any context in which you might want to fetch resources.

The fetch() method is controlled by the connect-src directive of [Content Security Policy](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Content-Security-Policy) rather than the directive of the resources it's retrieving.

**Note:** The fetch() method's parameters are identical to those of the [Request()](https://developer.mozilla.org/en-US/docs/Web/API/Request/Request) constructor.

## [Syntax](https://developer.mozilla.org/en-US/docs/Web/API/fetch#syntax)

fetch(resource)

fetch(resource, options)

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### [Parameters](https://developer.mozilla.org/en-US/docs/Web/API/fetch#parameters)

resource

This defines the resource that you wish to fetch. This can either be:

* A string or any other object with a [stringifier](https://developer.mozilla.org/en-US/docs/Glossary/Stringifier) — including a [URL](https://developer.mozilla.org/en-US/docs/Web/API/URL) object — that provides the URL of the resource you want to fetch.
* A [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) object.

options Optional

An object containing any custom settings that you want to apply to the request. The possible options are:

method

The request method, e.g., GET, POST. Note that the [Origin](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Origin) header is not set on Fetch requests with a method of [HEAD](https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods/HEAD) or [GET](https://developer.mozilla.org/en-US/docs/Web/HTTP/Methods/GET). (This behavior was corrected in Firefox 65 — see [bug 1508661](https://bugzilla.mozilla.org/show_bug.cgi?id=1508661).)

headers

Any headers you want to add to your request, contained within a [Headers](https://developer.mozilla.org/en-US/docs/Web/API/Headers) object or an object literal with [String](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/String) values. Note that [some names are forbidden](https://developer.mozilla.org/en-US/docs/Glossary/Forbidden_header_name).

body

Any body that you want to add to your request: this can be a [Blob](https://developer.mozilla.org/en-US/docs/Web/API/Blob), an [ArrayBuffer](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/ArrayBuffer), a [TypedArray](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypedArray), a [DataView](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/DataView), a [FormData](https://developer.mozilla.org/en-US/docs/Web/API/FormData), a [URLSearchParams](https://developer.mozilla.org/en-US/docs/Web/API/URLSearchParams), string object or literal, or a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) object. This latest possibility is still experimental; check the [compatibility information](https://developer.mozilla.org/en-US/docs/Web/API/Request#browser_compatibility) to verify you can use it. Note that a request using the GET or HEAD method cannot have a body.

mode

The mode you want to use for the request, e.g., cors, no-cors, or same-origin.

credentials

Controls what browsers do with credentials ([cookies](https://developer.mozilla.org/en-US/docs/Web/HTTP/Cookies), [HTTP authentication](https://developer.mozilla.org/en-US/docs/Web/HTTP/Authentication) entries, and TLS client certificates). Must be one of the following strings:

omit

Tells browsers to exclude credentials from the request, and ignore any credentials sent back in the response (e.g., any [Set-Cookie](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Set-Cookie) header).

same-origin

Tells browsers to include credentials with requests to same-origin URLs, and use any credentials sent back in responses from same-origin URLs. **This is the default value.**

include

Tells browsers to include credentials in both same- and cross-origin requests, and always use any credentials sent back in responses.

**Note:** Credentials may be included in simple and "final" cross-origin requests, but should not be included in [CORS preflight requests](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS#preflight_requests_and_credentials).

cache

A string indicating how the request will interact with the browser's [HTTP cache](https://developer.mozilla.org/en-US/docs/Web/HTTP/Caching). The possible values, default, no-store, reload, no-cache, force-cache, and only-if-cached, are documented in the article for the [cache](https://developer.mozilla.org/en-US/docs/Web/API/Request/cache) property of the [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) object.

redirect

How to handle a redirect response:

* follow: Automatically follow redirects. Unless otherwise stated the redirect mode is set to follow.
* error: Abort with an error if a redirect occurs.
* manual: Caller intends to process the response in another context. See [WHATWG fetch standard](https://fetch.spec.whatwg.org/#requests) for more information.

referrer

A string specifying the referrer of the request. This can be a same-origin URL, about:client, or an empty string.

referrerPolicy

Specifies the [referrer policy](https://w3c.github.io/webappsec-referrer-policy/#referrer-policies) to use for the request. May be one of no-referrer, no-referrer-when-downgrade, same-origin, origin, strict-origin, origin-when-cross-origin, strict-origin-when-cross-origin, or unsafe-url.

integrity

Contains the [subresource integrity](https://developer.mozilla.org/en-US/docs/Web/Security/Subresource_Integrity) value of the request (e.g., sha256-BpfBw7ivV8q2jLiT13fxDYAe2tJllusRSZ273h2nFSE=).

keepalive

The keepalive option can be used to allow the request to outlive the page. Fetch with the keepalive flag is a replacement for the [Navigator.sendBeacon()](https://developer.mozilla.org/en-US/docs/Web/API/Navigator/sendBeacon) API.

signal

An [AbortSignal](https://developer.mozilla.org/en-US/docs/Web/API/AbortSignal) object instance; allows you to communicate with a fetch request and abort it if desired via an [AbortController](https://developer.mozilla.org/en-US/docs/Web/API/AbortController).

### [Return value](https://developer.mozilla.org/en-US/docs/Web/API/fetch#return_value)

A [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that resolves to a [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object.

### [Exceptions](https://developer.mozilla.org/en-US/docs/Web/API/fetch#exceptions)

AbortError [DOMException](https://developer.mozilla.org/en-US/docs/Web/API/DOMException)

The request was aborted due to a call to the [AbortController](https://developer.mozilla.org/en-US/docs/Web/API/AbortController) [abort()](https://developer.mozilla.org/en-US/docs/Web/API/AbortController/abort) method.

[TypeError](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypeError)

Can occur for the following reasons:

| **Reason** | **Failing examples** |
| --- | --- |
| Invalid header name. | // space in "C ontent-Type"  const headers = {  'C ontent-Type': 'text/xml',  'Breaking-Bad': '<3',  };  fetch('https://example.com/', { headers }); |
| Invalid header value. The header object must contain exactly two elements. | const headers = [  ['Content-Type', 'text/html', 'extra'],  ['Accept'],  ];  fetch('https://example.com/', { headers }); |
| Invalid URL or scheme, or using a scheme that fetch does not support, or using a scheme that is not supported for a particular request mode. | fetch('blob://example.com/', { mode: 'cors' }); |
| URL includes credentials. | fetch('https://user:password@example.com/'); |
| Invalid referrer URL. | fetch('https://example.com/', { referrer: './abc\u0000df' }); |
| Invalid modes (navigate and websocket). | fetch('https://example.com/', { mode: 'navigate' }); |
| If the request cache mode is "only-if-cached" and the request mode is other than "same-origin". | fetch('https://example.com/', {  cache: 'only-if-cached',  mode: 'no-cors',  }); |
| If the request method is an invalid name token or one of forbidden headers ('CONNECT', 'TRACE' or 'TRACK'). | fetch('https://example.com/', { method: 'CONNECT' }); |
| If the request mode is "no-cors" and the request method is not a CORS-safe-listed method ('GET', 'HEAD', or 'POST'). | fetch('https://example.com/', {  method: 'CONNECT',  mode: 'no-cors',  }); |
| If the request method is 'GET' or 'HEAD' and the body is non-null or not undefined. | fetch('https://example.com/', {  method: 'GET',  body: new FormData(),  }); |
| If fetch throws a network error. |  |

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/fetch#examples)

In our [Fetch Request example](https://github.com/mdn/dom-examples/tree/main/fetch/fetch-request) (see [Fetch Request live](https://mdn.github.io/dom-examples/fetch/fetch-request/)) we create a new [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) object using the relevant constructor, then fetch it using a fetch() call. Since we are fetching an image, we run [Response.blob()](https://developer.mozilla.org/en-US/docs/Web/API/Response/blob) on the response to give it the proper MIME type so it will be handled properly, then create an Object URL of it and display it in an [<img>](https://developer.mozilla.org/en-US/docs/Web/HTML/Element/img) element.

const myImage = document.querySelector('img');

const myRequest = new Request('flowers.jpg');

fetch(myRequest)

.then((response) => {

if (!response.ok) {

throw new Error(`HTTP error! Status: ${response.status}`);

}

return response.blob();

})

.then((response) => {

myImage.src = URL.createObjectURL(response);

});

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In the [Fetch with init then Request example](https://github.com/mdn/dom-examples/tree/main/fetch/fetch-with-init-then-request/index.html) (see [Fetch Request init live](https://mdn.github.io/dom-examples/fetch/fetch-with-init-then-request/)), we do the same thing except that we pass in an init object when we invoke fetch():

const myImage = document.querySelector('img');

const myHeaders = new Headers();

myHeaders.append('Accept', 'image/jpeg');

const myInit = {

method: 'GET',

headers: myHeaders,

mode: 'cors',

cache: 'default',

};

const myRequest = new Request('flowers.jpg');

fetch(myRequest, myInit)

.then((response) => {

// …

});

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You could also pass the init object in with the Request constructor to get the same effect:

const myRequest = new Request('flowers.jpg', myInit);

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You can also use an object literal as headers in init.

const myInit = {

method: 'GET',

headers: {

'Accept': 'image/jpeg',

},

mode: 'cors',

cache: 'default',

};

const myRequest = new Request('flowers.jpg', myInit);

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/fetch#specifications)

| **Specification** |
| --- |
| [Fetch Standard # fetch-method](https://fetch.spec.whatwg.org/#fetch-method) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/fetch#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Ffetch&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.fetch%60%0A*+Report+started%3A+2022-09-24T08%3A35%3A33.665Z%0A%0A%3C%2Fdetails%3E&title=api.fetch+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| fetch | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | 1.0  footnote  Toggle history | 18.0.0  more  Toggle history |
| Support for blob: and data: | 48  Toggle history | 79  Toggle history | 39  Toggle history | 35  Toggle history | 10.1  Toggle history | 48  Toggle history | 39  Toggle history | 35  Toggle history | 10.3  Toggle history | 5.0  Toggle history | 43  Toggle history | 1.9  Toggle history | ?  Toggle history |
| init.referrerPolicy parameter | 52  Toggle history | 79  Toggle history | 52  Toggle history | 39  Toggle history | 11.1  Toggle history | 52  Toggle history | 52  Toggle history | 41  Toggle history | No  Toggle history | 6.0  Toggle history | 52  Toggle history | No  Toggle history | ?  Toggle history |
| init.signal parameter | 66  Toggle history | 16  Toggle history | 57  Toggle history | 53  Toggle history | 11.1  Toggle history | 66  Toggle history | 57  Toggle history | 47  Toggle history | 11.3  Toggle history | 9.0  Toggle history | 66  Toggle history | 1.11  Toggle history | 18.0.0  more  Toggle history |
| Available in workers | 42  Toggle history | 14  Toggle history | 39  Toggle history | 29  Toggle history | 10.1  Toggle history | 42  Toggle history | 39  Toggle history | 29  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 42  Toggle history | Yes  Toggle history | ?  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

See implementation notes.

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/fetch#see_also)

* [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API)
* [ServiceWorker API](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API)
* [HTTP access control (CORS)](https://developer.mozilla.org/en-US/docs/Web/HTTP/CORS)
* [HTTP](https://developer.mozilla.org/en-US/docs/Web/HTTP)

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* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Ffetch&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Ffetch%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2Ffetch%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Ffetch%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2F4e233c16c6f0d347972c5c762f5b836318a46124%0A*+Document+last+modified%3A+2022-09-13T05%3A27%3A14.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 13, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/fetch/contributors.txt)

# TextEncoder

<https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder>

he **TextEncoder** interface takes a stream of code points as input and emits a stream of UTF-8 bytes.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

## [Example](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#example)

const encoder = new TextEncoder()

const view = encoder.encode('€')

console.log(view); // Uint8Array(3) [226, 130, 172]

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## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#constructor)

[TextEncoder()](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/TextEncoder)

Returns a newly constructed TextEncoder that will generate a byte stream with UTF-8 encoding.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#properties)

The TextEncoder interface doesn't inherit any property.

[TextEncoder.prototype.encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/encoding) Read only

Always returns "utf-8".

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#methods)

The TextEncoder interface doesn't inherit any method.

[TextEncoder.encode()](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/encode)

Takes a string as input, and returns a [Uint8Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Uint8Array) containing UTF-8 encoded text.

