JavaScript Restrictor

Webextension that improves your privacy and security

Developer documentation

Libor Polčák

TARZAN project VI20172020062 document
Faculty of Information Technology, Brno University of Technology

Last change: June 12, 2020

How to write a new wrapper?

The primary focus of JSR is to provide security and privacy oriented wrappers of JavaScript APIs. As some of the code is very similar for each wrapper, we use a unified approach to describe wrappers. The approach is described below. This approach also helps to automatically modify `toString` conversions of the wrapped APIs, i.e. a correctly written wrapper creates a modified function but `wrapper.toString()` returns the original string. Finally, this approach also helps in generating code dealing with the Firefox bug described in #25.

File structure

- `wrapping.js` provides main facilities for interacting with specific wrappers:
    - `add_wrappers()` has to be provided with all the wrappers. Hence, a typical module with wrappers of a web standard APIS. ends with a call of `add_wrappers(list_of_all_wrappers_defined_by_the_module)`.
    - `build_wrapping_code` contains all the registered wrappers. The keys are referenced by the levels wrapper list. Do not modify the `build_wrapping_code` variable directly, use `add_wrappers` instead.
    - The module also provides common functions used by the wrappers, e.g. `rounding_function` and `noise_function`.
- `wrappingS-XYZ` are files dealing with APIs introduced by specific web or ECMA standard. See the **naming conventions** for details on the XYZ part of the name. See the **wrapper specification** section for the properties of the wrapper objects.

Naming conventions

JSR adopted the naming conventions of the Web API Manager. See the paper:

Peter Snyder, Cynthia Taylor, and Chris Kanich, “Most Websites Don’t Need to Vibrate: A Cost–Benefit Approach to Improving Browser Security,” in Proceedings of the 2017 ACM Conference on Computer and Communications Security, 2017.

Wrapper specification

Once you are set with the file name for your wrappers, you can start coding. The basic structure of the file is:

```
(function() {
        // definition of common functions used by the wrappers bellow
        var wrappers = [
                {
                        // wrapping object 1
                },
                {
                        // wrapping object 2
                },
...
                {
                        // wrapping object n
                },
        ]
        add_wrappers(wrappers);
})();
```

The content of the module should be in an IIFE so that it does not polute the global namespace. The property values are strings that are generally interpreted either as identifiers or JS code.

Each wrapping object must have the following mandatory properties:

- `parent_object` and `parent_object_property` are used to define the name of the wrapping (`parent_object.parent_object_property`) that is referenced by level wrappers. Additionally, it is used if `wrapper_prototype` is defined to provide the object name to have the prototype changed. Finally, `Object.freeze` is called on `parent_object.parent_object_property` .
- `wrapped_objects` is a list of objects, each having two properties:
    - `original_name` - the original name of the object to be wrapped. Do not mention `window` here!
        - `wrapped_name` - the vatiable name that can be used by `wrapping_function_body` , `helping_code` and other code fragments to reference the original object. Note that this name is not available outside the code generated by this wrappper.

Each wrapping object can have the following optional properties:

- `wrapping_function_args` is a string that is used as an argument list for the wrapping function. Typically this string reflects the parameters of the original method, it can be an empty string, a list of parameters, such as `"source, target, color"` or `"...args"` .

- `wrapping_function_body` specified the behaviour of the wrapped function. You can provide a completely different implementation but often, you want to refer to the original implementation (available in the variable `wrapped_name`) and modify the original implementation.
- `wrapping_code_function_name` can be used to call the wrapping function from the other code inside the wrapper. For example to create another wrapper similar to the original wrapper.
- `wrapper_prototype` - if defined, `parent_object.parent_object_property` prototype is set to the prototype identifier provided by `wrapper_prototype` .
- `original_function` if not provided, it defaults to `parent_object.parent_object_property` . This name is used for overloading the `toString` function. Instead of the wrapping code, `toString` returns the content of the original function.
- `helping_code` provides you an option to define code available for both `replacement` function and `post_wrapping_code`
- `replace_original_function` is used to control which function should be replaced
- `post_replacement_code` Allows to provide additional code with the access to the original function and to the wrapped function
- `post_wrapping_code` is a list of additional wrapping objects with a similar structure to the wrappers, see the section bellow.

Post wrapping code

Complex wrappers need to provide additional wrapping code. Currently JSR supports additional wrapping of:

- Definition of a function (used, for example, to reintroduce `Date.now()` function to the wrapped `Date` object)

```
[
	{
		code_type: "function_define",
		original_function: "originalDateConstructor.now",
		parent_object: "window.Date",
		parent_object_property: "now",
		wrapping_function_args: "",
		wrapping_function_body: "return func(originalDateConstructor.r
	},
]
```

- Export a function from the wrapping namespace (currently not used, the following code exposes the unwrapped, i.e. original, version of Date.now to page scripts)

```
[
	{
		code_type: "function_export",
		parent_object: "window.Date",
		parent_object_property: "now",
		export_function_name: "originalDateConstructor.now",
	},
]
```

- Redefine an object property (used to prevent leaking iframe properties to the unwrapped objects):

```
{
	code_type: "object_properties",
	parent_object: "HTMLIFrameElement.prototype",
	parent_object_property: "contentWindow",
	wrapped_objects: [
		{
			original_name: "HTMLIFrameElement.prototype.__lookupGe
			wrapped_name: "cw",
		},
	],
	wrapped_properties: [
		{
			property_name: "get",
			property_value: `
				function() {
					var parent=cw.call(this);
					try {
						parent.HTMLCanvasElement;
					}
					catch(d) {
						return; // HTMLIFrameElement.c
					}
					wrapping(parent);
					return parent;
				}`,
		},
	],
}
```

The generated wrapper structure

To get a better idea how the code is generated see the following pseudo code. Please do not refer to any name created by the code builders from your wrapper. Use your custom names. If it is not available, please, open an issue where you explain what you are trying to achieve. It is probable that we will introduce a new property that allows to provide your name to the code builders. The code lives in an anonymous namespaces, so variables introduced here do not directly leak to page scripts.

```
// Define wrapped_name(s) variables holding the original JS objects
helping_code // if present
function wrapping_code_function_name(param) {
        // Store original function: either original_function which defaults tc
        function replacement(wrapping_function_args) {
                wrapping_function_body
        }
        if (replace_original_function)
                original_function = replacement
        else
                parent_object.parent_object_property = replacement
        // Modify toString
        post_replacement_code
}
wrapping_code_function_name(window if wrapping_code_function_call_window) // T
// wrappings generated by post wrapping code
```

Compiling the wrappers

Of course the wrappers need to be compiled to JavaScript before inserting the code to page scripts. See `code_builders.js` and `ffbug1267027.js` .

Registering a new wrapper

`fix_manifest.sh` automatically adds all modules with file name of `wrapping*.js` to the manifest.json of the extension. There is no need for any additional action.

Register new wrapper to be used by the extension in a level or available in the GUI.

See `levels.js` and its list `wrapping_groups.groups` . Once you add your wrapper to an existing group or create a new group, the wrapper becomes available in the built-in levels containing the group and in the GUI for custom levels.

JavaScript Restrictor

Generated by Doxygen 1.8.17

Chapter 1

File Index

1.1 File List

Here is a list of all files with brief descriptions:

Chapter 2

File Documentation

2.1 chrome/http_shield_chrome.js File Reference

Functions

- window addEventListener ("online", function() { browser.webRequest.onErrorOccurred.addListener(onErrorOccuredListener, {urls:["<all_urls>"]});})

  If the browser regained connectivity - came online.
- function onErrorOccuredListener (responseDetails)
- function onHeadersReceivedRequestListener (headers)
- function insertHostInStats (targetDomain)
- function beforeSendHeadersListener (requestDetail)
- function notifyBlockedHost (host)
- function messageListener (message, sender, sendResponse)

Variables

- var blockedHosts = new Object()

  Associative array of hosts, that are currently blocked based on their previous actions.
- var hostStatistics = new Object()

  Information about hosts, for which cant be used DNS query.
- var uniqueErrorHostsRatio = 10.0

  Percentage of hosts, that can register an HTTP error response.
- var uniqueErrorHostsLimit = 20

  If there are more hosts than uniqueErrorHostsLimit which are targeted from the same origin, the origin host becomes blocked.
- var errorsAllowed = 10

  Number of Request Timed Out errors allowed for one origin.
- var httpClientErrorsAllowed = 5

  Number of HTTP client errors (eg. 404 not found, 403 forbidden etc.) per requestTimeInterval.
- var httpErrorList

  Errors that are considered as possible attacker threat.
- var chromeErrorString = "net::ERR_CONNECTION_TIMED_OUT"

2.1.1 Function Documentation

2.1.1.1 addEventListener()

```
window addEventListener (
             "online" ,
             function() { browser.webRequest.onErrorOccurred.addListener(onErrorOccuredListener,
{urls:["<all_urls>"]});}  )
```

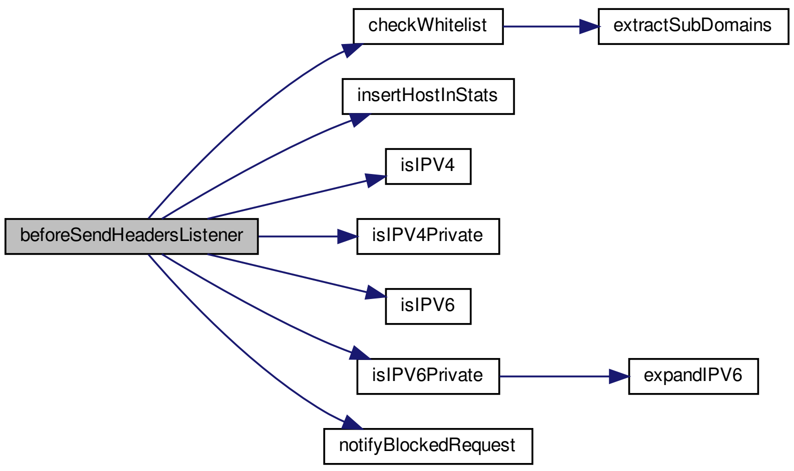
If the browser regained connectivity - came online.

If the browser lost connectivity - gone offline.