[TextEncoder.encodeInto()](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/encodeInto)

Takes a string to encode and a destination [Uint8Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Uint8Array) to put resulting UTF-8 encoded text into, and returns a dictionary object indicating the progress of the encoding. This is potentially more performant than the older encode() method.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#specifications)

| **Specification** |
| --- |
| [Encoding # interface-textencoder](https://encoding.spec.whatwg.org/#interface-textencoder) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextEncoder&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.TextEncoder%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A39.609Z%0A%0A%3C%2Fdetails%3E&title=api.TextEncoder+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| TextEncoder | 38  Toggle history | 79  Toggle history | 18  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 18  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 11.0.0  more  Toggle history |
| [TextEncoder() constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/TextEncoder) | 38  Toggle history | 79  Toggle history | 18  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 18  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 11.0.0  more  Toggle history |
| [encode](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/encode) | 38  Toggle history | 79  Toggle history | 18  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 18  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| [encodeInto](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/encodeInto) | 74  Toggle history | 79  Toggle history | 66  Toggle history | 62  Toggle history | 14.1  Toggle history | 74  Toggle history | 66  Toggle history | 50  Toggle history | 14.5  Toggle history | 11.0  Toggle history | 74  Toggle history | 1.0  Toggle history | 12.11.0  Toggle history |
| [encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder/encoding) | 38  Toggle history | 79  Toggle history | 18  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 18  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| Available in workers | 38  Toggle history | 79  Toggle history | 20  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 20  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 10.5.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder#see_also)

* The [TextDecoder](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder) interface describing the inverse operation.
* [Node.js supports global export from v11.0.0](https://nodejs.org/api/util.html#util_class_util_textencoder)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/textencoder/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextEncoder&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Ftextencoder%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextEncoder%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Ftextencoder%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Ff7dae62645a2c735ed6f6ed63f664bf279fdfc4b%0A*+Document+last+modified%3A+2022-09-09T05%3A19%3A45.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

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# TextDecoder

<https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder>

The **TextDecoder** interface represents a decoder for a specific text encoding, such as UTF-8, ISO-8859-2, KOI8-R, GBK, etc. A decoder takes a stream of bytes as input and emits a stream of code points.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#examples)

### [Representing text with typed arrays](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#representing_text_with_typed_arrays)

This example shows how to decode a Chinese/Japanese character, as represented by five different typed arrays: [Uint8Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Uint8Array), [Int8Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Int8Array), [Uint16Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Uint16Array), [Int16Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Int16Array), and [Int32Array](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Int32Array).

let utf8decoder = new TextDecoder(); // default 'utf-8' or 'utf8'

let u8arr = new Uint8Array([240, 160, 174, 183]);

let i8arr = new Int8Array([-16, -96, -82, -73]);

let u16arr = new Uint16Array([41200, 47022]);

let i16arr = new Int16Array([-24336, -18514]);

let i32arr = new Int32Array([-1213292304]);

console.log(utf8decoder.decode(u8arr));

console.log(utf8decoder.decode(i8arr));

console.log(utf8decoder.decode(u16arr));

console.log(utf8decoder.decode(i16arr));

console.log(utf8decoder.decode(i32arr));

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### [Handling non-UTF8 text](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#handling_non-utf8_text)

In this example, we decode the Russian text "Привет, мир!", which means "Hello, world." In our [TextDecoder()](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/TextDecoder) constructor, we specify the Windows-1251 character encoding, which is appropriate for Cyrillic script.

let win1251decoder = new TextDecoder('windows-1251');

let bytes = new Uint8Array([207, 240, 232, 226, 229, 242, 44, 32, 236, 232, 240, 33]);

console.log(win1251decoder.decode(bytes)); // Привет, мир!

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## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#constructor)

[TextDecoder()](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/TextDecoder)

Returns a newly constructed TextDecoder that will generate a code point stream with the decoding method specified in parameters.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#properties)

The TextDecoder interface doesn't inherit any properties.

[TextDecoder.encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/encoding) Read only

A string containing the name of the decoder, that is a string describing the method the TextDecoder will use.

[TextDecoder.fatal](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/fatal) Read only

A [Boolean](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Boolean) indicating whether the error mode is fatal.

[TextDecoder.ignoreBOM](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/ignoreBOM) Read only

A [Boolean](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Boolean) indicating whether the [byte order mark](https://www.w3.org/International/questions/qa-byte-order-mark) is ignored.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#methods)

The TextDecoder interface doesn't inherit any method.

[TextDecoder.decode()](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/decode)

Returns a string containing the text decoded with the method of the specific TextDecoder object.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#specifications)

| **Specification** |
| --- |
| [Encoding # interface-textdecoder](https://encoding.spec.whatwg.org/#interface-textdecoder) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextDecoder&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.TextDecoder%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A40.166Z%0A%0A%3C%2Fdetails%3E&title=api.TextDecoder+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

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|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| TextDecoder | 38  Toggle history | 79  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 11.0.0  more  Toggle history |
| [TextDecoder() constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/TextDecoder) | 38  Toggle history | 79  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 11.0.0  more  Toggle history |
| [decode](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/decode) | 38  Toggle history | 79  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  footnote  Toggle history | 11.0.0  more  Toggle history |
| [encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/encoding) | 38  Toggle history | 79  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 19  more  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| [fatal](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/fatal) | 38  Toggle history | 79  Toggle history | 36  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 36  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| [ignoreBOM](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder/ignoreBOM) | 38  Toggle history | 79  Toggle history | 63  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 63  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 8.3.0  Toggle history |
| Available in workers | 38  Toggle history | 79  Toggle history | 20  Toggle history | 25  Toggle history | 10.1  Toggle history | 38  Toggle history | 20  Toggle history | 25  Toggle history | 10.3  Toggle history | 3.0  Toggle history | 38  Toggle history | 1.0  Toggle history | 10.5.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

See implementation notes.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder#see_also)

* The [TextEncoder](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder) interface describing the inverse operation.
* A [shim](https://github.com/inexorabletash/text-encoding) allowing to use this interface in browsers that don't support it.
* [Node.js supports global export from v11.0.0](https://nodejs.org/api/util.html#util_class_util_textdecoder)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/textdecoder/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextDecoder&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Ftextdecoder%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextDecoder%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Ftextdecoder%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Ff7dae62645a2c735ed6f6ed63f664bf279fdfc4b%0A*+Document+last+modified%3A+2022-09-09T05%3A19%3A45.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

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# TextEncoderStream

<https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream>

The **TextEncoderStream** interface of the [Encoding API](https://developer.mozilla.org/en-US/docs/Web/API/Encoding_API) converts a stream of strings into bytes in the UTF-8 encoding. It is the streaming equivalent of [TextEncoder](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoder).

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream#constructor)

[TextEncoderStream()](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/TextEncoderStream)

Creates a new TextEncoderStream object.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream#properties)

[TextEncoderStream.encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/encoding) Read only

Always returns "utf-8".

[TextEncoderStream.readable](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/readable) Read only

Returns the [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) instance controlled by this object.

[TextEncoderStream.writable](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/writable) Read only

Returns the [WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream) instance controlled by this object.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream#examples)

* [Examples of streaming structured data and HTML](https://streams.spec.whatwg.org/demos/)
* [An example of fetch request streams which uses TextEncoderStream to upload the data](https://glitch.com/~fetch-request-stream).

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream#specifications)

| **Specification** |
| --- |
| [Encoding # interface-textencoderstream](https://encoding.spec.whatwg.org/#interface-textencoderstream) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextEncoderStream&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.TextEncoderStream%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A40.857Z%0A%0A%3C%2Fdetails%3E&title=api.TextEncoderStream+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

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|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| TextEncoderStream | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  footnote  Toggle history |
| [TextEncoderStream() constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/TextEncoderStream) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/encoding) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [readable](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/readable) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [writable](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream/writable) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

In development. Supported in a pre-release version.

In development. Supported in a pre-release version.

See implementation notes.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream#see_also)

* [TextDecoderStream](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream)
* [Streams API Concepts](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Concepts)
* [Experimenting with the Streams API](https://deanhume.com/experimenting-with-the-streams-api/)

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* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/textencoderstream/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextEncoderStream&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Ftextencoderstream%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextEncoderStream%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Ftextencoderstream%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Ff7dae62645a2c735ed6f6ed63f664bf279fdfc4b%0A*+Document+last+modified%3A+2022-09-09T05%3A19%3A45.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

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# TextDecoderStream

<https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream>

The **TextDecoderStream** interface of the [Encoding API](https://developer.mozilla.org/en-US/docs/Web/API/Encoding_API) converts a stream of text in a binary encoding, such as UTF-8 etc., to a stream of strings. It is the streaming equivalent of [TextDecoder](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoder).

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream#constructor)

[TextDecoderStream()](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/TextDecoderStream)

Creates a new TextDecoderStream object.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream#properties)

[TextDecoderStream.encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/encoding) Read only

An encoding.

[TextDecoderStream.fatal](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/fatal) Read only

A [boolean](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Boolean) indicating if the error mode is fatal.

[TextDecoderStream.ignoreBOM](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/ignoreBOM) Read only

A [boolean](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Boolean) indicating whether the byte order mark is ignored.

[TextDecoderStream.readable](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/readable) Read only

Returns the [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) instance controlled by this object.

[TextDecoderStream.writable](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/writable) Read only

Returns the [WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream) instance controlled by this object.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream#examples)

* [Examples of streaming structured data and HTML](https://streams.spec.whatwg.org/demos/)
* [An example of fetch request streams which uses TextDecoderStream](https://glitch.com/~fetch-request-stream).

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream#specifications)

| **Specification** |
| --- |
| [Encoding # interface-textdecoderstream](https://encoding.spec.whatwg.org/#interface-textdecoderstream) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextDecoderStream&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.TextDecoderStream%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A41.490Z%0A%0A%3C%2Fdetails%3E&title=api.TextDecoderStream+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| TextDecoderStream | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  footnote  Toggle history |
| [TextDecoderStream() constructor](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/TextDecoderStream) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [encoding](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/encoding) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [fatal](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/fatal) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [ignoreBOM](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/ignoreBOM) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [readable](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/readable) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |
| [writable](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/writable) | 71  Toggle history | 79  Toggle history | 105  Toggle history | 58  Toggle history | 14.1  Toggle history | 71  Toggle history | 105  Toggle history | 50  Toggle history | 14.5  Toggle history | 10.0  Toggle history | 71  Toggle history | 1.11  Toggle history | 16.6.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

In development. Supported in a pre-release version.

In development. Supported in a pre-release version.

See implementation notes.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream#see_also)

* [TextEncoderStream](https://developer.mozilla.org/en-US/docs/Web/API/TextEncoderStream)
* [Streams API Concepts](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Concepts)
* [Experimenting with the Streams API](https://deanhume.com/experimenting-with-the-streams-api/)

### Found a problem with this page?

* [Edit on **GitHub**](https://github.com/mdn/content/edit/main/files/en-us/web/api/textdecoderstream/index.md)
* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/textdecoderstream/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextDecoderStream&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Ftextdecoderstream%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FTextDecoderStream%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Ftextdecoderstream%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Ff7dae62645a2c735ed6f6ed63f664bf279fdfc4b%0A*+Document+last+modified%3A+2022-09-09T05%3A19%3A45.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 9, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/TextDecoderStream/contributors.txt)

# Performance

<https://developer.mozilla.org/en-US/docs/Web/API/Performance>

The **Performance** interface provides access to performance-related information for the current page. It's part of the High Resolution Time API, but is enhanced by the [Performance Timeline API](https://developer.mozilla.org/en-US/docs/Web/API/Performance_Timeline), the [Navigation Timing API](https://developer.mozilla.org/en-US/docs/Web/API/Navigation_timing_API), the [User Timing API](https://developer.mozilla.org/en-US/docs/Web/API/User_Timing_API), and the [Resource Timing API](https://developer.mozilla.org/en-US/docs/Web/API/Resource_Timing_API).

An object of this type can be obtained by calling the [window.performance](https://developer.mozilla.org/en-US/docs/Web/API/performance_property) read-only attribute.

**Note:** This interface and its members are available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API) via [WorkerGlobalScope.performance](https://developer.mozilla.org/en-US/docs/Web/API/performance_property), except where indicated below. Also, note that performance markers and measures are per context. If you create a mark on the main thread (or other worker), you cannot see it in a worker thread, and vice versa.

EventTargetPerformance

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/Performance#properties)

The Performance interface doesn't inherit any properties.

[Performance.navigation](https://developer.mozilla.org/en-US/docs/Web/API/Performance/navigation) Read only Deprecated

A legacy [PerformanceNavigation](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceNavigation) object that provides useful context about the operations included in the times listed in timing, including whether the page was a load or a refresh, how many redirections occurred, and so forth.

**Note:** Not available in workers.

[Performance.timing](https://developer.mozilla.org/en-US/docs/Web/API/Performance/timing) Read only Deprecated

A legacy [PerformanceTiming](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceTiming) object containing latency-related performance information.

**Note:** Not available in workers.

[Performance.memory](https://developer.mozilla.org/en-US/docs/Web/API/Performance/memory) Read only Non-standard

A non-standard extension added in Chrome, this property provides an object with basic memory usage information. You **should not use** this non-standard API.

[Performance.timeOrigin](https://developer.mozilla.org/en-US/docs/Web/API/Performance/timeOrigin) Read only

Returns the high resolution timestamp of the start time of the performance measurement.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/Performance#methods)

The Performance interface doesn't inherit any methods.

[Performance.clearMarks()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/clearMarks)

Removes the given mark from the browser's performance entry buffer.

[Performance.clearMeasures()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/clearMeasures)

Removes the given measure from the browser's performance entry buffer.

[Performance.clearResourceTimings()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/clearResourceTimings)

Removes all [performance entries](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry) with a [entryType](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry/entryType) of "resource" from the browser's performance data buffer.

[Performance.getEntries()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/getEntries)

Returns a list of [PerformanceEntry](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry) objects based on the given filter.

[Performance.getEntriesByName()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/getEntriesByName)

Returns a list of [PerformanceEntry](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry) objects based on the given name and entry type.

[Performance.getEntriesByType()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/getEntriesByType)

Returns a list of [PerformanceEntry](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry) objects of the given entry type.

[Performance.mark()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/mark)

Creates a [timestamp](https://developer.mozilla.org/en-US/docs/Web/API/DOMHighResTimeStamp) in the browser's performance entry buffer with the given name.

[Performance.measure()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/measure)

Creates a named [timestamp](https://developer.mozilla.org/en-US/docs/Web/API/DOMHighResTimeStamp) in the browser's performance entry buffer between two specified marks (known as the start mark and end mark, respectively).

[Performance.now()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/now)

Returns a [DOMHighResTimeStamp](https://developer.mozilla.org/en-US/docs/Web/API/DOMHighResTimeStamp) representing the number of milliseconds elapsed since a reference instant.

[Performance.setResourceTimingBufferSize()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/setResourceTimingBufferSize)

Sets the browser's resource timing buffer size to the specified number of "resource" [type](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry/entryType) [performance entry](https://developer.mozilla.org/en-US/docs/Web/API/PerformanceEntry) objects.

[Performance.toJSON()](https://developer.mozilla.org/en-US/docs/Web/API/Performance/toJSON)

A jsonizer returning a JSON object representing the Performance object.

## [Events](https://developer.mozilla.org/en-US/docs/Web/API/Performance#events)

Listen to these events using addEventListener() or by assigning an event listener to the oneventname property of this interface.

[resourcetimingbufferfull](https://developer.mozilla.org/en-US/docs/Web/API/Performance/resourcetimingbufferfull_event)

Fired when the browser's [resource timing buffer](https://developer.mozilla.org/en-US/docs/Web/API/Performance/setResourceTimingBufferSize) is full.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Performance#specifications)

| **Specification** |
| --- |
| [High Resolution Time # sec-performance](https://w3c.github.io/hr-time/#sec-performance) |
| [Performance Timeline # extensions-to-the-performance-interface](https://w3c.github.io/performance-timeline/#extensions-to-the-performance-interface) |
| [Resource Timing Level 2 # sec-extensions-performance-interface](https://w3c.github.io/resource-timing/#sec-extensions-performance-interface) |
| [User Timing # extensions-performance-interface](https://w3c.github.io/user-timing/#extensions-performance-interface) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Performance#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FPerformance&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.Performance%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A42.036Z%0A%0A%3C%2Fdetails%3E&title=api.Performance+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| Performance | 6  Toggle history | 12  Toggle history | 7  Toggle history | 15  Toggle history | 8  Toggle history | 18  Toggle history | 7  Toggle history | 14  Toggle history | 9  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 8.5.0  Toggle history |
| [clearMarks](https://developer.mozilla.org/en-US/docs/Web/API/Performance/clearMarks) | 29  more  Toggle history | 12  Toggle history | 41  Toggle history | 33  Toggle history | 11  Toggle history | 29  more  Toggle history | 42  Toggle history | 33  Toggle history | 11  Toggle history | 2.0  more  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 8.5.0  Toggle history |
| [clearMeasures](https://developer.mozilla.org/en-US/docs/Web/API/Performance/clearMeasures) | 29  more  Toggle history | 12  Toggle history | 41  Toggle history | 33  Toggle history | 11  Toggle history | 29  more  Toggle history | 42  Toggle history | 33  Toggle history | 11  Toggle history | 2.0  more  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 16.7.0  Toggle history |
| [clearResourceTimings](https://developer.mozilla.org/en-US/docs/Web/API/Performance/clearResourceTimings) | 46  more  Toggle history | 12  Toggle history | 35  Toggle history | 33  more  Toggle history | 11  Toggle history | 46  more  Toggle history | 35  Toggle history | 33  more  Toggle history | 11  Toggle history | 5.0  more  Toggle history | 46  more  Toggle history | No  Toggle history | No  Toggle history |
| eventCounts | 85  Toggle history | 85  Toggle history | 89  Toggle history | 71  Toggle history | No  Toggle history | 85  Toggle history | 89  Toggle history | 60  Toggle history | No  Toggle history | 14.0  Toggle history | 85  Toggle history | No  Toggle history | No  Toggle history |
| [getEntries](https://developer.mozilla.org/en-US/docs/Web/API/Performance/getEntries) | 28  more  Toggle history | 12  Toggle history | 35  Toggle history | No  Toggle history | 11  Toggle history | 28  more  Toggle history | 35  Toggle history | No  Toggle history | 11  Toggle history | 1.5  more  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 16.7.0  Toggle history |
| [getEntriesByName](https://developer.mozilla.org/en-US/docs/Web/API/Performance/getEntriesByName) | 28  more  Toggle history | 12  Toggle history | 35  Toggle history | No  Toggle history | 11  Toggle history | 28  more  Toggle history | 35  Toggle history | No  Toggle history | 11  Toggle history | 1.5  more  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 16.7.0  Toggle history |
| [getEntriesByType](https://developer.mozilla.org/en-US/docs/Web/API/Performance/getEntriesByType) | 28  more  Toggle history | 12  Toggle history | 35  Toggle history | 15  more  Toggle history | 11  Toggle history | 28  more  Toggle history | 35  Toggle history | 15  more  Toggle history | 11  Toggle history | 1.5  more  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 16.7.0  Toggle history |
| [mark](https://developer.mozilla.org/en-US/docs/Web/API/Performance/mark) | 28  more  Toggle history | 12  Toggle history | 41  Toggle history | 33  Toggle history | 11  Toggle history | 28  more  Toggle history | 42  Toggle history | 33  Toggle history | 11  Toggle history | 1.5  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 8.5.0  Toggle history |
| [measure](https://developer.mozilla.org/en-US/docs/Web/API/Performance/measure) | 28  more  Toggle history | 12  Toggle history | 41  Toggle history | 33  Toggle history | 11  Toggle history | 28  more  Toggle history | 42  Toggle history | 33  Toggle history | 11  Toggle history | 1.5  Toggle history | 4.4  Toggle history | 1.2  Toggle history | 8.5.0  Toggle history |
| Returns undefined  DeprecatedNon-standard | 25 – 95  Toggle history | 12 – 95  Toggle history | 41  Toggle history | 33 – 81  Toggle history | 11 – 15  Toggle history | 25 – 95  Toggle history | 42  Toggle history | 33  Toggle history | 11 – 15  Toggle history | 1.5  Toggle history | 4.4 – 95  Toggle history | No  Toggle history | 8.5.0  Toggle history |
| measureUserAgentSpecificMemory  Experimental | 89  Toggle history | 89  Toggle history | No  Toggle history | 75  Toggle history | No  Toggle history | 89  Toggle history | No  Toggle history | 63  Toggle history | No  Toggle history | 15.0  Toggle history | 89  Toggle history | No  Toggle history | No  Toggle history |
| [memory](https://developer.mozilla.org/en-US/docs/Web/API/Performance/memory)  [Non-standard](https://developer.mozilla.org/en-US/docs/Web/API/Performance/memory) | 7  Toggle history | 79  Toggle history | No  Toggle history | 15  Toggle history | No  Toggle history | 18  Toggle history | No  Toggle history | 14  Toggle history | No  Toggle history | 1.0  Toggle history | 37  Toggle history | No  Toggle history | No  Toggle history |
| [navigation](https://developer.mozilla.org/en-US/docs/Web/API/Performance/navigation)  [Deprecated](https://developer.mozilla.org/en-US/docs/Web/API/Performance/navigation) | 10  Toggle history | 12  Toggle history | 7  Toggle history | 15  Toggle history | 8  Toggle history | 18  Toggle history | 7  Toggle history | No  Toggle history | 9  Toggle history | 1.0  Toggle history | 37  Toggle history | No  Toggle history | No  Toggle history |
| [now](https://developer.mozilla.org/en-US/docs/Web/API/Performance/now) | 24  more  Toggle history | 12  Toggle history | 15  footnote  Toggle history | 15  Toggle history | 8  Toggle history | 25  Toggle history | 15  footnote  Toggle history | 14  Toggle history | 9  Toggle history | 1.5  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 8.5.0  Toggle history |
| [resourcetimingbufferfull event](https://developer.mozilla.org/en-US/docs/Web/API/Performance/resourcetimingbufferfull_event) | 46  more  Toggle history | 79  Toggle history | 35  Toggle history | No  Toggle history | 11  Toggle history | 46  more  Toggle history | 35  Toggle history | 33  more  Toggle history | 11  Toggle history | 5.0  more  Toggle history | 46  more  Toggle history | No  Toggle history | No  Toggle history |
| [setResourceTimingBufferSize](https://developer.mozilla.org/en-US/docs/Web/API/Performance/setResourceTimingBufferSize) | 46  more  Toggle history | 12  Toggle history | 35  Toggle history | 33  more  Toggle history | 11  Toggle history | 46  more  Toggle history | 35  Toggle history | 33  more  Toggle history | 11  Toggle history | 5.0  more  Toggle history | 46  more  Toggle history | No  Toggle history | No  Toggle history |
| [timeOrigin](https://developer.mozilla.org/en-US/docs/Web/API/Performance/timeOrigin) | 62  Toggle history | 16  Toggle history | 53  Toggle history | 49  Toggle history | 15  Toggle history | 62  Toggle history | 53  Toggle history | 46  Toggle history | 15  Toggle history | 8.0  Toggle history | 62  Toggle history | 1.22  Toggle history | 8.5.0  Toggle history |
| [timing](https://developer.mozilla.org/en-US/docs/Web/API/Performance/timing)  [Deprecated](https://developer.mozilla.org/en-US/docs/Web/API/Performance/timing) | 6  Toggle history | 12  Toggle history | 7  Toggle history | 15  Toggle history | 8  Toggle history | 18  Toggle history | 7  Toggle history | 14  Toggle history | 9  Toggle history | 1.0  Toggle history | 37  Toggle history | No  Toggle history | 8.5.0  altname  Toggle history |
| [toJSON](https://developer.mozilla.org/en-US/docs/Web/API/Performance/toJSON) | 56  Toggle history | 12  Toggle history | 25  Toggle history | No  Toggle history | 14.1  Toggle history | 56  Toggle history | 25  Toggle history | No  Toggle history | 14.5  Toggle history | 6.0  Toggle history | 56  Toggle history | 1.22  Toggle history | 16.1.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

No support

No support

Experimental. Expect behavior to change in the future.

Non-standard. Check cross-browser support before using.

Deprecated. Not for use in new websites.

See implementation notes.

Uses a non-standard name.

Requires a vendor prefix or different name for use.

Has more compatibility info.

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* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FPerformance&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fperformance%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FPerformance%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fperformance%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2F331a21b7c2cfb816876a4fa391a34d70914dff68%0A*+Document+last+modified%3A+2022-09-18T05%3A26%3A47.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 18, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/Performance/contributors.txt)

# Crypto

<https://developer.mozilla.org/en-US/docs/Web/API/Crypto>

The **Crypto** interface represents basic cryptography features available in the current context. It allows access to a cryptographically strong random number generator and to cryptographic primitives.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

The [Web Crypto API](https://developer.mozilla.org/en-US/docs/Web/API/Web_Crypto_API) is accessed through the global [crypto](https://developer.mozilla.org/en-US/docs/Web/API/crypto_property) property, which is a Crypto object.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/Crypto#properties)

This interface implements properties defined on [RandomSource](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/getRandomValues).

[Crypto.subtle](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/subtle) Read only Secure context

Returns a [SubtleCrypto](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto) object providing access to common cryptographic primitives, like hashing, signing, encryption, or decryption.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/Crypto#methods)

This interface implements methods defined on [RandomSource](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/getRandomValues).