2.1.1.2 beforeSendHeadersListener()

```
function beforeSendHeadersListener (
              requestDetail )
```

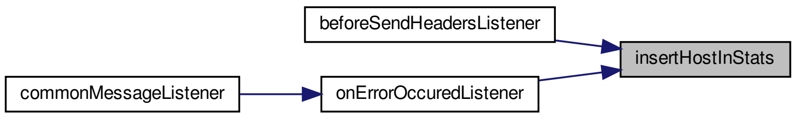
webRequest event listener, hooked to onBeforeSendHeaders event Catches all requests, analyzes them, does blocking, modifies counters, blocks if one of the limits was exceeded Here is the call graph for this function:



2.1.1.3 insertHostInStats()

```
function insertHostInStats (
             targetDomain )
```

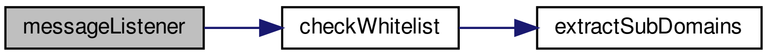
Function that creates object representing source host Recieves target hostname in targetDomain argument Here is the caller graph for this function:



2.1.1.4 messageListener()

```
function messageListener (
             message,
             sender,
             sendResponse )
```

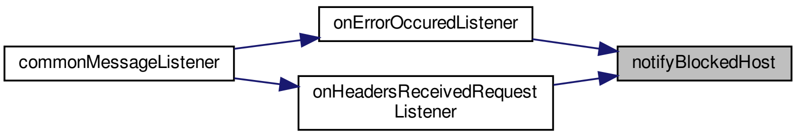
webRequest event listener, hooked to onMessage event obtains message string in message, message sender in sender and function for sending response in sendResponse Does approriate action based on message text Here is the call graph for this function:



2.1.1.5 notifyBlockedHost()

```
function notifyBlockedHost (
             host )
```

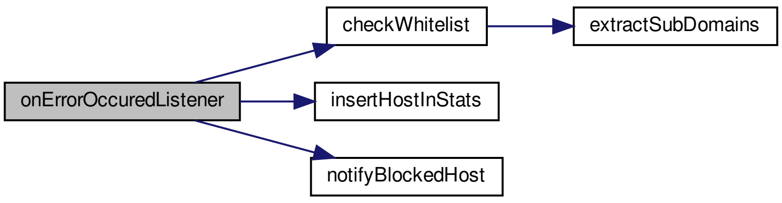
Creates and presents notification to the user works with webExtensions notification API Here is the caller graph for this function:



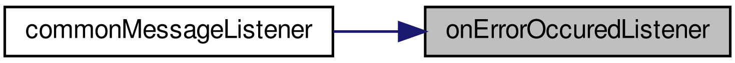
2.1.1.6 onErrorOccuredListener()

```
function onErrorOccuredListener (
              responseDetails )
```

webRequest event listener, hooked to onErrorOccured event Catches all errors, checks them for Request Timed out errors Iterates error counter, blocks the host if limit was exceeded Takes object representing error in responseDetails variable Here is the call graph for this function:



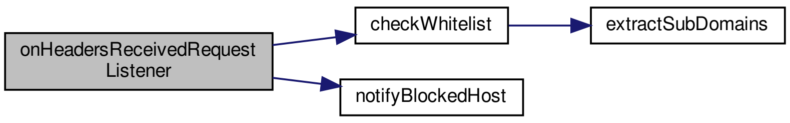
Here is the caller graph for this function:



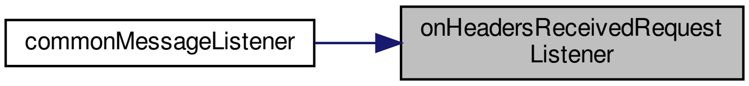
2.1.1.7 onHeadersReceivedRequestListener()

```
function onHeadersReceivedRequestListener (
              headers )
```

webRequest event listener, hooked to onErrorOccured event Catches all responses, analyzes those with record in hostStatistics Modifies counters, blocks if one of the limits was exceeded Here is the call graph for this function:



Here is the caller graph for this function:



2.1.2 Variable Documentation

2.1.2.1 blockedHosts

```
var blockedHosts = new Object()
```

Associative array of hosts, that are currently blocked based on their previous actions.

2.1.2.2 chromeErrorString

```
var chromeErrorString = "net::ERR_CONNECTION_TIMED_OUT"
```

String that defines Request Timed Out error in Chrome according to: `https://developer.chrome.↩ com/extensions/webRequest#event-onErrorOccurred` It's not backwards compatible, but it's the best we have

2.1.2.3 errorsAllowed

```
var errorsAllowed = 10
```

Number of Request Timed Out errors allowed for one origin.

2.1.2.4 hostStatistics

```
var hostStatistics = new Object()
```

Information about hosts, for which cant be used DNS query.

2.1.2.5 httpClientErrorsAllowed

```
var httpClientErrorsAllowed = 5
```

Number of HTTP client errors (eg. 404 not found, 403 forbidden etc.) per requestTimeInterval.

2.1.2.6 httpErrorList

```
var httpErrorList
```

Initial value:

```
= {
  400:true,
  404:true,
  405:true,
  406:true,
  408:true,
  410:true,
  413:true,
  414:true,
  415:true,
  501:true,
  503:true,
  505:true
}
```

Errors that are considered as possible attacker threat.

2.1.2.7 uniqueErrorHostsLimit

```
var uniqueErrorHostsLimit = 20
```

If there are more hosts than uniqueErrorHostsLimit which are targeted from the same origin, the origin host becomes blocked.

2.1.2.8 uniqueErrorHostsRatio

```
var uniqueErrorHostsRatio = 10.0
```

Percentage of hosts, that can register an HTTP error response.

2.2 common/background.js File Reference

Functions

- if ((typeof browser)==="undefined") {redefineNewArrayFunctions}
- function updateBadge (level)
- function tabUpdate (tabid, changeInfo)
- function tabActivate (activeInfo)
- browser tabs onUpdated addListener (tabUpdate)
- function connected (port)

Variables

- var tab_levels = {}
- var current_level = {level_id: "?"}
- var queryInfo

2.2.1 Function Documentation

2.2.1.1 addListener()

```
browser runtime onMessage addListener (
            tabUpdate  )
```

2.2.1.2 connected()

```
function connected (
             port )
```

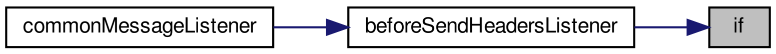
Create a port to popup window

The communication cannels are mostly used because browser.runtime.getBackgroundPage() does not work as expected. See also `https://bugzilla.mozilla.org/show_bug.cgi?id=1329304`. We always send back current level

2.2.1.3 if()

```
if (
              (typeof browser) = == "undefined" ) {redefineNewArrayFunctions}
```

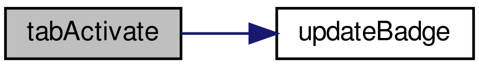
Here is the caller graph for this function:



2.2.1.4 tabActivate()

```
function tabActivate (
              activeInfo )
```

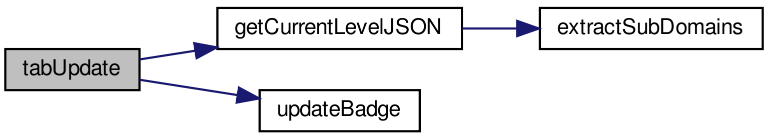
Here is the call graph for this function:



2.2.1.5 tabUpdate()

```
function tabUpdate (
              tabid,
              changeInfo )
```

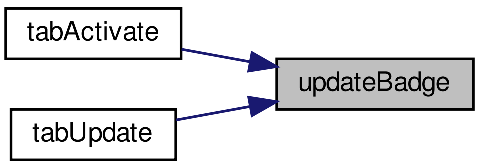
Here is the call graph for this function:



2.2.1.6 updateBadge()

```
function updateBadge (
              level )
```

Here is the caller graph for this function:



2.2.2 Variable Documentation

2.2.2.1 current_level

```
var current_level = {level_id:  "?"}
```

2.2.2.2 queryInfo

```
var queryInfo
```

Initial value:

```
= {
  active: true,
  currentWindow: true
}
```

2.2.2.3 tab_levels

```
var tab_levels = {}
```

2.3 common/browser.js File Reference

Functions

- if ((typeof browser)==="undefined")

2.3.1 Function Documentation

2.3.1.1 if()

```
if (
              (typeof browser) = == "undefined" )
```

2.4 common/code_builders.js File Reference

Functions

- function enclose_wrapping (code,...args)
- function enclose_wrapping2 (code, name, params, call_with_window)
- function define_page_context_function (wrapper)
- function generate_assign_function_code (code_spec_obj)
- function generate_object_properties (code_spec_obj)
- function wrap_code (wrappers)

Variables

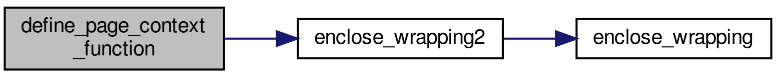
- var build_code

2.4.1 Function Documentation

2.4.1.1 define_page_context_function()

```
function define_page_context_function (
              wrapper )
```

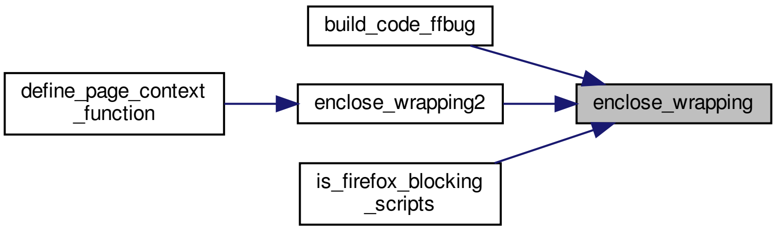
This function create code (as string) that creates code that can be used to inject (or overwrite) a function in the page context. Here is the call graph for this function:



2.4.1.2 enclose_wrapping()

```
function enclose_wrapping (
              code,
              args )
```

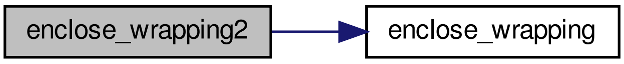
Create IIFE to wrap the code in closure Here is the caller graph for this function:



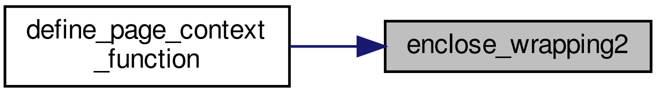
2.4.1.3 enclose_wrapping2()

```
function enclose_wrapping2 (
              code,
              name,
              params,
              call_with_window )
```

Create wrapping that might be IIFE or a function that is immediately called and also available for future. Here is the call graph for this function:



Here is the caller graph for this function:



2.4.1.4 generate_assign_function_code()

```
function generate_assign_function_code (
              code_spec_obj )
```

This function creates code that assigns an already defined function to given property.

2.4.1.5 generate_object_properties()

```
function generate_object_properties (
              code_spec_obj )
```

This function wraps object properties using Object.defineProperties.

2.4.1.6 wrap_code()

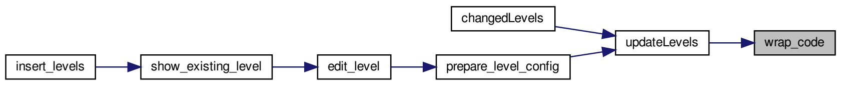
```
function wrap_code (
              wrappers )
```

Transform wrapping arrays into code.

Parameters

Array	of wrapping arrays.

Here is the caller graph for this function:



2.4.2 Variable Documentation

2.4.2.1 build_code

```
var build_code
```

This function builds the wrapping code.

2.5 common/document_start.js File Reference

Functions

- browser runtime sendMessage ({ message:"get wrapping for URL", url:window.location.href }, function handleResponse(reply) { injectScript(reply.code, reply.wrappers, reply.ffbug1267027);})

  Get current level configuration from the background script.