[Crypto.getRandomValues()](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/getRandomValues)

Fills the passed [TypedArray](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/TypedArray) with cryptographically sound random values.

[Crypto.randomUUID()](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/randomUUID)

Returns a randomly generated, 36 character long v4 UUID.

## [Usage notes](https://developer.mozilla.org/en-US/docs/Web/API/Crypto#usage_notes)

You should avoid using the Web Crypto API on insecure contexts, even though the Crypto interface is present on insecure contexts, as is the [crypto](https://developer.mozilla.org/en-US/docs/Web/API/crypto_property) property. In addition, the Crypto method [getRandomValues()](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/getRandomValues) is available on insecure contexts, but the [subtle](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/subtle) property is not.

In general, you probably should just treat Crypto as available only on secure contexts.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Crypto#specifications)

| **Specification** |
| --- |
| [Web Cryptography API # crypto-interface](https://w3c.github.io/webcrypto/#crypto-interface) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Crypto#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FCrypto&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.Crypto%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A42.582Z%0A%0A%3C%2Fdetails%3E&title=api.Crypto+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| Crypto | 11  Toggle history | 12  Toggle history | 21  Toggle history | 15  Toggle history | 5  Toggle history | 18  Toggle history | 21  Toggle history | 14  Toggle history | 5  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.11  more  Toggle history | 15.0.0  altname  Toggle history |
| [getRandomValues()](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/getRandomValues) | 11  Toggle history | 12  Toggle history | 21  Toggle history | 15  Toggle history | 5  Toggle history | 18  Toggle history | 21  Toggle history | 14  Toggle history | 5  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 15.0.0  Toggle history |
| [randomUUID()](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/randomUUID) | 92  Toggle history | 92  Toggle history | 95  Toggle history | 78  Toggle history | 15.4  Toggle history | 92  Toggle history | 95  Toggle history | 65  Toggle history | 15.4  Toggle history | 16.0  Toggle history | 92  Toggle history | 1.11  Toggle history | 16.7.0  footnote  Toggle history |
| [subtle](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/subtle) | 37  Toggle history | 12  Toggle history | 34  Toggle history | 24  Toggle history | 11  more  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 11  more  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.11  Toggle history | 15.0.0  Toggle history |
| Secure context required | 60  Toggle history | 79  Toggle history | 75  Toggle history | 47  Toggle history | 15  Toggle history | 60  Toggle history | 79  Toggle history | 44  Toggle history | 15  Toggle history | 8.0  Toggle history | 60  Toggle history | No  Toggle history | No  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

No support

No support

See implementation notes.

Uses a non-standard name.

Requires a vendor prefix or different name for use.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Crypto#see_also)

* [Web security](https://developer.mozilla.org/en-US/docs/Web/Security)
* [Secure contexts](https://developer.mozilla.org/en-US/docs/Web/Security/Secure_Contexts)
* [Features restricted to secure contexts](https://developer.mozilla.org/en-US/docs/Web/Security/Secure_Contexts/features_restricted_to_secure_contexts)
* [Transport Layer Security](https://developer.mozilla.org/en-US/docs/Web/Security/Transport_Layer_Security)
* [Strict-Transport-Security](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Strict-Transport-Security)

### Found a problem with this page?

* [Edit on **GitHub**](https://github.com/mdn/content/edit/main/files/en-us/web/api/crypto/index.md)
* [Source on **GitHub**](https://github.com/mdn/content/blob/main/files/en-us/web/api/crypto/index.md?plain=1)
* [Report a problem with this content on **GitHub**](https://github.com/mdn/content/issues/new?template=page-report.yml&mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FCrypto&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EPage+report+details%3C%2Fsummary%3E%0A%0A*+Folder%3A+%60en-us%2Fweb%2Fapi%2Fcrypto%60%0A*+MDN+URL%3A+https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FCrypto%0A*+GitHub+URL%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fblob%2Fmain%2Ffiles%2Fen-us%2Fweb%2Fapi%2Fcrypto%2Findex.md%0A*+Last+commit%3A+https%3A%2F%2Fgithub.com%2Fmdn%2Fcontent%2Fcommit%2Fbf30e32f3b51f59080f2c76795beadb247a551eb%0A*+Document+last+modified%3A+2022-09-09T05%3A07%3A36.000Z%0A%0A%3C%2Fdetails%3E)
* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 9, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/contributors.txt)

# SubtleCrypto

<https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto>

**Secure context:** This feature is available only in [secure contexts](https://developer.mozilla.org/en-US/docs/Web/Security/Secure_Contexts) (HTTPS), in some or all [supporting browsers](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#browser_compatibility).

The **SubtleCrypto** interface of the [Web Crypto API](https://developer.mozilla.org/en-US/docs/Web/API/Web_Crypto_API) provides a number of low-level cryptographic functions. Access to the features of SubtleCrypto is obtained through the [subtle](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/subtle) property of the [Crypto](https://developer.mozilla.org/en-US/docs/Web/API/Crypto) object you get from the [crypto](https://developer.mozilla.org/en-US/docs/Web/API/crypto_property) property.

**Warning:** This API provides a number of low-level cryptographic primitives. It's very easy to misuse them, and the pitfalls involved can be very subtle.

Even assuming you use the basic cryptographic functions correctly, secure key management and overall security system design are extremely hard to get right, and are generally the domain of specialist security experts.

Errors in security system design and implementation can make the security of the system completely ineffective.

Please learn and experiment, but don't guarantee or imply the security of your work before an individual knowledgeable in this subject matter thoroughly reviews it. The [Crypto 101 Course](https://www.crypto101.io/) can be a great place to start learning about the design and implementation of secure systems.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#properties)

This interface doesn't inherit any properties, as it has no parent interface.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#methods)

This interface doesn't inherit any methods, as it has no parent interface.

[SubtleCrypto.encrypt()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/encrypt)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with the encrypted data corresponding to the clear text, algorithm, and key given as parameters.

[SubtleCrypto.decrypt()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/decrypt)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with the clear data corresponding to the encrypted text, algorithm, and key given as parameters.

[SubtleCrypto.sign()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/sign)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with the signature corresponding to the text, algorithm, and key given as parameters.

[SubtleCrypto.verify()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/verify)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a boolean value indicating if the signature given as a parameter matches the text, algorithm, and key that are also given as parameters.

[SubtleCrypto.digest()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/digest)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a digest generated from the algorithm and text given as parameters.

[SubtleCrypto.generateKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/generateKey)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a newly-generated [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey), for symmetrical algorithms, or a [CryptoKeyPair](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKeyPair), containing two newly generated keys, for asymmetrical algorithms. These will match the algorithm, usages, and extractability given as parameters.

[SubtleCrypto.deriveKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveKey)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a newly generated [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey) derived from the master key and specific algorithm given as parameters.

[SubtleCrypto.deriveBits()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveBits)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a newly generated buffer of pseudo-random bits derived from the master key and specific algorithm given as parameters.

[SubtleCrypto.importKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/importKey)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey) corresponding to the format, the algorithm, raw key data, usages, and extractability given as parameters.

[SubtleCrypto.exportKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/exportKey)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a buffer containing the key in the requested format.

[SubtleCrypto.wrapKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/wrapKey)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a wrapped symmetric key for usage (transfer and storage) in insecure environments. The wrapped key matches the format specified in the given parameters, and wrapping is done by the given wrapping key, using the specified algorithm.

[SubtleCrypto.unwrapKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/unwrapKey)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that fulfills with a [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey) corresponding to the wrapped key given in the parameter.

## [Using SubtleCrypto](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#using_subtlecrypto)

We can split the functions implemented by this API into two groups: cryptography functions and key management functions.

### [Cryptography functions](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#cryptography_functions)

These are the functions you can use to implement security features such as privacy and authentication in a system. The SubtleCrypto API provides the following cryptography functions:

* [sign()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/sign) and [verify()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/verify): create and verify digital signatures.
* [encrypt()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/encrypt) and [decrypt()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/decrypt): encrypt and decrypt data.
* [digest()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/digest): create a fixed-length, collision-resistant digest of some data.

### [Key management functions](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#key_management_functions)

Except for [digest()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/digest), all the cryptography functions in the API use cryptographic keys. In the SubtleCrypto API a cryptographic key is represented using a [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey) object. To perform operations like signing and encrypting, you pass a [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey) object into the [sign()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/sign) or [encrypt()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/encrypt) function.

#### Generating and deriving keys

The [generateKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/generateKey) and [deriveKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveKey) functions both create a new [CryptoKey](https://developer.mozilla.org/en-US/docs/Web/API/CryptoKey) object.

The difference is that generateKey() will generate a new distinct key value each time you call it, while deriveKey() derives a key from some initial keying material. If you provide the same keying material to two separate calls to deriveKey(), you will get two CryptoKey objects that have the same underlying value. This is useful if, for example, you want to derive an encryption key from a password and later derive the same key from the same password to decrypt the data.

#### Importing and exporting keys

To make keys available outside your app, you need to export the key, and that's what [exportKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/exportKey) is for. You can choose one of a number of export formats.

The inverse of exportKey() is [importKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/importKey). You can import keys from other systems, and support for standard formats like [PKCS #8](https://datatracker.ietf.org/doc/html/rfc5208) and [JSON Web Key](https://datatracker.ietf.org/doc/html/rfc7517) helps you do this. The exportKey() function exports the key in an unencrypted format.

If the key is sensitive you should use [wrapKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/wrapKey), which exports the key and then encrypts it using another key; the API calls a "key-wrapping key".

The inverse of wrapKey() is [unwrapKey()](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/unwrapKey), which decrypts then imports the key.

#### Storing keys

CryptoKey objects can be stored using the [structured clone algorithm](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API/Structured_clone_algorithm), meaning that you can store and retrieve them using standard web storage APIs. The specification expects that most developers will use the [IndexedDB API](https://developer.mozilla.org/en-US/docs/Web/API/IndexedDB_API) to store CryptoKey objects.

### [Supported algorithms](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#supported_algorithms)

The cryptographic functions provided by the Web Crypto API can be performed by one or more different cryptographic algorithms: the algorithm argument to the function indicates which algorithm to use. Some algorithms need extra parameters: in these cases the algorithm argument is a dictionary object that includes the extra parameters.

The table below summarizes which algorithms are suitable for which cryptographic operations:

|  | [**sign()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/sign)[**verify()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/verify) | [**encrypt()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/encrypt)[**decrypt()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/decrypt) | [**digest()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/digest) | [**deriveBits()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveBits)[**deriveKey()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveKey) | [**wrapKey()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/wrapKey)[**unwrapKey()**](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/unwrapKey) |
| --- | --- | --- | --- | --- | --- |
| **RSASSA-PKCS1-v1\_5** | ✓ |  |  |  |  |
| **RSA-PSS** | ✓ |  |  |  |  |
| **ECDSA** | ✓ |  |  |  |  |
| **HMAC** | ✓ |  |  |  |  |
| **RSA-OAEP** |  | ✓ |  |  | ✓ |
| **AES-CTR** |  | ✓ |  |  | ✓ |
| **AES-CBC** |  | ✓ |  |  | ✓ |
| **AES-GCM** |  | ✓ |  |  | ✓ |
| **SHA-1** |  |  | ✓ |  |  |
| **SHA-256** |  |  | ✓ |  |  |
| **SHA-384** |  |  | ✓ |  |  |
| **SHA-512** |  |  | ✓ |  |  |
| **ECDH** |  |  |  | ✓ |  |
| **HKDF** |  |  |  | ✓ |  |
| **PBKDF2** |  |  |  | ✓ |  |
| **AES-KW** |  |  |  |  | ✓ |