2.5.1 Function Documentation

2.5.1.1 sendMessage()

```
browser runtime sendMessage (
            { message:"get wrapping for URL", url:window.location.href } ,
            function handleResponse(reply) { injectScript(reply.code, reply.wrappers, reply.↩
ffbug1267027);}  )
```

Get current level configuration from the background script.

2.6 common/ffbug1267027.js File Reference

Functions

- function define_page_context_function_ffbug (wrapper)
- function generate_assign_function_code_ffbug (code_spec_obj)
- function generate_object_properties_ffbug (code_spec_obj)
- function build_code_ffbug (wrapper,...args)
- function is_firefox_blocking_scripts ()

Variables

- var injectScriptElement = injectScript

  The original script injecting function.

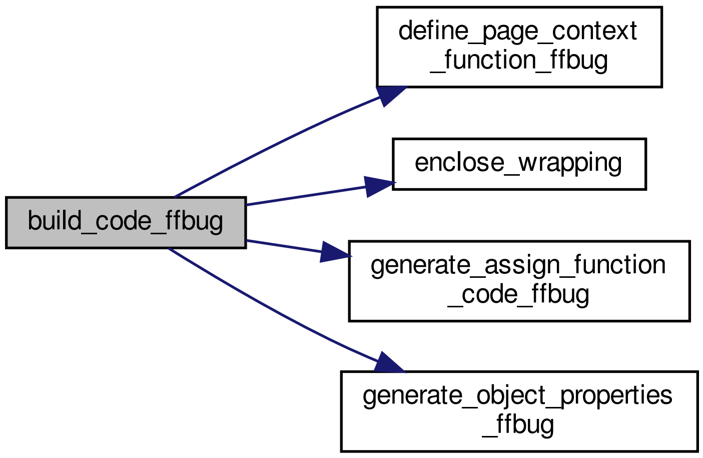
2.6.1 Function Documentation

2.6.1.1 build_code_ffbug()

```
function build_code_ffbug (
              wrapper,
              args )
```

Alternative definition of the build_code function.

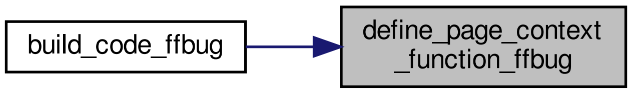
FIXME:this code needs improvements, see bug #25 Here is the call graph for this function:



2.6.1.2 define_page_context_function_ffbug()

```
function define_page_context_function_ffbug (
              wrapper )
```

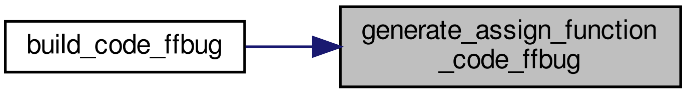
This function create code (as string) that creates code that can be used to inject (or overwrite) a function in the page context. Supporting code for dealing with bug `https://bugzilla.mozilla.org/show_bug.cgi?id=1267027`. Here is the caller graph for this function:



2.6.1.3 generate_assign_function_code_ffbug()

```
function generate_assign_function_code_ffbug (
              code_spec_obj )
```

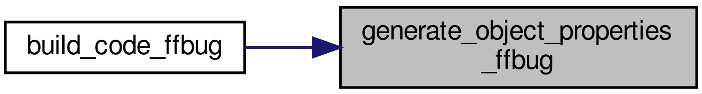
This function creates code that assigns an already defined function to given property. Supporting code for dealing with bug https://bugzilla.mozilla.org/show_bug.cgi?id=1267027. Here is the caller graph for this function:



2.6.1.4 generate_object_properties_ffbug()

```
function generate_object_properties_ffbug (
              code_spec_obj )
```

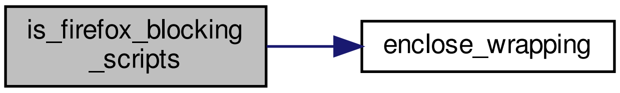
This function wraps object properties using Object.defineProperties. Supporting code for dealing with bug https://bugzilla.mozilla.org/show_bug.cgi?id=1267027. Here is the caller graph for this function:



2.6.1.5 is_firefox_blocking_scripts()

```
function is_firefox_blocking_scripts ( )
```

Determine if we are running in the context where FF blocks script inserting due to bug `https://bugzilla.mozilla.org/show_bug.cgi?id=1267027` Here is the call graph for this function:



2.6.2 Variable Documentation

2.6.2.1 injectScriptElement

```
var injectScriptElement = injectScript
```

The original script injecting function.

2.7 common/helpers.js File Reference

Functions

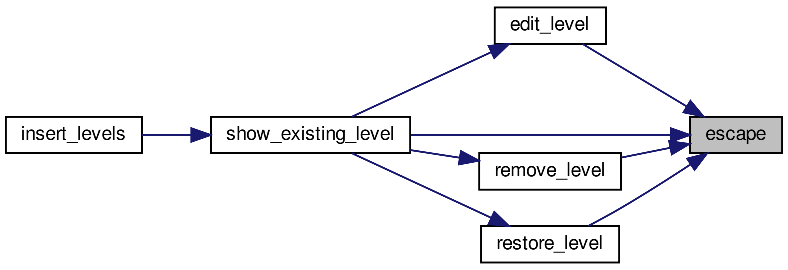
- function escape (str)

2.7.1 Function Documentation

2.7.1.1 escape()

```
function escape (
                str )
```

Here is the caller graph for this function:



2.8 common/http_shield_common.js File Reference

Functions

- if ((typeof browser)==="undefined")
- browser storage sync get (["requestShieldOn"], function(result){ if(result.requestShieldOn==undefined||result.↩ requestShieldOn) { browser.webRequest.onBeforeSendHeaders.addListener(beforeSendHeadersListener, {urls:["<all_urls>"]},["blocking", "requestHeaders"]);if(typeof onHeadersReceivedRequestListener==="function") { browser.webRequest.onHeadersReceived.addListener(onHeadersReceivedRequestListener, {urls:["<all↩ _urls>"]},["blocking"]);browser.webRequest.onErrorOccurred.addListener(onErrorOccuredListener, {urls↩ :["<all_urls>"]});} } })

  Check the storage for requestShieldOn object.
- browser runtime onMessage addListener (commonMessageListener)

  Hook up the listener for receiving messages.
- readFile (browser.runtime.getURL("ipv4.csv")) .then(_res

  Obtain file path in user's file system and read CSV file with IPv4 local zones.
- readFile (browser.runtime.getURL("ipv6.csv")) .then(_res

  Obtain file path in user's file system and read CSV file with IPv6 local zones.
- function isIPV4 (url)
- function isIPV6 (url)
- function isIPV4Private (ipAddr)
- function isIPV6Private (ipAddr)
- function parseCSV (csv, ipv4)
- function CSVToArray (strData)
- function expandIPV6 (ip6addr)
- function checkWhitelist (hostname)
- function notifyBlockedRequest (origin, target, resource)
- function commonMessageListener (message, sender, sendResponse)

Variables

- var localIPV4DNSZones

  Locally served IPV4 DNS zones loaded from IANA.
- var localIPV6DNSZones

  Locally served IPV6 DNS zones loaded from IANA.
- var doNotBlockHosts = new Object()

  Associtive array of hosts, that are currently among trusted "do not blocked" hosts.
- let readFile

  Function for reading locally stored csv file.

2.8.1 Function Documentation

2.8.1.1 addListener()

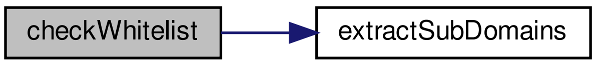
```
browser runtime onMessage addListener (
            commonMessageListener  )
```

Hook up the listener for receiving messages.

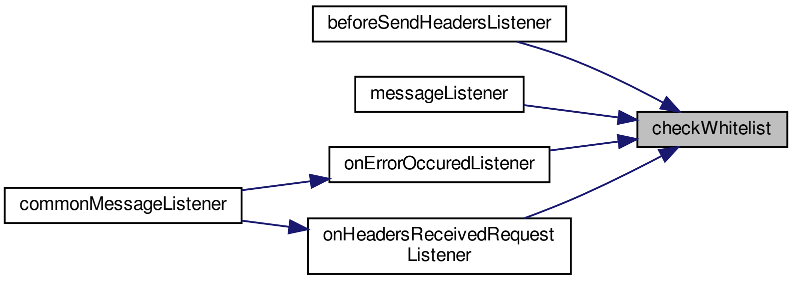
2.8.1.2 checkWhitelist()

```
function checkWhitelist (
              hostname )
```

Here is the call graph for this function:



Here is the caller graph for this function:

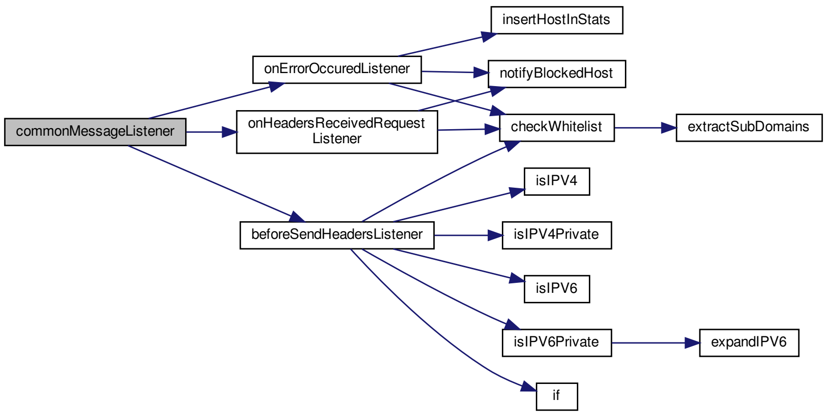


2.8.1.3 commonMessageListener()

```
function commonMessageListener (
              message,
              sender,
              sendResponse )
```

Event listener hooked up to webExtensions onMessage event Receives full message in message, sender of the message in sender, function for sending response in sendResponse Does appropriate action based on message

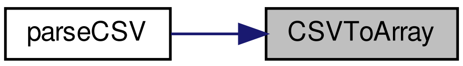
Here is the call graph for this function:



2.8.1.4 CSVToArray()

```
function CSVToArray (
              strData )
```

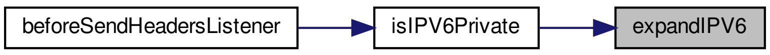
Auxillary function for parsing CSV files Converts CSV to array strData - loaded CSV file Returns array containing CSV rows Here is the caller graph for this function:



2.8.1.5 expandIPV6()

```
function expandIPV6 (
              ip6addr )
```

Function for expanding shorten ipv6 addresses Takes valid ipv6 address in ip6addr argument Returns expanded ipv6 address in string This function should be only called on valid IPv6 address Here is the caller graph for this function:



2.8.1.6 get()

```
browser storage sync get (
              function(result){ if(result.whitelistedHosts !=undefined) doNotBlockHosts=result.←
whitelistedHosts;}  )
```

Check the storage for requestShieldOn object.