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#specifications)

| **Specification** |
| --- |
| [Web Cryptography API # subtlecrypto-interface](https://w3c.github.io/webcrypto/#subtlecrypto-interface) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FSubtleCrypto&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.SubtleCrypto%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A43.710Z%0A%0A%3C%2Fdetails%3E&title=api.SubtleCrypto+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| SubtleCrypto | 37  Toggle history | 12  Toggle history | 34  Toggle history | 24  Toggle history | 11  more  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 11  more  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.11  Toggle history | 15.0.0  Toggle history |
| [decrypt](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/decrypt) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.18  more  Toggle history | 15.0.0  Toggle history |
| [deriveBits](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveBits) | 41  Toggle history | 79  more  Toggle history | 34  Toggle history | 28  Toggle history | 11  Toggle history | 41  Toggle history | 34  Toggle history | 28  Toggle history | 11  Toggle history | 4.0  Toggle history | 41  Toggle history | 1.15  more  Toggle history | 15.0.0  footnote  Toggle history |
| [deriveKey](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/deriveKey) | 41  Toggle history | 79  more  Toggle history | 34  Toggle history | 28  Toggle history | 11  Toggle history | 41  Toggle history | 34  Toggle history | 28  Toggle history | 11  Toggle history | 4.0  Toggle history | 41  Toggle history | 1.15  Toggle history | 15.0.0  footnote  Toggle history |
| [digest](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/digest) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.11  Toggle history | 15.0.0  Toggle history |
| [encrypt](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/encrypt) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.18  more  Toggle history | 15.0.0  Toggle history |
| [exportKey](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/exportKey) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.18  more  Toggle history | 15.0.0  footnote  Toggle history |
| [generateKey](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/generateKey) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.14  more  Toggle history | 15.0.0  footnote  Toggle history |
| [importKey](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/importKey) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.17  more  Toggle history | 15.0.0  footnote  Toggle history |
| Secure context required | 60  Toggle history | 79  Toggle history | 75  Toggle history | 47  Toggle history | 15  Toggle history | 60  Toggle history | No  Toggle history | 44  Toggle history | 15  Toggle history | 8.0  Toggle history | 60  Toggle history | No  Toggle history | No  Toggle history |
| [sign](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/sign) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.12  Toggle history | 15.0.0  footnote  Toggle history |
| [unwrapKey](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/unwrapKey) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.17  Toggle history | 15.0.0  footnote  Toggle history |
| [verify](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/verify) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.14  more  Toggle history | 15.0.0  footnote  Toggle history |
| Available in workers | 37  Toggle history | 79  Toggle history | 48  Toggle history | 24  Toggle history | 11  Toggle history | 37  Toggle history | 48  Toggle history | 24  Toggle history | 11  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.11  Toggle history | 15.0.0  Toggle history |
| [wrapKey](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto/wrapKey) | 37  Toggle history | 79  more  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 37  Toggle history | 34  Toggle history | 24  Toggle history | 7  Toggle history | 3.0  Toggle history | 37  Toggle history | 1.15  Toggle history | 15.0.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

No support

No support

See implementation notes.

Requires a vendor prefix or different name for use.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/SubtleCrypto#see_also)

* [Web Crypto API](https://developer.mozilla.org/en-US/docs/Web/API/Web_Crypto_API)
* [Non-cryptographic uses of SubtleCrypto](https://developer.mozilla.org/en-US/docs/Web/API/Web_Crypto_API/Non-cryptographic_uses_of_subtle_crypto)
* [Web security](https://developer.mozilla.org/en-US/docs/Web/Security)
* [Privacy, permissions, and information security](https://developer.mozilla.org/en-US/docs/Web/Privacy)
* [Crypto](https://developer.mozilla.org/en-US/docs/Web/API/Crypto) and [Crypto.subtle](https://developer.mozilla.org/en-US/docs/Web/API/Crypto/subtle).
* [Crypto 101](https://www.crypto101.io/): an introductory course on cryptography.

# WebSocket

<https://developer.mozilla.org/en-US/docs/Web/API/WebSocket>

The WebSocket object provides the API for creating and managing a [WebSocket](https://developer.mozilla.org/en-US/docs/Web/API/WebSockets_API) connection to a server, as well as for sending and receiving data on the connection.

To construct a WebSocket, use the [WebSocket()](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/WebSocket) constructor.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

EventTargetWebSocket

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#constructor)

[WebSocket()](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/WebSocket)

Returns a newly created WebSocket object.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#properties)

[WebSocket.binaryType](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/binaryType)

The binary data type used by the connection.

[WebSocket.bufferedAmount](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/bufferedAmount) Read only

The number of bytes of queued data.

[WebSocket.extensions](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/extensions) Read only

The extensions selected by the server.

[WebSocket.protocol](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/protocol) Read only

The sub-protocol selected by the server.

[WebSocket.readyState](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/readyState) Read only

The current state of the connection.

[WebSocket.url](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/url) Read only

The absolute URL of the WebSocket.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#methods)

[WebSocket.close()](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/close)

Closes the connection.

[WebSocket.send()](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/send)

Enqueues data to be transmitted.

## [Events](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#events)

Listen to these events using addEventListener() or by assigning an event listener to the oneventname property of this interface.

[close](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/close_event)

Fired when a connection with a WebSocket is closed. Also available via the onclose property

[error](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/error_event)

Fired when a connection with a WebSocket has been closed because of an error, such as when some data couldn't be sent. Also available via the onerror property.

[message](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/message_event)

Fired when data is received through a WebSocket. Also available via the onmessage property.

[open](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/open_event)

Fired when a connection with a WebSocket is opened. Also available via the onopen property.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#examples)

// Create WebSocket connection.

const socket = new WebSocket('ws://localhost:8080');

// Connection opened

socket.addEventListener('open', (event) => {

socket.send('Hello Server!');

});

// Listen for messages

socket.addEventListener('message', (event) => {

console.log('Message from server ', event.data);

});

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## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#specifications)

| **Specification** |
| --- |
| [WebSockets Standard # the-websocket-interface](https://websockets.spec.whatwg.org/#the-websocket-interface) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FWebSocket&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.WebSocket%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A44.138Z%0A%0A%3C%2Fdetails%3E&title=api.WebSocket+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno |
| WebSocket | 4  Toggle history | 12  Toggle history | 11  more  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 14  more  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [WebSocket() constructor](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/WebSocket) | 4  Toggle history | 12  Toggle history | 11  more  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 14  more  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [binaryType](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/binaryType) | 15  Toggle history | 12  Toggle history | 11  Toggle history | 12.1  Toggle history | 6  Toggle history | 18  Toggle history | 14  Toggle history | 12.1  Toggle history | 6  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [bufferedAmount](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/bufferedAmount) | 4  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [close](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/close) | 4  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [close event](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/close_event) | 4  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.4  Toggle history |
| [error event](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/error_event) | 5  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.4  Toggle history |
| [extensions](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/extensions) | 16  Toggle history | 12  Toggle history | 8  Toggle history | 12.1  Toggle history | 6  Toggle history | 18  Toggle history | 8  Toggle history | 12.1  Toggle history | 6  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [message event](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/message_event) | 4  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.4  Toggle history |
| [open event](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/open_event) | 4  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.4  Toggle history |
| [protocol](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/protocol) | 15  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 6  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 6  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| Supports protocol as specified by RFC 6455 | 16  Toggle history | 12  Toggle history | 11  Toggle history | 15  Toggle history | 6  Toggle history | 18  Toggle history | 14  Toggle history | 14  Toggle history | 6  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.4  Toggle history |
| [readyState](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/readyState) | 4  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [send](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/send) | 4  Toggle history | 12  Toggle history | 18  footnotemore  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 18  footnotemore  Toggle history | 12.1  Toggle history | 4.2  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| [url](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/url) | 18  Toggle history | 12  Toggle history | 7  Toggle history | 12.1  Toggle history | 6  Toggle history | 18  Toggle history | 7  Toggle history | 12.1  Toggle history | 6  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.4  Toggle history |
| Available in workers | 4  Toggle history | 12  Toggle history | 37  Toggle history | 12.1  Toggle history | 5  Toggle history | 18  Toggle history | 37  Toggle history | 12.1  Toggle history | 5  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.4  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

See implementation notes.

Requires a vendor prefix or different name for use.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket#see_also)

* [Writing WebSocket client applications](https://developer.mozilla.org/en-US/docs/Web/API/WebSockets_API/Writing_WebSocket_client_applications)

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* Want to fix the problem yourself? See [our Contribution guide](https://github.com/mdn/content/blob/main/README.md).

**Last modified:** Sep 9, 2022, [by MDN contributors](https://developer.mozilla.org/en-US/docs/Web/API/WebSocket/contributors.txt)

# setTimeout

<https://developer.mozilla.org/en-US/docs/Web/API/setTimeout>

The global **setTimeout()** method sets a timer which executes a function or specified piece of code once the timer expires.

## [Syntax](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#syntax)

setTimeout(code)

setTimeout(code, delay)

setTimeout(functionRef)

setTimeout(functionRef, delay)

setTimeout(functionRef, delay, param1)

setTimeout(functionRef, delay, param1, param2)

setTimeout(functionRef, delay, param1, param2, /\* … ,\*/ paramN)

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### [Parameters](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#parameters)

functionRef

A [function](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Function) to be executed after the timer expires.

code

An alternative syntax that allows you to include a string instead of a function, which is compiled and executed when the timer expires. This syntax is **not recommended** for the same reasons that make using [eval()](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/eval) a security risk.

delay Optional

The time, in milliseconds that the timer should wait before the specified function or code is executed. If this parameter is omitted, a value of 0 is used, meaning execute "immediately", or more accurately, the next event cycle.

Note that in either case, the actual delay may be longer than intended; see [Reasons for delays longer than specified](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#reasons_for_delays_longer_than_specified) below.

Also note that if the value isn't a number, implicit [type coercion](https://developer.mozilla.org/en-US/docs/Glossary/Type_coercion) is silently done on the value to convert it to a number — which can lead to unexpected and surprising results; see [Non-number delay values are silently coerced into numbers](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#non-number_delay_values_are_silently_coerced_into_numbers) for an example.

param1, …, paramN Optional

Additional arguments which are passed through to the function specified by functionRef.

### [Return value](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#return_value)

The returned timeoutID is a positive integer value which identifies the timer created by the call to setTimeout(). This value can be passed to [clearTimeout()](https://developer.mozilla.org/en-US/docs/Web/API/clearTimeout) to cancel the timeout.

It is guaranteed that a timeoutID value will never be reused by a subsequent call to setTimeout() or setInterval() on the same object (a window or a worker). However, different objects use separate pools of IDs.

## [Description](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#description)

Timeouts are cancelled using [clearTimeout()](https://developer.mozilla.org/en-US/docs/Web/API/clearTimeout).

To call a function repeatedly (e.g., every N milliseconds), consider using [setInterval()](https://developer.mozilla.org/en-US/docs/Web/API/setInterval).

### [Non-number delay values are silently coerced into numbers](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#non-number_delay_values_are_silently_coerced_into_numbers)

If setTimeout() is called with [delay](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#delay) value that's not a number, implicit [type coercion](https://developer.mozilla.org/en-US/docs/Glossary/Type_coercion) is silently done on the value to convert it to a number. For example, the following code incorrectly uses the string "1000" for the delay value, rather than the number 1000 – but it nevertheless works, because when the code runs, the string is coerced into the number 1000, and so the code executes 1 second later.

setTimeout(() => {

console.log("Delayed for 1 second.");

}, "1000")

But in many cases, the implicit type coercion can lead to unexpected and surprising results. For example, when the following code runs, the string "1 second" ultimately gets coerced into the number 0 — and so, the code executes immediately, with zero delay.

setTimeout(() => {

console.log("Delayed for 1 second.");

}, "1 second")

Therefore, don't use strings for the delay value but instead always use numbers:

setTimeout(() => {

console.log("Delayed for 1 second.");

}, 1000)

### [Working with asynchronous functions](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#working_with_asynchronous_functions)

setTimeout() is an asynchronous function, meaning that the timer function will not pause execution of other functions in the functions stack. In other words, you cannot use setTimeout() to create a "pause" before the next function in the function stack fires.

See the following example:

setTimeout(() => {console.log("this is the first message")}, 5000);

setTimeout(() => {console.log("this is the second message")}, 3000);

setTimeout(() => {console.log("this is the third message")}, 1000);

// Output:

// this is the third message

// this is the second message

// this is the first message

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Notice that the first function does not create a 5-second "pause" before calling the second function. Instead, the first function is called, but waits 5 seconds to execute. While the first function is waiting to execute, the second function is called, and a 3-second wait is applied to the second function before it executes. Since neither the first nor the second function's timers have completed, the third function is called and completes its execution first. Then the second follows. Then finally the first function is executed after its timer finally completes.

To create a progression in which one function only fires after the completion of another function, see the documentation on [Promises](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise).

### [The "this" problem](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#the_this_problem)

When you pass a method to setTimeout(), it will be invoked with a this value that may differ from your expectation. The general issue is explained in detail in the [JavaScript reference](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Operators/this#as_an_object_method).

Code executed by setTimeout() is called from an execution context separate from the function from which setTimeout was called. The usual rules for setting the this keyword for the called function apply, and if you have not set this in the call or with bind, it will default to the window (or global) object. It will not be the same as the this value for the function that called setTimeout.

See the following example:

const myArray = ['zero', 'one', 'two'];

myArray.myMethod = function (sProperty) {

console.log(arguments.length > 0 ? this[sProperty] : this);

};

myArray.myMethod(); // prints "zero,one,two"

myArray.myMethod(1); // prints "one"

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The above works because when myMethod is called, its this is set to myArray by the call, so within the function, this[sProperty] is equivalent to myArray[sProperty]. However, in the following:

setTimeout(myArray.myMethod, 1.0\*1000); // prints "[object Window]" after 1 second

setTimeout(myArray.myMethod, 1.5\*1000, '1'); // prints "undefined" after 1.5 seconds

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The myArray.myMethod function is passed to setTimeout, then when it's called, its this is not set, so it defaults to the window object.

There's also no option to pass a thisArg to setTimeout as there is in Array methods such as [forEach()](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/forEach) and [reduce()](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Array/reduce). As shown below, using call to set this doesn't work either.

setTimeout.call(myArray, myArray.myMethod, 2.0\*1000); // error

setTimeout.call(myArray, myArray.myMethod, 2.5\*1000, 2); // same error

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#### Solutions

##### USE A WRAPPER FUNCTION

A common way to solve the problem is to use a wrapper function that sets this to the required value:

setTimeout(function () {

myArray.myMethod();

}, 2.0 \* 1000); // prints "zero,one,two" after 2 seconds

setTimeout(function () {

myArray.myMethod('1');

}, 2.5 \* 1000); // prints "one" after 2.5 seconds

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The wrapper function can be an arrow function:

setTimeout(() => {myArray.myMethod()}, 2.0 \* 1000); // prints "zero,one,two" after 2 seconds

setTimeout(() => {myArray.myMethod('1')}, 2.5 \* 1000); // prints "one" after 2.5 seconds

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##### USE BIND()

Alternatively, you can use [bind()](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Function/bind) to set the value of this for all calls to a given function:

const myArray = ['zero', 'one', 'two'];

const myBoundMethod = (function (sProperty) {

console.log(arguments.length > 0 ? this[sProperty] : this);

}).bind(myArray);

myBoundMethod(); // prints "zero,one,two" because 'this' is bound to myArray in the function

myBoundMethod(1); // prints "one"

setTimeout(myBoundMethod, 1.0\*1000); // still prints "zero,one,two" after 1 second because of the binding

setTimeout(myBoundMethod, 1.5\*1000, "1"); // prints "one" after 1.5 seconds

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### [Passing string literals](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#passing_string_literals)

Passing a string instead of a function to setTimeout() has the same problems as using [eval()](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/eval).

// Don't do this

setTimeout("console.log('Hello World!');", 500);

// Do this instead

setTimeout(() => {

console.log('Hello World!');

}, 500);

A string passed to [setTimeout()](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout) is evaluated in the global context, so local symbols in the context where [setTimeout()](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout) was called will not be available when the string is evaluated as code.

### [Reasons for delays longer than specified](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#reasons_for_delays_longer_than_specified)

There are a number of reasons why a timeout may take longer to fire than anticipated. This section describes the most common reasons.

#### Nested timeouts

As specified in the [HTML standard](https://html.spec.whatwg.org/multipage/timers-and-user-prompts.html#timers), browsers will enforce a minimum timeout of 4 milliseconds once a nested call to setTimeout has been scheduled 5 times.

This can be seen in the following example, in which we nest a call to setTimeout with a delay of 0 milliseconds, and log the delay each time the handler is called. The first four times, the delay is approximately 0 milliseconds, and after that it is approximately 4 milliseconds:

<button id="run">Run</button>

<pre>previous this actual delay</pre>

<div id="log"></div>

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let last = 0;

let iterations = 10;

function timeout() {

// log the time of this call

logline(new Date().getMilliseconds());

// if we are not finished, schedule the next call

if (iterations-- > 0) {

setTimeout(timeout, 0);

}

}

function run() {

// clear the log

const log = document.querySelector("#log");

while (log.lastElementChild) {

log.removeChild(log.lastElementChild);

}

// initialize iteration count and the starting timestamp

iterations = 10;

last = new Date().getMilliseconds();

// start timer

setTimeout(timeout, 0);

}

function pad(number) {

return number.toString().padStart(3, "0");

}

function logline(now) {

// log the last timestamp, the new timestamp, and the difference

const newLine = document.createElement("pre");

newLine.textContent = `${pad(last)} ${pad(now)} ${now - last}`;

document.getElementById("log").appendChild(newLine);

last = now;

}

document.querySelector("#run").addEventListener("click", run);

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#### Timeouts in inactive tabs

To reduce the load (and associated battery usage) from background tabs, browsers will enforce a minimum timeout delay in inactive tabs. It may also be waived if a page is playing sound using a Web Audio API [AudioContext](https://developer.mozilla.org/en-US/docs/Web/API/AudioContext).

The specifics of this are browser-dependent:

* Firefox Desktop and Chrome both have a minimum timeout of 1 second for inactive tabs.
* Firefox for Android has a minimum timeout of 15 minutes for inactive tabs and may unload them entirely.
* Firefox does not throttle inactive tabs if the tab contains an [AudioContext](https://developer.mozilla.org/en-US/docs/Web/API/AudioContext).

#### Throttling of tracking scripts

Firefox enforces additional throttling for scripts that it recognizes as tracking scripts. When running in the foreground, the throttling minimum delay is still 4ms. In background tabs, however, the throttling minimum delay is 10,000 ms, or 10 seconds, which comes into effect 30 seconds after a document has first loaded.

See [Tracking Protection](https://wiki.mozilla.org/Security/Tracking_protection) for more details.

#### Late timeouts

The timeout can also fire later than expected if the page (or the OS/browser) is busy with other tasks. One important case to note is that the function or code snippet cannot be executed until the thread that called setTimeout() has terminated. For example:

function foo() {

console.log('foo has been called');

}

setTimeout(foo, 0);

console.log('After setTimeout');

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Will write to the console:

After setTimeout

foo has been called

This is because even though setTimeout was called with a delay of zero, it's placed on a queue and scheduled to run at the next opportunity; not immediately. Currently-executing code must complete before functions on the queue are executed, thus the resulting execution order may not be as expected.

#### Deferral of timeouts during pageload

Firefox will defer firing setTimeout() timers while the current tab is loading. Firing is deferred until the main thread is deemed idle (similar to [window.requestIdleCallback()](https://developer.mozilla.org/en-US/docs/Web/API/Window/requestIdleCallback)), or until the load event is fired.

### [WebExtension background pages and timers](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#webextension_background_pages_and_timers)

In [WebExtensions](https://developer.mozilla.org/en-US/docs/Mozilla/Add-ons/WebExtensions), setTimeout() does not work reliably. Extension authors should use the [alarms](https://developer.mozilla.org/en-US/docs/Mozilla/Add-ons/WebExtensions/API/alarms) API instead.

### [Maximum delay value](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#maximum_delay_value)

Browsers including Internet Explorer, Chrome, Safari, and Firefox store the delay as a 32-bit signed integer internally. This causes an integer overflow when using delays larger than 2,147,483,647 ms (about 24.8 days), resulting in the timeout being executed immediately.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#examples)

### [Setting and clearing timeouts](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#setting_and_clearing_timeouts)

The following example sets up two simple buttons in a web page and hooks them to the setTimeout() and clearTimeout() routines. Pressing the first button will set a timeout which shows a message after two seconds and stores the timeout id for use by clearTimeout(). You may optionally cancel this timeout by pressing on the second button.

#### HTML

<button onclick="delayedMessage();">Show a message after two seconds</button>

<button onclick="clearMessage();">Cancel message before it happens</button>

<div id="output"></div>

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#### JavaScript

let timeoutID;

function setOutput(outputContent) {

document.querySelector('#output').textContent = outputContent;

}

function delayedMessage() {

setOutput('');

timeoutID = setTimeout(setOutput, 2\*1000, 'That was really slow!');

}

function clearMessage() {

clearTimeout(timeoutID);

}

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#### Result

See also the [clearTimeout() example](https://developer.mozilla.org/en-US/docs/Web/API/clearTimeout#example).

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#specifications)

| **Specification** |
| --- |
| [HTML Standard # dom-settimeout-dev](https://html.spec.whatwg.org/multipage/timers-and-user-prompts.html#dom-settimeout-dev) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FsetTimeout&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.setTimeout%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A45.337Z%0A%0A%3C%2Fdetails%3E&title=api.setTimeout+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| setTimeout | 1  Toggle history | 12  Toggle history | 1  Toggle history | 4  Toggle history | 1  Toggle history | 18  Toggle history | 4  Toggle history | 10.1  Toggle history | 1  Toggle history | 1.0  Toggle history | 4.4  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| Supports parameters for callback | 1  Toggle history | 12  Toggle history | 1  Toggle history | 15  Toggle history | 1.2  Toggle history | 18  Toggle history | 4  Toggle history | 14  Toggle history | 1  Toggle history | 1.0  Toggle history | 37  Toggle history | 1.0  Toggle history | 0.10.0  Toggle history |
| Available in workers | 3  Toggle history | 12  Toggle history | 3.5  Toggle history | 12.1  Toggle history | 4  Toggle history | 18  Toggle history | 4  Toggle history | 12.1  Toggle history | 5  Toggle history | 1.0  Toggle history | 4.4  Toggle history | Yes  Toggle history | 10.5.0  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

Partial support

Partial support

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/setTimeout#see_also)

* [Polyfill of setTimeout which allows passing arguments to the callback in core-js](https://github.com/zloirock/core-js#settimeout-and-setinterval)
* [clearTimeout](https://developer.mozilla.org/en-US/docs/Web/API/clearTimeout)
* [setInterval()](https://developer.mozilla.org/en-US/docs/Web/API/setInterval)
* [window.requestAnimationFrame](https://developer.mozilla.org/en-US/docs/Web/API/window/requestAnimationFrame)
* [queueMicrotask()](https://developer.mozilla.org/en-US/docs/Web/API/queueMicrotask)

# Streams API

<https://developer.mozilla.org/en-US/docs/Web/API/Streams_API>

The Streams API allows JavaScript to programmatically access streams of data received over the network and process them as desired by the developer.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

## [Concepts and usage](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#concepts_and_usage)

Streaming involves breaking a resource that you want to receive over a network down into small chunks, then processing it bit by bit. This is something browsers do anyway when receiving assets to be shown on webpages — videos buffer and more is gradually available to play, and sometimes you'll see images display gradually as more is loaded.

But this has never been available to JavaScript before. Previously, if we wanted to process a resource of some kind (be it a video, or a text file, etc.), we'd have to download the entire file, wait for it to be deserialized into a suitable format, then process the whole lot after it is fully received.

With Streams being available to JavaScript, this all changes — you can now start processing raw data with JavaScript bit by bit as soon as it is available on the client-side, without needing to generate a buffer, string, or blob.

There are more advantages too — you can detect when streams start or end, chain streams together, handle errors and cancel streams as required, and react to the speed the stream is being read at.

The basic usage of Streams hinges around making responses available as streams. For example, the response body returned by a successful [fetch request](https://developer.mozilla.org/en-US/docs/Web/API/fetch) can be exposed as a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream), and you can then read it using a reader created with [ReadableStream.getReader()](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/getReader), cancel it with [ReadableStream.cancel()](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/cancel), etc.

More complicated uses involve creating your own stream using the [ReadableStream()](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/ReadableStream) constructor, for example to process data inside a [service worker](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API).

You can also write data to streams using [WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream).

**Note:** You can find a lot more details about the theory and practice of streams in our articles — [Streams API concepts](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Concepts), [Using readable streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Using_readable_streams), [Using readable byte streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Using_readable_byte_streams), and [Using writable streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Using_writable_streams).

## [Stream interfaces](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#stream_interfaces)

### [Readable streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#readable_streams)

[ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream)

Represents a readable stream of data. It can be used to handle response streams of the [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API), or developer-defined streams (e.g. a custom [ReadableStream()](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/ReadableStream) constructor).

[ReadableStreamDefaultReader](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStreamDefaultReader)

Represents a default reader that can be used to read stream data supplied from a network (e.g. a fetch request).

[ReadableStreamDefaultController](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStreamDefaultController)

Represents a controller allowing control of a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream)'s state and internal queue. Default controllers are for streams that are not byte streams.

### [Writable streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#writable_streams)

[WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream)

Provides a standard abstraction for writing streaming data to a destination, known as a sink. This object comes with built-in backpressure and queuing.

[WritableStreamDefaultWriter](https://developer.mozilla.org/en-US/docs/Web/API/WritableStreamDefaultWriter)

Represents a default writable stream writer that can be used to write chunks of data to a writable stream.

[WritableStreamDefaultController](https://developer.mozilla.org/en-US/docs/Web/API/WritableStreamDefaultController)

Represents a controller allowing control of a [WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream)'s state. When constructing a WritableStream, the underlying sink is given a corresponding WritableStreamDefaultController instance to manipulate.