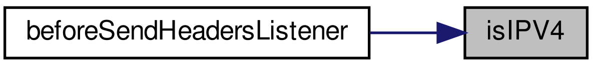
2.8.1.7 if()

```
if (
               (typeof browser) = == "undefined" )
```

2.8.1.8 isIPV4()

```
function isIPV4 (
               url )
```

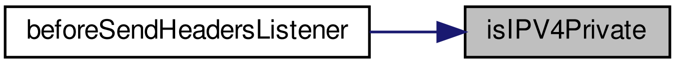
Checks validity of IPv4 addresses, returns TRUE if the url matches IPv4 regex FALSE otherwise Here is the caller graph for this function:



2.8.1.9 isIPV4Private()

```
function isIPV4Private (
              ipAddr )
```

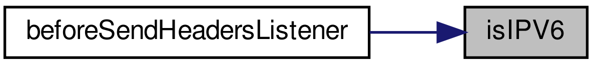
Checks whether the ipAddr is found in IPv4 localZones Returns TRUE if ipAddr exists in localZones fetched from IANA FALSE otherwise This function should only be called on valid IPv4 address Here is the caller graph for this function:



2.8.1.10 isIPV6()

```
function isIPV6 (
              url )
```

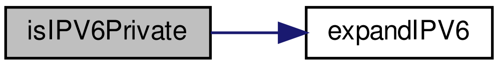
Checks validity IPV6 address Returns TRUE, if URL is valid IPV6 address FALSE otherwise Here is the caller graph for this function:



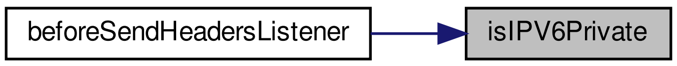
2.8.1.11 isIPV6Private()

```
function isIPV6Private (
              ipAddr )
```

Checks whether the ipAddr is found in IPv6 localZones Returns TRUE if ipAddr exists in localZones fetched from IANA FALSE otherwise This function should only be called on valid IPv6 address Here is the call graph for this function:



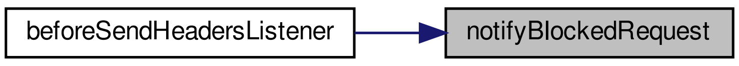
Here is the caller graph for this function:



2.8.1.12 notifyBlockedRequest()

```
function notifyBlockedRequest (
              origin,
              target,
              resource )
```

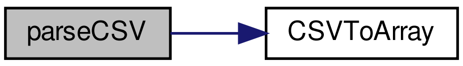
Creates and presents notification to the user works with webExtensions notification API Creates notification about blocked request Arguments: origin - origin of the request target - target of the request resource - type of the resource Here is the caller graph for this function:



2.8.1.13 parseCSV()

```
function parseCSV (
              csv,
              ipv4 )
```

Function for parsing CSV files obtained from IANA Strips .IN-ADDR and .IP6 from zones and comma delimiter, merges them into array by CSV rows Arguments: csv - CSV obtained from IANA ipv4 - bool, saying whether the csv is IPv4 CSV or IPv6 Returns: Array of parsed CSV values Here is the call graph for this function:



2.8.1.14 readFile() [1/2]

```
readFile (
             browser.runtime.  getURL"ipv4.csv" )
```

Obtain file path in user's file system and read CSV file with IPv4 local zones.

2.8.1.15 readFile() [2/2]

```
readFile (
             browser.runtime.  getURL"ipv6.csv" )
```

Obtain file path in user's file system and read CSV file with IPv6 local zones.

2.8.2 Variable Documentation

2.8.2.1 doNotBlockHosts

```
var doNotBlockHosts = new Object()
```

Associtive array of hosts, that are currently among trusted "do not blocked" hosts.

2.8.2.2 localIPV4DNSZones

```
var localIPV4DNSZones
```

Locally served IPV4 DNS zones loaded from IANA.

2.8.2.3 localIPV6DNSZones

```
var localIPV6DNSZones
```

Locally served IPV6 DNS zones loaded from IANA.

2.8.2.4 readFile

```
let readFile
```

Initial value:

```
= (_path) => {
  return new Promise((resolve, reject) => {

    fetch(_path, {mode:'same-origin'})
      .then(function(_res) {

        return _res.blob();
      })
      .then(function(_blob) {
        var reader = new FileReader();

        reader.addEventListener("loadend", function() {
          resolve(this.result);
        });

        reader.readAsText(_blob);
      })
      .catch(error => {
        reject(error);
      });
  });
}
```

Function for reading locally stored csv file.

2.9 common/inject.js File Reference

Variables

- window injectScript

2.9.1 Variable Documentation

2.9.1.1 injectScript

```
window injectScript
```

Initial value:

```
= function (text) {
  var parent = document.documentElement;
  var script = document.createElement('script');
  script.text = text;
  script.async = false;
  parent.insertBefore(script, parent.firstChild);
  parent.removeChild(script);
}
```

Execute given script in the page's JavaScript context.

This function is a modified version of the similar function from Privacy Badger https://www.eff.↵org/privacybadger https://github.com/EFForg/privacybadger/blob/master/src/js/utils.↵js Copyright (C) 2014 Electronic Frontier Foundation

Derived from Adblock Plus Copyright (C) 2006-2013 Eyeo GmbH

Privacy Badger is free software: you can redistribute it and/or modify it under the terms of the GNU General Public License version 3 as published by the Free Software Foundation.

Parameters

{String}	text The content of the script to insert.

2.10 common/levels.js File Reference

Functions

- if ((typeof browser)==="undefined")
- function init_levels ()
- function updateLevels (res)
- browser storage sync get (null, updateLevels)
- function changedLevels (changed, area)
- browser storage onChanged addListener (changedLevels)
- function setDefaultLevel (level)
- function saveDomainLevels ()
- function getCurrentLevelJSON (url)

Variables

- var wrapping_groups
- var level_0
- var level_1
- var level_2
- var level_3
- const L0 = "0"
- const L1 = "1"
- const L2 = "2"

- const L3 = "3"
- var levels = {}
- var default_level = {}
- var domains = {}
- var wrapped_codes = {}
- let levels_initialised = false
- let levels_updated_callbacks = [ ]

2.10.1 Function Documentation

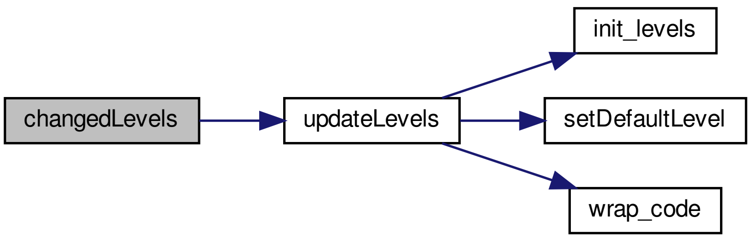
2.10.1.1 addListener()

```
browser storage onChanged addListener (
            changedLevels  )
```

2.10.1.2 changedLevels()

```
function changedLevels (
             changed,
             area )
```

Here is the call graph for this function:



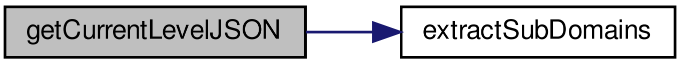
2.10.1.3 get()

```
browser storage sync get (
            null ,
            updateLevels  )
```

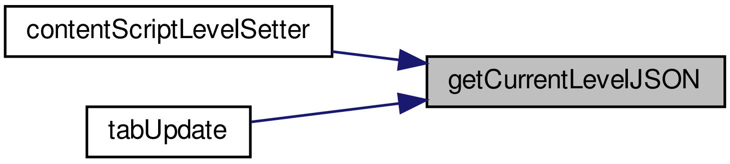
2.10.1.4 getCurrentLevelJSON()

```
function getCurrentLevelJSON (
              url )
```

Here is the call graph for this function:



Here is the caller graph for this function:



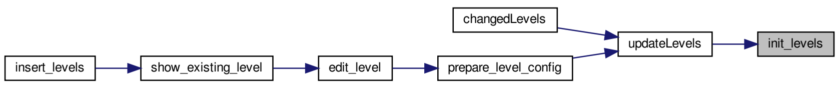
2.10.1.5 if()

```
if (
              (typeof browser) = == "undefined" )
```

2.10.1.6 init_levels()

```
init_levels ( )
```

Here is the caller graph for this function:



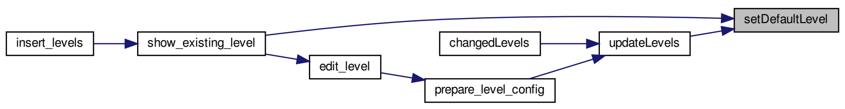
2.10.1.7 saveDomainLevels()

```
function saveDomainLevels ( )
```

2.10.1.8 setDefaultLevel()

```
function setDefaultLevel (
             level )
```

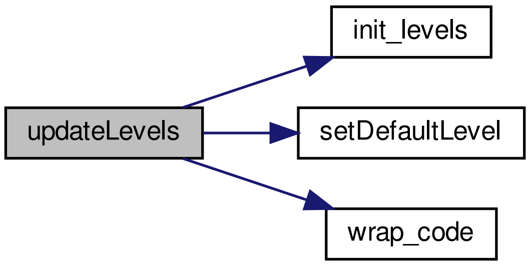
Here is the caller graph for this function:



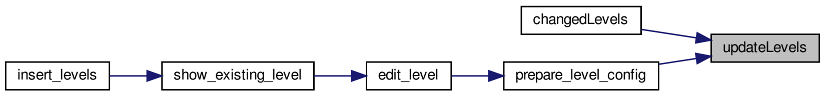
2.10.1.9 updateLevels()

```
function updateLevels (
             res )
```

Here is the call graph for this function:



Here is the caller graph for this function:



2.10.2 Variable Documentation

2.10.2.1 default_level

```
var default_level = {}
```

2.10.2.2 domains

```
var domains = {}
```

2.10.2.3 L0

```
const L0 = "0"
```

2.10.2.4 L1

```
const L1 = "1"
```

2.10.2.5 L2

```
const L2 = "2"
```

2.10.2.6 L3

```
const L3 = "3"
```

2.10.2.7 level_0

```
var level_0
```

Initial value:

```
= {
  "level_id": "0",
  "level_text": "Built-in 0",
  "level_description": "No protection at all",
}
```

2.10.2.8 level_1

```
var level_1
```

Initial value:

```
= {
  "level_id": "1",
  "level_text": "Built-in 1",
  "level_description": "Minimal level of protection",
  "time_precision": true,
  "time_precision_precision": 2,
  "time_precision_randomize": false,
  "hardware": true,
  "battery": true,
}
```

2.10.2.9 level_2

```
var level_2
```

Initial value:

```
= {
  "level_id": "2",
  "level_text": "Built-in 2",
  "level_description": "Recomended level of protection for most sites",
  "time_precision": true,
  "time_precision_precision": 1,
  "time_precision_randomize": false,
  "hardware": true,
  "battery": true,
  "htmlcanvaselement": true,
}
```

2.10.2.10 level_3

```
var level_3
```

Initial value:

```
= {
  "level_id": "3",
  "level_text": "Built-in 3",
  "level_description": "High level of protection",
  "time_precision": true,
  "time_precision_precision": 0,
  "time_precision_randomize": true,
  "hardware": true,
  "battery": true,
  "htmlcanvaselement": true,
  "xhr": true,
  "xhr_behaviour_block": false,
  "xhr_behaviour_ask": true,
  "arrays": true,
  "arrays_mapping": true,
  "shared_array": true,
  "shared_array_approach_block": true,
  "shared_array_approach_polyfill": false,
  "webworker": true,
  "webworker_approach_polyfill": true,
  "webworker_approach_slow": false,
}
```

2.10.2.11 levels

```
var levels = {}
```

2.10.2.12 levels_initialised

```
let levels_initialised = false
```

2.10.2.13 levels_updated_callbacks

```
let levels_updated_callbacks = []
```

2.10.2.14 wrapped_codes

```
var wrapped_codes = {}
```

2.10.2.15 wrapping_groups

```
var wrapping_groups
```

Wrapping groups

Used to control the built-in levels and options GUI.