### [Transform Streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#transform_streams)

[TransformStream](https://developer.mozilla.org/en-US/docs/Web/API/TransformStream)

Represents a set of transformable data.

[TransformStreamDefaultController](https://developer.mozilla.org/en-US/docs/Web/API/TransformStreamDefaultController)

Provides methods to manipulate the [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) and [WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream) associated with a transform stream.

### [Related stream APIs and operations](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#related_stream_apis_and_operations)

[ByteLengthQueuingStrategy](https://developer.mozilla.org/en-US/docs/Web/API/ByteLengthQueuingStrategy)

Provides a built-in byte length queuing strategy that can be used when constructing streams.

[CountQueuingStrategy](https://developer.mozilla.org/en-US/docs/Web/API/CountQueuingStrategy)

Provides a built-in chunk counting queuing strategy that can be used when constructing streams.

### [Extensions to other APIs](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#extensions_to_other_apis)

[Request](https://developer.mozilla.org/en-US/docs/Web/API/Request)

When a new Request object is constructed, you can pass it a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream) in the body property of its RequestInit dictionary. This Request could then be passed to a [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) to commence fetching the stream.

[Response.body](https://developer.mozilla.org/en-US/docs/Web/API/Response/body)

The response body returned by a successful [fetch request](https://developer.mozilla.org/en-US/docs/Web/API/fetch) is exposed by default as a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream), and can have a reader attached to it, etc.

### [ByteStream-related interfaces](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#bytestream-related_interfaces)

[ReadableStreamBYOBReader](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStreamBYOBReader)

Represents a BYOB ("bring your own buffer") reader that can be used to read stream data supplied by the developer (e.g. a custom [ReadableStream()](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/ReadableStream) constructor).

[ReadableByteStreamController](https://developer.mozilla.org/en-US/docs/Web/API/ReadableByteStreamController)

Represents a controller allowing control of a [ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream)'s state and internal queue. Byte stream controllers are for byte streams.

[ReadableStreamBYOBRequest](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStreamBYOBRequest)

Represents a pull into request in a [ReadableByteStreamController](https://developer.mozilla.org/en-US/docs/Web/API/ReadableByteStreamController).

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#examples)

We have created a directory of examples to go along with the Streams API documentation — see [mdn/dom-examples/streams](https://github.com/mdn/dom-examples/tree/main/streams). The examples are as follows:

* [Simple stream pump](https://mdn.github.io/dom-examples/streams/simple-pump/): This example shows how to consume a ReadableStream and pass its data to another.
* [Grayscale a PNG](https://mdn.github.io/dom-examples/streams/grayscale-png/): This example shows how a ReadableStream of a PNG can be turned into grayscale.
* [Simple random stream](https://mdn.github.io/dom-examples/streams/simple-random-stream/): This example shows how to use a custom stream to generate random strings, enqueue them as chunks, and then read them back out again.
* [Simple tee example](https://mdn.github.io/dom-examples/streams/simple-tee-example/): This example extends the Simple random stream example, showing how a stream can be teed and both resulting streams can be read independently.
* [Simple writer](https://mdn.github.io/dom-examples/streams/simple-writer/): This example shows how to write to a writable stream, then decode the stream and write the contents to the UI.
* [Unpack chunks of a PNG](https://mdn.github.io/dom-examples/streams/png-transform-stream/): This example shows how [pipeThrough()](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/pipeThrough) can be used to transform a ReadableStream into a stream of other data types by transforming a data of a PNG file into a stream of PNG chunks.

Examples from other developers:

* [Progress Indicators with Streams, Service Workers, & Fetch](https://fetch-progress.anthum.com/).

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#specifications)

| **Specification** |
| --- |
| [Streams Standard # rs-class](https://streams.spec.whatwg.org/#rs-class) |
| [Streams Standard # ws-class](https://streams.spec.whatwg.org/#ws-class) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#browser_compatibility)

### [api.ReadableStream](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#api.readablestream)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FStreams_API&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.ReadableStream%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A45.445Z%0A%0A%3C%2Fdetails%3E&title=api.ReadableStream+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| ReadableStream | 43  Toggle history | 14  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | 16.5.0  footnote  Toggle history |
| [ReadableStream() constructor](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/ReadableStream) | 43  Toggle history | 79  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [cancel](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/cancel) | 43  Toggle history | 14  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [getReader](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/getReader) | 43  Toggle history | 14  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [locked](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/locked) | 43  Toggle history | 14  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [pipeThrough](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/pipeThrough) | 59  Toggle history | 79  Toggle history | 102  Toggle history | 46  Toggle history | 10.1  Toggle history | 59  Toggle history | 102  Toggle history | 43  Toggle history | 10.3  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [pipeTo](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/pipeTo) | 59  Toggle history | 79  Toggle history | 100  Toggle history | 46  Toggle history | 10.1  Toggle history | 59  Toggle history | 100  Toggle history | 43  Toggle history | 10.3  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [tee](https://developer.mozilla.org/en-US/docs/Web/API/ReadableStream/tee) | 43  Toggle history | 79  Toggle history | 65  Toggle history | 30  Toggle history | 10.1  Toggle history | 43  Toggle history | 65  Toggle history | 30  Toggle history | 10.3  Toggle history | 4.0  Toggle history | 43  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [transferable](https://developer.mozilla.org/en-US/docs/Glossary/Transferable_objects) | 87  Toggle history | 87  Toggle history | 103  Toggle history | 73  Toggle history | No  Toggle history | 87  Toggle history | 103  Toggle history | 62  Toggle history | No  Toggle history | 14.0  Toggle history | 87  Toggle history | No  Toggle history | No  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

See implementation notes.

### [api.WritableStream](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#api.writablestream)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FStreams_API&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.WritableStream%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A45.529Z%0A%0A%3C%2Fdetails%3E&title=api.WritableStream+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno | Node.js |
| WritableStream | 59  Toggle history | 16  Toggle history | 100  Toggle history | 47  Toggle history | 14.1  Toggle history | 59  Toggle history | 100  Toggle history | 44  Toggle history | 14.5  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  footnote  Toggle history |
| [WritableStream() constructor](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream/WritableStream) | 59  Toggle history | 16  Toggle history | 100  Toggle history | 47  Toggle history | 14.1  Toggle history | 59  Toggle history | 100  Toggle history | 44  Toggle history | 14.5  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [abort](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream/abort) | 59  Toggle history | 16  Toggle history | 100  Toggle history | 47  Toggle history | 14.1  Toggle history | 59  Toggle history | 100  Toggle history | 44  Toggle history | 14.5  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| close | 81  Toggle history | 81  Toggle history | 100  Toggle history | 68  Toggle history | 14.1  Toggle history | 81  Toggle history | 100  Toggle history | 58  Toggle history | 14.5  Toggle history | 13.0  Toggle history | 81  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [getWriter](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream/getWriter) | 59  Toggle history | 16  Toggle history | 100  Toggle history | 47  Toggle history | 14.1  Toggle history | 59  Toggle history | 100  Toggle history | 44  Toggle history | 14.5  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [locked](https://developer.mozilla.org/en-US/docs/Web/API/WritableStream/locked) | 59  Toggle history | 16  Toggle history | 100  Toggle history | 47  Toggle history | 14.1  Toggle history | 59  Toggle history | 100  Toggle history | 44  Toggle history | 14.5  Toggle history | 7.0  Toggle history | 59  Toggle history | 1.0  Toggle history | 16.5.0  Toggle history |
| [transferable](https://developer.mozilla.org/en-US/docs/Glossary/Transferable_objects) | 87  Toggle history | 87  Toggle history | 103  Toggle history | 73  Toggle history | No  Toggle history | 87  Toggle history | 103  Toggle history | 62  Toggle history | No  Toggle history | 14.0  Toggle history | 87  Toggle history | No  Toggle history | No  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

See implementation notes.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API#see_also)

* [Streams API concepts](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Concepts)
* [Using readable streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Using_readable_streams)
* [Using readable byte streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Using_readable_byte_streams)
* [Using writable streams](https://developer.mozilla.org/en-US/docs/Web/API/Streams_API/Using_writable_streams)

# URLPattern

<https://developer.mozilla.org/en-US/docs/Web/API/URLPattern>

**Experimental:** **This is an**[**experimental technology**](https://developer.mozilla.org/en-US/docs/MDN/Writing_guidelines/Experimental_deprecated_obsolete#experimental)  
Check the [Browser compatibility table](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#browser_compatibility) carefully before using this in production.

The **URLPattern** interface matches URLs or parts of URLs against a pattern. The pattern can contain capturing groups that extract parts of the matched URL.

More information about the syntax of patterns can be found on the API overview page: [URL Pattern API](https://developer.mozilla.org/en-US/docs/Web/API/URL_Pattern_API)

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

## [Constructor](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#constructor)

[URLPattern()](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/URLPattern) Experimental

Returns a new URLPattern object based on the given pattern and base URL.

## [Properties](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#properties)

[hash](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/hash) Experimental

A string containing a pattern to match the hash part of a URL.

[hostname](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/hostname) Experimental

A string containing a pattern to match the hostname part of a URL.

[password](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/password) Experimental

A string containing a pattern to match the password part of a URL.

[pathname](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/pathname) Experimental

A string containing a pattern to match the pathname part of a URL.

[port](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/port) Experimental

A string containing a pattern to match the port part of a URL.

[protocol](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/protocol) Experimental

A string containing a pattern to match the protocol part of a URL.

[search](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/search) Experimental

A string containing a pattern to match the search part of a URL.

[username](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/username) Experimental

A string containing a pattern to match the username part of a URL.

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#methods)

[exec()](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/exec) Experimental

Returns an object with the matched parts of the URL or null if the URL does not match.

[test()](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/test) Experimental

Returns true if the URL matches the given pattern, false otherwise.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#specifications)

| **Specification** |
| --- |
| [URLPattern API # urlpattern](https://wicg.github.io/urlpattern/#urlpattern) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FURLPattern&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.URLPattern%60%0A*+Report+started%3A+2022-09-24T07%3A55%3A48.422Z%0A%0A%3C%2Fdetails%3E&title=api.URLPattern+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | | server |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android | Deno |
| URLPattern  Experimental | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [URLPattern() constructor](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/URLPattern)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/URLPattern) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [exec](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/exec)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/exec) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [hash](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/hash)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/hash) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [hostname](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/hostname)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/hostname) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [password](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/password)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/password) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [pathname](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/pathname)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/pathname) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [port](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/port)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/port) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [protocol](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/protocol)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/protocol) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [search](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/search)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/search) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [test](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/test)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/test) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |
| [username](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/username)  [Experimental](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern/username) | 95  Toggle history | 95  Toggle history | No  Toggle history | 81  Toggle history | No  Toggle history | 95  Toggle history | No  Toggle history | 67  Toggle history | No  Toggle history | 17.0  Toggle history | 95  Toggle history | 1.15  more  Toggle history |

### Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

No support

No support

Experimental. Expect behavior to change in the future.

User must explicitly enable this feature.

Has more compatibility info.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/URLPattern#see_also)

* A polyfill of URLPattern is available [on GitHub](https://github.com/kenchris/urlpattern-polyfill)
* The pattern syntax used by URLPattern is similar to the syntax used by [path-to-regexp](https://github.com/pillarjs/path-to-regexp)

# Cache

<https://developer.mozilla.org/en-US/docs/Web/API/Cache>

The **Cache** interface provides a persistent storage mechanism for [Request](https://developer.mozilla.org/en-US/docs/Web/API/Request) / [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object pairs that are cached in long lived memory. How long a Cache object lives is browser dependent, but a single origin's scripts can typically rely on the presence of a previously populated Cache object. Note that the Cache interface is exposed to windowed scopes as well as workers. You don't have to use it in conjunction with service workers, even though it is defined in the service worker spec.

An origin can have multiple, named Cache objects. You are responsible for implementing how your script (e.g. in a [ServiceWorker](https://developer.mozilla.org/en-US/docs/Web/API/ServiceWorker)) handles Cache updates. Items in a Cache do not get updated unless explicitly requested; they don't expire unless deleted. Use [CacheStorage.open()](https://developer.mozilla.org/en-US/docs/Web/API/CacheStorage/open) to open a specific named Cache object and then call any of the Cache methods to maintain the Cache.

You are also responsible for periodically purging cache entries. Each browser has a hard limit on the amount of cache storage that a given origin can use. Cache quota usage estimates are available via the [StorageManager.estimate()](https://developer.mozilla.org/en-US/docs/Web/API/StorageManager/estimate) method. The browser does its best to manage disk space, but it may delete the Cache storage for an origin. The browser will generally delete all of the data for an origin or none of the data for an origin. Make sure to version caches by name and use the caches only from the version of the script that they can safely operate on. See [Deleting old caches](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API/Using_Service_Workers#deleting_old_caches) for more information.