2.11 common/options.js File Reference

Functions

- if ((typeof browser)==="undefined")
- function prepare_level_config (action_descr, params=wrapping_groups.empty_level)
- function edit_level (id)
- function restore_level (id, level_params)
- function show_existing_level (levelsEl, level)
- function remove_level (id)
- function insert_levels ()
- window addEventListener ("load", function() { if(!levels_initialised) { levels_updated_callbacks.↩ push(insert_levels);} else { insert_levels();} loadWhitelist();load_on_off_switch();})
- document getElementById ("new_level").addEventListener("click" => prepare_level_config("Add new level"))
- document document document document getElementsByClassName ("slider")[0].addEventListener("click"
- function add_to_whitelist ()
- function remove_from_whitelist ()
- function update_whitelist (listbox)
- function sendMessage (message)
- function getSelectValues (select)
- function loadWhitelist ()
- function load_on_off_switch ()
- function control_http_request_shield ()

Variables

- const html_element_value_source

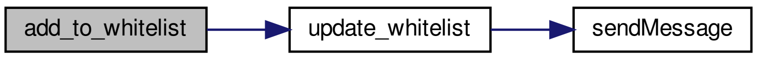
  A map where to look for the values in HTML elements.

2.11.1 Function Documentation

2.11.1.1 add_to_whitelist()

```
function add_to_whitelist ( )
```

Here is the call graph for this function:



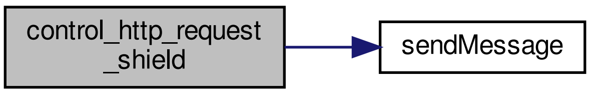
2.11.1.2 addEventListener()

```
window addEventListener (
             "load" ,
             function() { if(!levels_initialised) { levels_updated_callbacks.push(insert_levels);}
else { insert_levels();} loadWhitelist();load_on_off_switch();}  )
```

2.11.1.3 control_http_request_shield()

```
function control_http_request_shield ( )
```

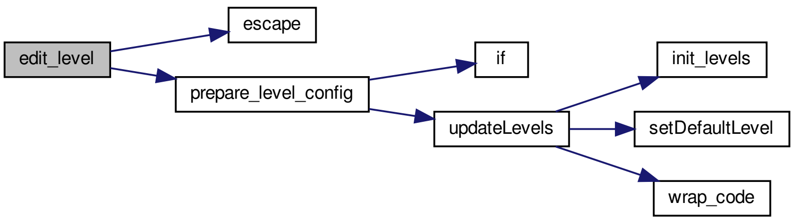
Here is the call graph for this function:



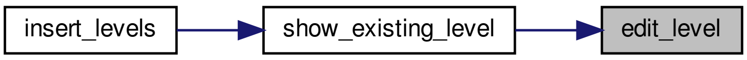
2.11.1.4 edit_level()

```
function edit_level (
              id )
```

Here is the call graph for this function:



Here is the caller graph for this function:



2.11.1.5 getElementById()

```
document document document getElementById (
              "new_level" ) => prepare_level_config("Add new level"))
```

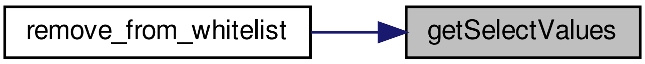
2.11.1.6 getElementsByClassName()

```
document document document document getElementsByClassName (
              "slider" )
```

2.11.1.7 getSelectValues()

```
function getSelectValues (
              select )
```

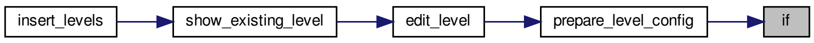
Here is the caller graph for this function:



2.11.1.8 if()

```
if (
              (typeof browser) = == "undefined" )
```

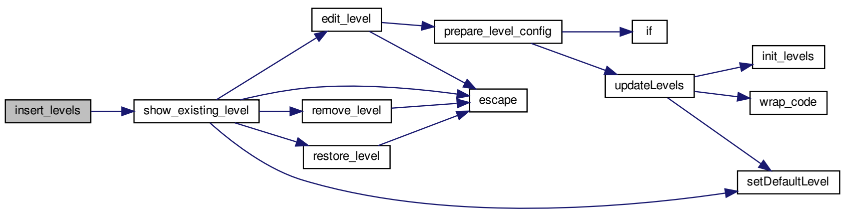
Here is the caller graph for this function:



2.11.1.9 insert_levels()

```
function insert_levels ( )
```

Here is the call graph for this function:



2.11.1.10 load_on_off_switch()

```
function load_on_off_switch ( )
```

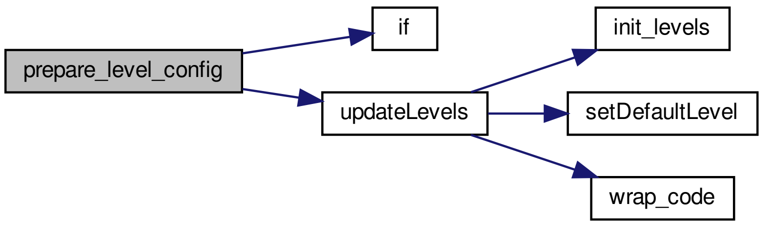
2.11.1.11 loadWhitelist()

```
function loadWhitelist ( )
```

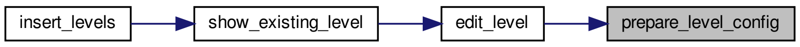
2.11.1.12 prepare_level_config()

```
function prepare_level_config (
              action_descr,
              params = wrapping_groups.empty_level )
```

Here is the call graph for this function:



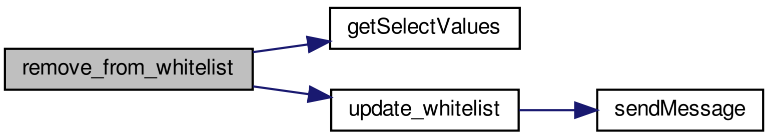
Here is the caller graph for this function:



2.11.1.13 remove_from_whitelist()

```
function remove_from_whitelist ( )
```

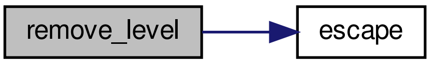
Here is the call graph for this function:



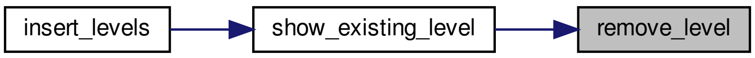
2.11.1.14 remove_level()

```
function remove_level (
              id )
```

Here is the call graph for this function:



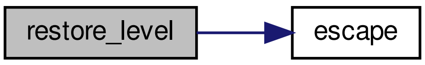
Here is the caller graph for this function:



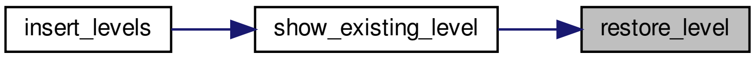
2.11.1.15 restore_level()

```
function restore_level (
              id,
              level_params )
```

Here is the call graph for this function:



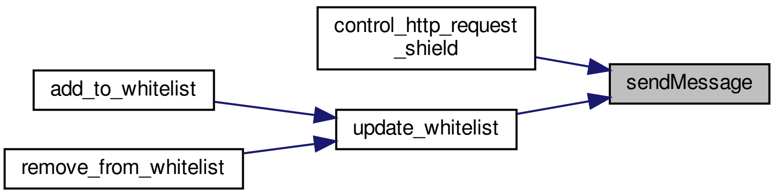
Here is the caller graph for this function:



2.11.1.16 sendMessage()

```
function sendMessage (
              message )
```

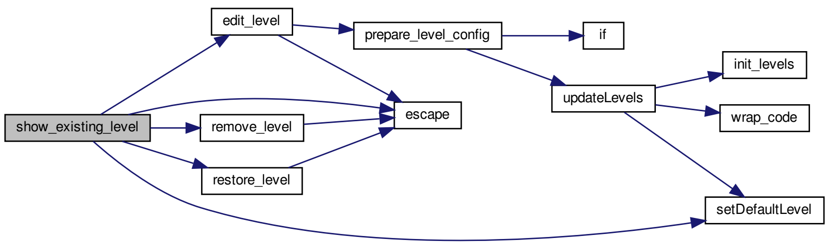
Here is the caller graph for this function:



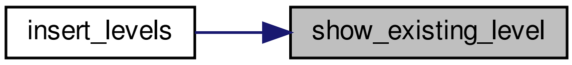
2.11.1.17 show_existing_level()

```
function show_existing_level (
              levelsEl,
              level )
```

Here is the call graph for this function:



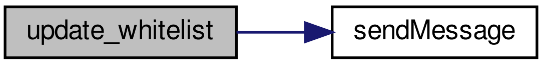
Here is the caller graph for this function:



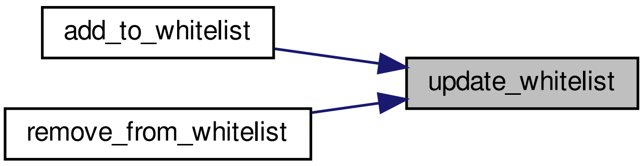
2.11.1.18 update_whitelist()

```
function update_whitelist (
             listbox )
```

Here is the call graph for this function:



Here is the caller graph for this function:



2.11.2 Variable Documentation

2.11.2.1 html_element_value_source

```
const html_element_value_source
```

Initial value:

```
= {
  "select": "value",
  "input-checkbox": "checked",
  "input-radio": "checked",
}
```

A map where to look for the values in HTML elements.

2.12 common/options_domains.js File Reference

Functions

- if ((typeof browser)==="undefined")
- function escape (str)

2.12.1 Function Documentation

2.12.1.1 escape()

```
function escape (
                str )
```

2.12.1.2 if()

```
if (
                (typeof browser) = == "undefined" )
```

2.13 common/popup.js File Reference

Functions

- if ((typeof browser)==="undefined")
- function showRefreshPageOption ()
- function changeActiveLevel (activeEl)
- browser tabs query (queryInfo, function(tabs) { let tab=tabs[0];url=new URL(tab.url);url.hostname=url.↩ hostname.replace(/^www\./,'');if(url.hostname==""||url.hostname==myAddon.hostname||url.hostname=="newtab") { document.getElementById("current_site_level_settings").style.opacity=fadeOut;return;} else { document.getElementById('curr site').innerHTML=url.hostname;} var port_to_background=browser.runtime.connect({name:"port_from↩ _popup"});var current_level={ level_id:"?" };port_to_background.onMessage.addListener(function(msg) { current_level=msg;var selectEl=document.getElementById("level-select");selectEl.innerHTML=`< span class="level level_control" id="default_level_select" title="Set the default level">Default</span >`;document.getElementById(`d _level_select`).addEventListener("click", function() { delete domains[url.hostname];saveDomainLevels();changeActiveLevel(this level_id in levels) { let level=levels[level_id];selectEl.appendChild(document.createRange().create↩ ContextualFragment(`< span class="level level_control" id="select-${level.level_id}" title="${level.level_↩ text}">${escape(level.level_id)}</span >`));document.getElementById(`select-${level.level_id}`).addEventListener("click", function() { domains[url.hostname]={ level_id:level.level_id, };saveDomainLevels();changeActiveLevel(this);current_level=level;}) if(current_level.is_default) { document.getElementById(`default_level_select`).classList.add("active");} else { var currentEl=document.getElementById(`select-${current_level.level_id}`);if(currentEl !==null) { currentEl.↩ classList.add("active");} } });})
- document getElementById ('controls').addEventListener('click'
- window close ()
- window addEventListener ("load", function() { load_on_off_switch();})
- document getElementsByClassName ("slider")[0].addEventListener("click"
- function load_on_off_switch ()

  Load switch state from storage for current site.
- function control_whitelist ()

  Event handler for On/off switch.

Variables

- const fadeOut = "0.3"
- const fadeIn = "1.0"
- var myAddon = new URL(browser.runtime.getURL ('./'))
- var url
- var queryInfo
- function e

2.13.1 Function Documentation

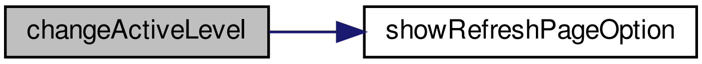
2.13.1.1 addEventListener()

```
window addEventListener (
             "load" ,
             function() { load_on_off_switch();}  )
```

2.13.1.2 changeActiveLevel()

```
function changeActiveLevel (
              activeEl )
```

Visaully highlights the active level. Here is the call graph for this function:



2.13.1.3 close()

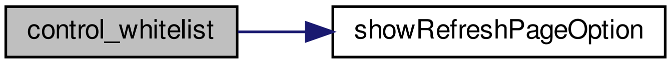
```
window close ( )
```

2.13.1.4 control_whitelist()

```
function control_whitelist ( )
```

Event handler for On/off switch.

Here is the call graph for this function:



2.13.1.5 getElementById()

```
document getElementById (
              'controls' )
```

2.13.1.6 getElementsByClassName()

```
document getElementsByClassName (
              "slider" )
```

2.13.1.7 if()

```
if (
              (typeof browser) = == "undefined" )
```

2.13.1.8 load_on_off_switch()

```
function load_on_off_switch ( )
```

Load switch state from storage for current site.

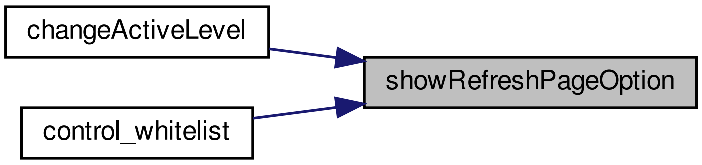
2.13.1.9 query()

```
browser tabs query (
             queryInfo ,
             function(tabs) { let tab=tabs[0];url=new URL(tab.url);url.hostname=url.hostname.↩
replace(/^www\./,'');if(url.hostname==""||url.hostname==myAddon.hostname||url.hostname=="newtab")
{ document.getElementById("current_site_level_settings").style.opacity=fadeOut;return;} else {
document.getElementById('current-site').innerHTML=url.hostname;} var port_to_background=browser.↩
runtime.connect({name:"port_from_popup"});var current_level={ level_id:"?" };port_to_background.onMessage.addL
{ current_level=msg;var selectEl=document.getElementById("level-select");selectEl.inner↩
HTML=`< span class="level level_control" id="default_level_select" title="Set the default
level">Default</span >`;document.getElementById(`default_level_select`).addEventListener("click",
function() { delete domains[url.hostname];saveDomainLevels();changeActiveLevel(this);current_level=default_lev
level_id in levels) { let level=levels[level_id];selectEl.appendChild(document.createRange().create↩
ContextualFragment(`< span class="level level_control" id="select-${level.level_id}" title="${level.↩
level_text}">${escape(level.level_id)}</span >`));document.getElementById(`select-${level.↩
level_id}`).addEventListener("click", function() { domains[url.hostname]={ level_id:level.↩
level_id, };saveDomainLevels();changeActiveLevel(this);current_level=level;});} if(current_↩
level.is_default) { document.getElementById(`default_level_select`).classList.add("active");}
else { var currentEl=document.getElementById(`select-${current_level.level_id}`);if(currentEl
!==null) { currentEl.classList.add("active");} } });}  )
```

2.13.1.10 showRefreshPageOption()

```
function showRefreshPageOption ( )
```

Enable the refresh page option. Here is the caller graph for this function:



2.13.2 Variable Documentation

2.13.2.1 e

```
function e
```

Initial value:
```
{
  browser.runtime.openOptionsPage()
```

2.13.2.2 fadeIn

```
const fadeIn = "1.0"
```

2.13.2.3 fadeOut

```
const fadeOut = "0.3"
```

2.13.2.4 myAddon

```
var myAddon = new URL(browser.runtime.getURL ('./'))
```

2.13.2.5 queryInfo

```
var queryInfo
```

Initial value:

```
= {
  active: true,
  currentWindow: true
}
```

2.13.2.6 url

```
var url
```

2.14 common/update.js File Reference

Functions

- if ((typeof browser)==="undefined")
- function installUpdate ()
- browser runtime onInstalled addListener (installUpdate)

2.14.1 Function Documentation

2.14.1.1 addListener()

```
browser runtime onInstalled addListener (
             installUpdate  )
```

2.14.1.2 if()

```
if (
                (typeof browser) = == "undefined" )
```

2.14.1.3 installUpdate()

```
function installUpdate ( )
```

0.3 storage { **default**: 2, // Default protection level version: 2.1, // The version of this storage custom_levels: {}, // associative array of custom level (key, its id => object) {level_id: short string used for example on the badge level↩ _text: Short level description level_description: Full level description ... wrapping_params (key-value pairs), see wrapping_groups for the list of params and supported values } domains: {}, // associative array of levels associated with specific domains (key, the domain => object) {level_id: short string of the level in use } whitelistedHosts: {} // associative array of hosts that are removed from http protection control (hostname => boolean) requestShieldOn: {} // Boolean, if it's TRUE or undefined, the http request protection is turned on, if it's FALSE, the protection si turned off

2.15 common/url.js File Reference

Functions

- function extractSubDomains (thisDomain)

2.15.1 Function Documentation

2.15.1.1 extractSubDomains()

```
function extractSubDomains (
             thisDomain )
```

Get all sub domains for a domain.

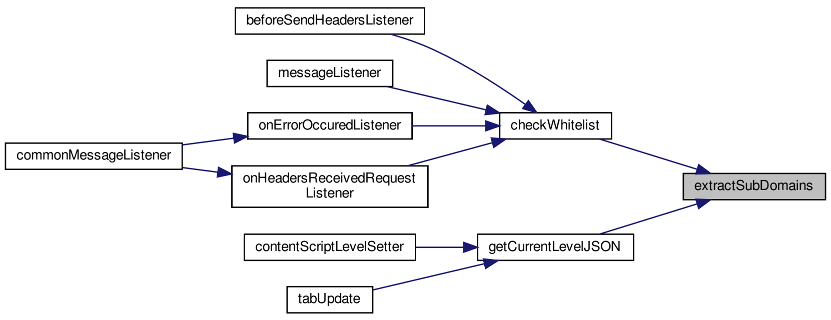
Parameters

thisDomain	Domain name string, e.g. www.fit.vutbr.cz

Returns

List of strings representing all subdomains, TLD excluded. The list starts with the most generic domain and continues with the more and more specific domains. For example, www.fit.vutbr.cz -> ["vutbr.cz", "fit.vutbr.cz", "www.fit.vutbr.cz"]

Here is the caller graph for this function:



2.16 common/wrapping.js File Reference

Functions

- function add_wrappers (wrappers)
- function noise_function (numberToChange, precision)

Variables

- var build_wrapping_code = {}
- var rounding_function
- var noise_function = `let lastValue = 0

2.16.1 Function Documentation

2.16.1.1 add_wrappers()

```
function add_wrappers (
                wrappers )
```

Adds a list of wrapping objects to the build_wrapping_code.

This function is called from each wrapper in its file.

2.16.1.2 noise_function()

```
function noise_function (
              numberToChange,
              precision )
```

2.16.2 Variable Documentation

2.16.2.1 build_wrapping_code

```
var build_wrapping_code = {}
```

The object carrying all the wrappers

2.16.2.2 noise_function

```
var noise_function = `let lastValue = 0
```

Function to be used by wrapped code for adding randomized noise

2.16.2.3 rounding_function

```
var rounding_function
```

Initial value:

```
= `function rounding_function(numberToRound, precision) {
  return numberToRound - (numberToRound % Math.pow(10, Math.max(3 - precision)));
}`
```

Function to be used by wrapped code used for rounding

2.17 common/wrappingS-AJAX.js File Reference

2.18 common/wrappingS-BATTERY-CR.js File Reference

Functions

- function add_wrappers (wrappers)

2.18.1 Function Documentation

2.18.1.1 add_wrappers()

```
function add_wrappers (
            wrappers  )
```

Adds a list of wrapping objects to the build_wrapping_code.

This function is called from each wrapper in its file.