**Note:** The key matching algorithm depends on the [VARY header](https://www.fastly.com/blog/best-practices-using-vary-header) in the value. So matching a new key requires looking at both key and value for entries in the Cache object.

**Note:** The caching API doesn't honor HTTP caching headers.

**Note:** This feature is available in [Web Workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API)

**Secure context:** This feature is available only in [secure contexts](https://developer.mozilla.org/en-US/docs/Web/Security/Secure_Contexts) (HTTPS), in some or all [supporting browsers](https://developer.mozilla.org/en-US/docs/Web/API/Cache#browser_compatibility).

## [Methods](https://developer.mozilla.org/en-US/docs/Web/API/Cache#methods)

[Cache.match(request, options)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/match)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that resolves to the response associated with the first matching request in the Cache object.

[Cache.matchAll(request, options)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/matchAll)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that resolves to an array of all matching responses in the Cache object.

[Cache.add(request)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/add)

Takes a URL, retrieves it and adds the resulting response object to the given cache. This is functionally equivalent to calling fetch(), then using put() to add the results to the cache.

[Cache.addAll(requests)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/addAll)

Takes an array of URLs, retrieves them, and adds the resulting response objects to the given cache.

[Cache.put(request, response)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/put)

Takes both a request and its response and adds it to the given cache.

[Cache.delete(request, options)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/delete)

Finds the Cache entry whose key is the request, returning a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that resolves to true if a matching Cache entry is found and deleted. If no Cache entry is found, the promise resolves to false.

[Cache.keys(request, options)](https://developer.mozilla.org/en-US/docs/Web/API/Cache/keys)

Returns a [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise) that resolves to an array of Cache keys.

## [Examples](https://developer.mozilla.org/en-US/docs/Web/API/Cache#examples)

This code snippet is from the [service worker selective caching sample](https://github.com/GoogleChrome/samples/blob/gh-pages/service-worker/selective-caching/service-worker.js). (see [selective caching live](https://googlechrome.github.io/samples/service-worker/selective-caching/)) The code uses [CacheStorage.open()](https://developer.mozilla.org/en-US/docs/Web/API/CacheStorage/open) to open any Cache objects with a Content-Type header that starts with font/.

The code then uses [Cache.match()](https://developer.mozilla.org/en-US/docs/Web/API/Cache/match) to see if there's already a matching font in the cache, and if so, returns it. If there isn't a matching font, the code fetches the font from the network and uses [Cache.put()](https://developer.mozilla.org/en-US/docs/Web/API/Cache/put) to cache the fetched resource.

The code handles exceptions thrown from the [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch) operation. Note that an HTTP error response (e.g., 404) will not trigger an exception. It will return a normal response object that has the appropriate error code.

The code snippet also shows a best practice for versioning caches used by the service worker. Though there's only one cache in this example, the same approach can be used for multiple caches. It maps a shorthand identifier for a cache to a specific, versioned cache name. The code also deletes all caches that aren't named in CURRENT\_CACHES.

In the code example, caches is a property of the [ServiceWorkerGlobalScope](https://developer.mozilla.org/en-US/docs/Web/API/ServiceWorkerGlobalScope). It holds the CacheStorage object, by which it can access the [CacheStorage](https://developer.mozilla.org/en-US/docs/Web/API/CacheStorage) interface.

**Note:** In Chrome, visit chrome://inspect/#service-workers and click on the "inspect" link below the registered service worker to view logging statements for the various actions the [service-worker.js](https://github.com/GoogleChrome/samples/blob/gh-pages/service-worker/selective-caching/service-worker.js) script is performing.

const CACHE\_VERSION = 1;

const CURRENT\_CACHES = {

font: `font-cache-v${CACHE\_VERSION}`,

};

self.addEventListener("activate", (event) => {

// Delete all caches that aren't named in CURRENT\_CACHES.

// While there is only one cache in this example, the same logic will handle the case where

// there are multiple versioned caches.

const expectedCacheNamesSet = new Set(Object.values(CURRENT\_CACHES));

event.waitUntil(

caches.keys().then((cacheNames) =>

Promise.all(

cacheNames.map((cacheName) => {

if (!expectedCacheNamesSet.has(cacheName)) {

// If this cache name isn't present in the set of "expected" cache names, then delete it.

console.log("Deleting out of date cache:", cacheName);

return caches.delete(cacheName);

}

})

)

)

);

});

self.addEventListener("fetch", (event) => {

console.log("Handling fetch event for", event.request.url);

event.respondWith(

caches.open(CURRENT\_CACHES.font).then((cache) => {

return cache

.match(event.request)

.then((response) => {

if (response) {

// If there is an entry in the cache for event.request, then response will be defined

// and we can just return it. Note that in this example, only font resources are cached.

console.log(" Found response in cache:", response);

return response;

}

// Otherwise, if there is no entry in the cache for event.request, response will be

// undefined, and we need to fetch() the resource.

console.log(

" No response for %s found in cache. About to fetch " +

"from network…",

event.request.url

);

// We call .clone() on the request since we might use it in a call to cache.put() later on.

// Both fetch() and cache.put() "consume" the request, so we need to make a copy.

// (see https://developer.mozilla.org/en-US/docs/Web/API/Request/clone)

return fetch(event.request.clone()).then((response) => {

console.log(

" Response for %s from network is: %O",

event.request.url,

response

);

if (

response.status < 400 &&

response.headers.has("content-type") &&

response.headers.get("content-type").match(/^font\//i)

) {

// This avoids caching responses that we know are errors (i.e. HTTP status code of 4xx or 5xx).

// We also only want to cache responses that correspond to fonts,

// i.e. have a Content-Type response header that starts with "font/".

// Note that for opaque filtered responses (https://fetch.spec.whatwg.org/#concept-filtered-response-opaque)

// we can't access to the response headers, so this check will always fail and the font won't be cached.

// All of the Google Web Fonts are served off of a domain that supports CORS, so that isn't an issue here.

// It is something to keep in mind if you're attempting to cache other resources from a cross-origin

// domain that doesn't support CORS, though!

// We call .clone() on the response to save a copy of it to the cache. By doing so, we get to keep

// the original response object which we will return back to the controlled page.

// (see https://developer.mozilla.org/en-US/docs/Web/API/Request/clone)

console.log(" Caching the response to", event.request.url);

cache.put(event.request, response.clone());

} else {

console.log(" Not caching the response to", event.request.url);

}

// Return the original response object, which will be used to fulfill the resource request.

return response;

});

})

.catch((error) => {

// This catch() will handle exceptions that arise from the match() or fetch() operations.

// Note that a HTTP error response (e.g. 404) will NOT trigger an exception.

// It will return a normal response object that has the appropriate error code set.

console.error(" Error in fetch handler:", error);

throw error;

});

})

);

});

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* [**Cookies and Cache objects**](https://developer.mozilla.org/en-US/docs/Web/API/Cache#cookies_and_cache_objects)

The [Fetch API](https://developer.mozilla.org/en-US/docs/Web/API/Fetch_API) requires [Set-Cookie](https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Set-Cookie) headers to be stripped before returning a [Response](https://developer.mozilla.org/en-US/docs/Web/API/Response) object from [fetch()](https://developer.mozilla.org/en-US/docs/Web/API/fetch). So a Response stored in a Cache won't contain Set-Cookie headers, and therefore won't cause any cookies to be stored.

## [Specifications](https://developer.mozilla.org/en-US/docs/Web/API/Cache#specifications)

| **Specification** |
| --- |
| [Service Workers # cache-interface](https://w3c.github.io/ServiceWorker/#cache-interface) |

## [Browser compatibility](https://developer.mozilla.org/en-US/docs/Web/API/Cache#browser_compatibility)

[Report problems with this compatibility data on GitHub](https://github.com/mdn/browser-compat-data/issues/new?mdn-url=https%3A%2F%2Fdeveloper.mozilla.org%2Fen-US%2Fdocs%2FWeb%2FAPI%2FCache&metadata=%3C%21--+Do+not+make+changes+below+this+line+--%3E%0A%3Cdetails%3E%0A%3Csummary%3EMDN+page+report+details%3C%2Fsummary%3E%0A%0A*+Query%3A+%60api.Cache%60%0A*+Report+started%3A+2022-09-24T07%3A56%3A03.791Z%0A%0A%3C%2Fdetails%3E&title=api.Cache+-+%3CSUMMARIZE+THE+PROBLEM%3E&template=data-problem.yml)

|  | desktop | | | | | mobile | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Chrome | Edge | Firefox | Opera | Safari | Chrome Android | Firefox for Android | Opera Android | Safari on iOS | Samsung Internet | WebView Android |
| Cache | 40  footnote  Toggle history | 16  Toggle history | 41  Toggle history | 27  footnote  Toggle history | 11.1  Toggle history | 40  footnote  Toggle history | 41  Toggle history | 27  footnote  Toggle history | 11.3  Toggle history | 4.0  Toggle history | 40  footnote  Toggle history |
| [add](https://developer.mozilla.org/en-US/docs/Web/API/Cache/add) | 44  footnote  Toggle history | 16  Toggle history | 41  Toggle history | 31  footnote  Toggle history | 11.1  Toggle history | 44  footnote  Toggle history | 41  Toggle history | 32  footnote  Toggle history | 11.3  Toggle history | 4.0  footnote  Toggle history | 44  footnote  Toggle history |
| [addAll](https://developer.mozilla.org/en-US/docs/Web/API/Cache/addAll) | 46  footnote  Toggle history | 16  Toggle history | 41  Toggle history | 33  footnote  Toggle history | 11.1  Toggle history | 46  footnote  Toggle history | 41  Toggle history | 33  footnote  Toggle history | 11.3  Toggle history | 5.0  footnote  Toggle history | 46  footnote  Toggle history |
| [delete](https://developer.mozilla.org/en-US/docs/Web/API/Cache/delete) | 43  Toggle history | 16  Toggle history | 41  Toggle history | 30  Toggle history | 11.1  Toggle history | 43  Toggle history | 41  Toggle history | 30  Toggle history | 11.3  Toggle history | 4.0  Toggle history | 43  Toggle history |
| [keys](https://developer.mozilla.org/en-US/docs/Web/API/Cache/keys) | 43  Toggle history | 16  Toggle history | 41  Toggle history | 30  Toggle history | 11.1  Toggle history | 43  Toggle history | 41  Toggle history | 30  Toggle history | 11.3  Toggle history | 4.0  Toggle history | 43  Toggle history |
| [match](https://developer.mozilla.org/en-US/docs/Web/API/Cache/match) | 43  Toggle history | 16  Toggle history | 41  Toggle history | 30  Toggle history | 11.1  Toggle history | 43  Toggle history | 41  Toggle history | 30  Toggle history | 11.3  Toggle history | 4.0  Toggle history | 43  Toggle history |
| [matchAll](https://developer.mozilla.org/en-US/docs/Web/API/Cache/matchAll) | 47  Toggle history | 16  Toggle history | 41  Toggle history | 34  footnote  Toggle history | 11.1  Toggle history | 47  Toggle history | 41  Toggle history | 34  Toggle history | 11.3  Toggle history | 5.0  Toggle history | 47  Toggle history |
| [put](https://developer.mozilla.org/en-US/docs/Web/API/Cache/put) | 43  footnote  Toggle history | 16  Toggle history | 41  Toggle history | 30  footnote  Toggle history | 11.1  Toggle history | 43  footnote  Toggle history | 41  Toggle history | 30  footnote  Toggle history | 11.3  Toggle history | 4.0  footnote  Toggle history | 43  footnote  Toggle history |
| Available in workers | 40  footnote  Toggle history | 16  Toggle history | 44  Toggle history | 27  footnote  Toggle history | 11.1  Toggle history | 40  footnote  Toggle history | 44  Toggle history | 27  footnote  Toggle history | 11.3  Toggle history | 4.0  Toggle history | 40  footnote  Toggle history |

* Legend

Tip: you can click/tap on a cell for more information.

Full support

Full support

See implementation notes.

## [See also](https://developer.mozilla.org/en-US/docs/Web/API/Cache#see_also)

* [Using Service Workers](https://developer.mozilla.org/en-US/docs/Web/API/Service_Worker_API/Using_Service_Workers)
* [Service workers basic code example](https://github.com/mdn/dom-examples/tree/main/service-worker/simple-service-worker)
* [Is ServiceWorker ready?](https://jakearchibald.github.io/isserviceworkerready/)
* [Promise](https://developer.mozilla.org/en-US/docs/Web/JavaScript/Reference/Global_Objects/Promise)
* [Using web workers](https://developer.mozilla.org/en-US/docs/Web/API/Web_Workers_API/Using_web_workers)