2.19 common/wrappingS-DM.js File Reference

2.20 common/wrappingS-ECMA-ARRAY.js File Reference

Functions

- function packIEEE754 (v, ebits, fbits)

  This function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` *under MIT licence.*
- function unpackIEEE754 (bytes, ebits, fbits)

  This function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` *under MIT licence.*
- function unpackF64 (b)

  Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` *under MIT licence.*
- function packF64 (v)

  Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` *under MIT licence.*
- function unpackF32 (b)

  Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` *under MIT licence.*
- function packF32 (v)

  Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` *under MIT licence.*
- function constructDecorator (wrapped)
- function offsetDecorator (wrapped, type, proxyRef, offsetF)
- function redefineNewArrayFunctions (target, offsetF)
- function redefineNewArrayConstructors (target)
- function getByteDecorator (wrapped, offsetF, name, doMapping)
- function setByteDecorator (wrapped, offsetF, name, doMapping)
- function getFloatDecorator (wrapped, name, doMapping)
- function setFloatDecorator (wrapped, name, doMapping)
- function getBigIntDecorator (wrapped, doMapping)
- function setBigIntDecorator (wrapped, doMapping)
- function redefineDataViewFunctions (target, offsetF, doMapping)
- function if (typeof target==='object' &&target !==null)
- if (doMapping)
- for (let i=0;i< _data['length'];i++)
- for (let p of typedTypes)
- add_wrappers (wrappers)

Variables

- var proxyHandler

  Default proxy handler for Typed Arrays.
- _data = new originalF(...arguments)
- var offsetF
- let _target = target
- var proxy = new newProxy(_data, ${proxyHandler})
- let j
- var wrappers
- let DEFAULT_TYPED_ARRAY_WRAPPER
- var typedTypes = ['Uint8Array', 'Int8Array', 'Uint8ClampedArray', 'Int16Array', 'Uint16Array', 'Int32Array', 'Uint32Array', 'Float32Array', 'Float64Array']

2.20.1 Function Documentation

2.20.1.1 add_wrappers()

```
add_wrappers (
             wrappers  )
```

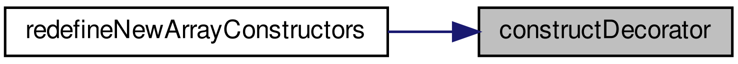
Adds a list of wrapping objects to the build_wrapping_code.

This function is called from each wrapper in its file.

2.20.1.2 constructDecorator()

```
function constructDecorator (
              wrapped )
```

Here is the caller graph for this function:



2.20.1.3 for() [1/2]

```
for ( )
```

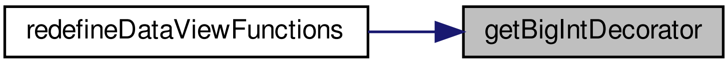
2.20.1.4 for() [2/2]

```
for (
            let p of typedTypes )
```

2.20.1.5 getBigIntDecorator()

```
function getBigIntDecorator (
             wrapped,
             doMapping )
```

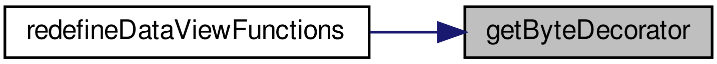
Here is the caller graph for this function:



2.20.1.6 getByteDecorator()

```
function getByteDecorator (
             wrapped,
             offsetF,
             name,
             doMapping )
```

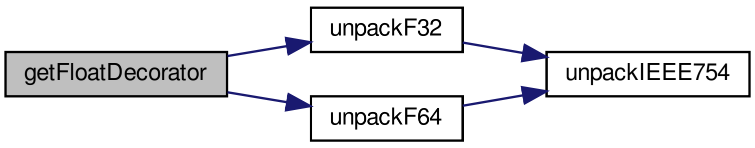
Here is the caller graph for this function:



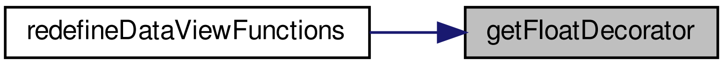
2.20.1.7 getFloatDecorator()

```
function getFloatDecorator (
              wrapped,
              name,
              doMapping )
```

Here is the call graph for this function:



Here is the caller graph for this function:



2.20.1.8 if() [1/2]

```
if (
              doMapping )
```

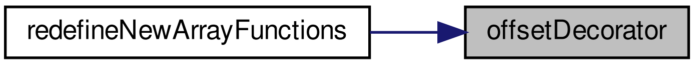
2.20.1.9 if() [2/2]

```
function if (
             typeof target = == 'object' && target !== null )
```

2.20.1.10 offsetDecorator()

```
function offsetDecorator (
              wrapped,
              type,
              proxyRef,
              offsetF )
```

Here is the caller graph for this function:

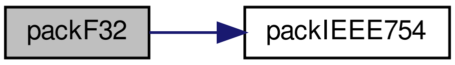


2.20.1.11 packF32()

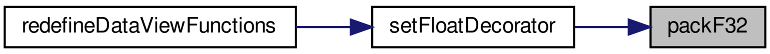
```
function packF32 (
              v )
```

Function was adopted from https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩
js under MIT licence.

Here is the call graph for this function:



Here is the caller graph for this function:

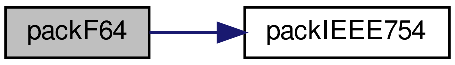


2.20.1.12 packF64()

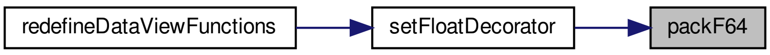
```
function packF64 (
              v )
```

Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` under MIT licence.

Here is the call graph for this function:



Here is the caller graph for this function:

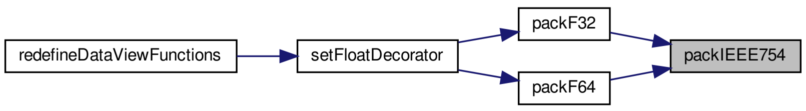


2.20.1.13 packIEEE754()

```
function packIEEE754 (
              v,
              ebits,
              fbits )
```

This function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray. js` under MIT licence.

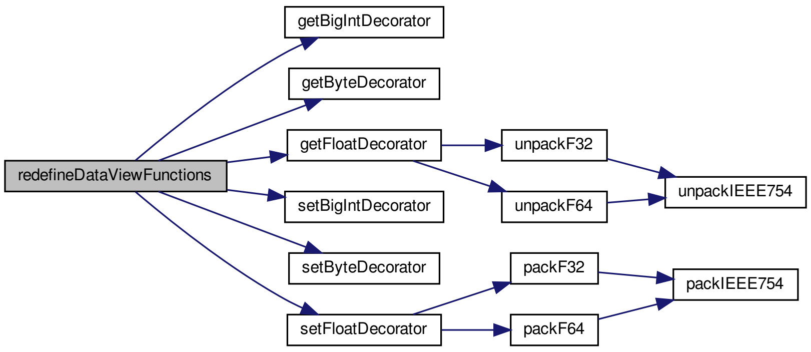
Here is the caller graph for this function:



2.20.1.14 redefineDataViewFunctions()

```
function redefineDataViewFunctions (
              target,
              offsetF,
              doMapping )
```

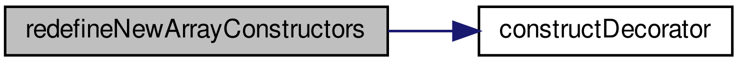
Here is the call graph for this function:



2.20.1.15 redefineNewArrayConstructors()

```
function redefineNewArrayConstructors (
              target )
```

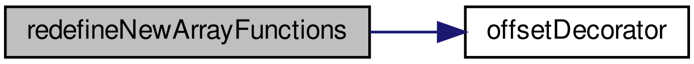
Here is the call graph for this function:



2.20.1.16 redefineNewArrayFunctions()

```
function redefineNewArrayFunctions (
              target,
              offsetF )
```

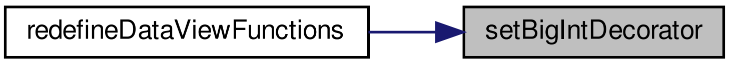
Here is the call graph for this function:



2.20.1.17 setBigIntDecorator()

```
function setBigIntDecorator (
              wrapped,
              doMapping )
```

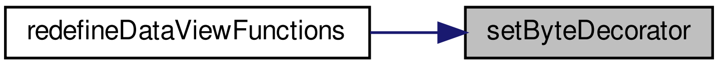
Here is the caller graph for this function:



2.20.1.18 setByteDecorator()

```
function setByteDecorator (
              wrapped,
              offsetF,
              name,
              doMapping )
```

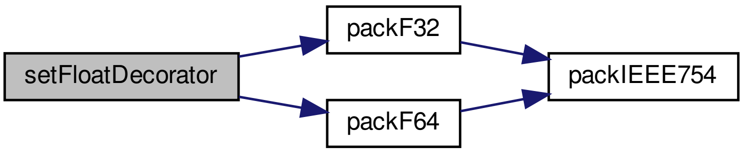
Here is the caller graph for this function:



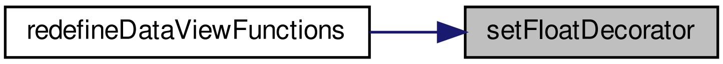
2.20.1.19 setFloatDecorator()

```
function setFloatDecorator (
              wrapped,
              name,
              doMapping )
```

Here is the call graph for this function:



Here is the caller graph for this function:

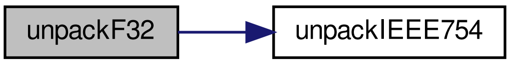


2.20.1.20 unpackF32()

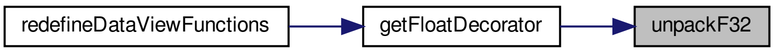
```
function unpackF32 (
             b )
```

Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` under MIT licence.

Here is the call graph for this function:



Here is the caller graph for this function:

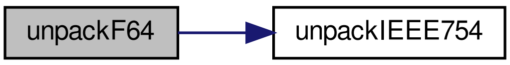


2.20.1.21 unpackF64()

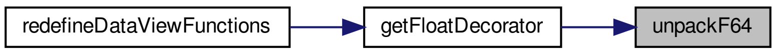
```
function unpackF64 (
             b )
```

Function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.↩ js` under MIT licence.

Here is the call graph for this function:



Here is the caller graph for this function:

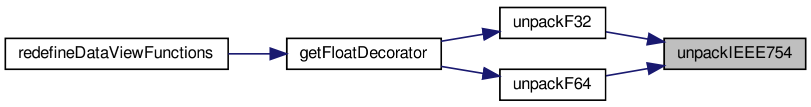


2.20.1.22 unpackIEEE754()

```
function unpackIEEE754 (
              bytes,
              ebits,
              fbits )
```

This function was adopted from `https://github.com/inexorabletash/polyfill/blob/master/typedarray.js` under MIT licence.

Here is the caller graph for this function:



2.20.2 Variable Documentation

2.20.2.1 _data

```
_data = new originalF(...arguments)
```

2.20.2.2 _target

```
let _target = target
```

2.20.2.3 DEFAULT_TYPED_ARRAY_WRAPPER

```
let DEFAULT_TYPED_ARRAY_WRAPPER
```

2.20.2.4 j

```
let j
```

2.20.2.5 offsetF

```
var offsetF
```

Initial value:

```
= function(x) {
    return x;
  }
```

2.20.2.6 proxy

```
return proxy = new newProxy(_data, ${proxyHandler})
```

2.20.2.7 proxyHandler

```
var proxyHandler
```

Initial value:

```
= `{
  get(target, key, receiver) {
    var random_idx = Math.floor(Math.random() * target['length']);

    var rand_val = target[random_idx];
    let proto_keys = ['buffer', 'byteLength', 'byteOffset', 'length'];
    if (proto_keys.indexOf(key) >= 0) {
      return target[key];
    }

    if (typeof key !== 'symbol' && Number(key) >= 0 && Number(key) < target.length) {
      key = offsetF(key)
    }
    let value = Reflect.get(...arguments);
    return typeof value == 'function' ? value.bind(target) : value;
  },
  set(target, key, value) {
    var random_idx = Math.floor(Math.random() * (target['length']));

    var rand_val = target[random_idx];
    rand_val = rand_val;
    if (typeof key !== 'symbol' && Number(key) >= 0 && Number(key) < target.length) {
      key = offsetF(key)
    }
    return Reflect.set(...arguments);
  }
}`
```

Default proxy handler for Typed Arrays.

2.20.2.8 typedTypes

```
var typedTypes = ['Uint8Array', 'Int8Array', 'Uint8ClampedArray', 'Int16Array', 'Uint16Array',
'Int32Array', 'Uint32Array', 'Float32Array', 'Float64Array']
```

2.20.2.9 wrappers

```
var wrappers
```

2.21 common/wrappingS-ECMA-DATE.js File Reference

2.22 common/wrappingS-ECMA-SHARED.js File Reference

Functions

- add_wrappers (wrappers)

Variables

- var proxyHandler
- function let _data = new originalF(target)
- var proxy = new Proxy(_data, ${proxyHandler})
- var wrappers

2.22.1 Function Documentation

2.22.1.1 add_wrappers()

```
add_wrappers (
            wrappers  )
```

Adds a list of wrapping objects to the build_wrapping_code.

This function is called from each wrapper in its file.

2.22.2 Variable Documentation

2.22.2.1 _data

```
function let _data = new originalF(target)
```

2.22.2.2 proxy

```
return proxy = new Proxy(_data, ${proxyHandler})
```

2.22.2.3 proxyHandler

```
var proxyHandler
```

Initial value:

```
= `{
  get(target, key, receiver) {
    let j;
    let slow = Math.floor(Math.random() * 10000)
    for (let i = 0; i < slow;) {
      j = i;
      i = j + 1;
    }
    let value = target[key];
    return typeof value == 'function' ? value.bind(target) : value;
  },
  set(target, key, value) {
    let j;
    let slow = Math.floor(Math.random() * 10000);
    for (let i = 0; i < slow;) {
      j = i;
      i = j + 1;
    }
    return Reflect.set(...arguments);
  }
}`
```

2.22.2.4 wrappers

```
var wrappers
```

Initial value:

```
= [
    {
      parent_object: "window",
      parent_object_property: "SharedArrayBuffer",
      original_function: "window.SharedArrayBuffer",
      wrapped_objects: [],
      helping_code: `
        if (window.SharedArrayBuffer === undefined) {
          return;
        }
        let forbid = args[0];
      `,
      wrapping_function_args: `target`,
      wrapping_function_body: wrappingFunctionBody,
      post_replacement_code: `
        if (forbid) {
          delete(window.SharedArrayBuffer);
        }
      `,
    }
  ]
```

2.23 common/wrappingS-H-C.js File Reference

2.24 common/wrappingS-HRT.js File Reference

Functions

- function add_wrappers (wrappers)

2.24.1 Function Documentation

2.24.1.1 add_wrappers()

```
function add_wrappers (
            wrappers  )
```

Adds a list of wrapping objects to the build_wrapping_code.

This function is called from each wrapper in its file.

2.25 common/wrappingS-HTML-LS.js File Reference

Functions

- function executeEach (arr, fun)
- function callErrorListener (err)
- function addEventListener (type, fun)

  If the browser regained connectivity - came online.
- function removeEventListener (type, fun)
- function postError (err)
- function runPostMessage (msg, transfer)
- function postMessage (msg, transfer)
- function workerPostMessage (msg)
- function workerAddEventListener (type, fun)
- xhr open ('GET', path)
- xhr send ()

Variables

- var errorListeners = [ ]
- var workerMessageListeners = [ ]
- var workerErrorListeners = [ ]
- var postMessageListeners = [ ]
- var terminated = false
- var script
- var workerSelf
- var api = this
- var xhr = new XMLHttpRequest()
- xhr onreadystatechange
- api postMessage = postMessage
- api addEventListener = addEventListener

    If the browser lost connectivity - gone offline.
- api removeEventListener = removeEventListener
- api terminate = terminate
- var slowBody
- let _old = _data.postMessage
- var wrappers

2.25.1 Function Documentation

2.25.1.1 addEventListener()

```
function addEventListener (
             "online" ,
             function() { browser.webRequest.onErrorOccurred.addListener(onErrorOccuredListener,
{urls:["<all_urls>"]});}  )
```

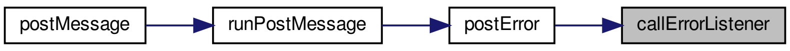
If the browser regained connectivity - came online.

If the browser lost connectivity - gone offline.

2.25.1.2 callErrorListener()

```
function callErrorListener (
              err )
```

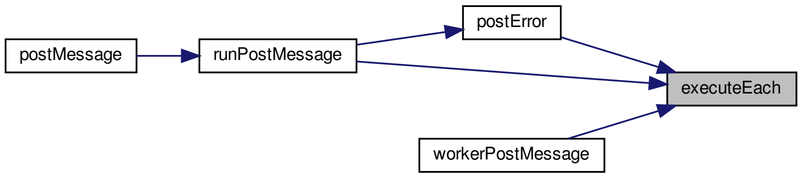
Here is the caller graph for this function:



2.25.1.3 executeEach()

```
function executeEach (
              arr,
              fun )
```

Here is the caller graph for this function:



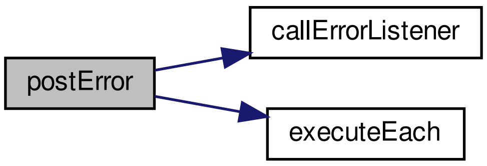
2.25.1.4 open()

```
xhr open (
             'GET' ,
             path  )
```

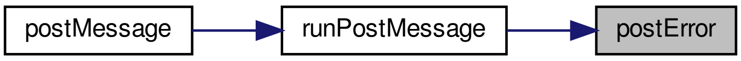
2.25.1.5 postError()

```
function postError (
              err )
```

Here is the call graph for this function:



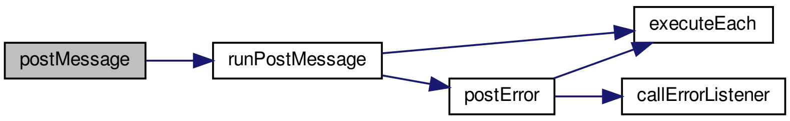
Here is the caller graph for this function:



2.25.1.6 postMessage()

```
function postMessage (
              msg,
              transfer )
```

Here is the call graph for this function:



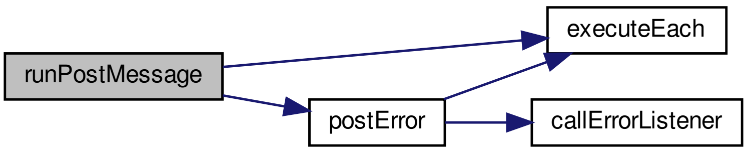
2.25.1.7 removeEventListener()

```
function removeEventListener (
              type,
              fun )
```

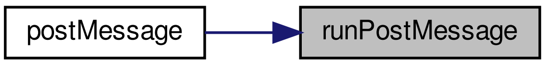
2.25.1.8 runPostMessage()

```
function runPostMessage (
              msg,
              transfer )
```

Here is the call graph for this function:



Here is the caller graph for this function:



2.25.1.9 send()

```
xhr send ( )
```

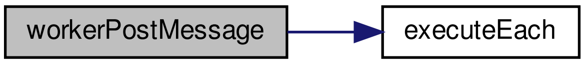
2.25.1.10 workerAddEventListener()

```
function workerAddEventListener (
              type,
              fun )
```

2.25.1.11 workerPostMessage()

```
function workerPostMessage (
              msg )
```

Here is the call graph for this function:



2.25.2 Variable Documentation

2.25.2.1 _old

```
let _old = _data.postMessage
```

2.25.2.2 addEventListener

```
window addEventListener = addEventListener
```

If the browser lost connectivity - gone offline.

2.25.2.3 api

```
return api = this
```

2.25.2.4 errorListeners

```
var errorListeners = []
```

2.25.2.5 onreadystatechange

```
xhr onreadystatechange
```

Initial value:

```
= function () {
    if (xhr.readyState === 4) {
      if (xhr.status >= 200 && xhr.status < 400) {
        script = xhr.responseText;
        workerSelf = {
          postMessage: workerPostMessage,
          addEventListener: workerAddEventListener,
          close: terminate
        };
        doEval(workerSelf, script);
        var currentListeners = postMessageListeners;
        postMessageListeners = [];
        for (var i = 0; i < currentListeners.length; i++) {
          runPostMessage(currentListeners[i].msg, currentListeners[i].transfer);
        }
      } else {
        postError(new Error('cannot find script ' + path));
      }
    }
  }
```

2.25.2.6 postMessage

```
_data postMessage = postMessage
```

2.25.2.7 postMessageListeners

```
var postMessageListeners = [ ]
```

2.25.2.8 removeEventListener

```
api removeEventListener = removeEventListener
```

2.25.2.9 script

```
var script
```

2.25.2.10 slowBody

```
var slowBody
```

Initial value:

```
= `
    let _data = new originalF(path)
```

2.25.2.11 terminate

```
function terminate = terminate
```

2.25.2.12 terminated

```
var terminated = false
```

2.25.2.13 workerErrorListeners

```
var workerErrorListeners = []
```

2.25.2.14 workerMessageListeners

```
var workerMessageListeners = []
```

2.25.2.15 workerSelf

```
var workerSelf
```

2.25.2.16 wrappers

```
var wrappers
```

2.25.2.17 xhr

```
var xhr = new XMLHttpRequest()
```

2.26 common/wrappingS-PT2.js File Reference

Functions

- if (doNoise===true)
- for (measure of measures)

Variables

- var common_function_body
- func = rounding_function
- var ret = [ ]
- var wrappers

2.26.1 Function Documentation

2.26.1.1 for()

```
for (
             measure of measures )
```

2.26.1.2 if()

```
if (
              doNoise = == true )
```

2.26.2 Variable Documentation

2.26.2.1 common_function_body

```
var common_function_body
```

Initial value:

```
= `
       var measures = origFunc.call(this, ...args)
```

2.26.2.2 func

```
func = rounding_function
```

2.26.2.3 ret

```
return ret = [ ]
```

2.26.2.4 wrappers

```
var wrappers
```

2.27 firefox/http_shield_firefox.js File Reference

Functions

- browser runtime onMessage addListener (messageListener)
- function async beforeSendHeadersListener (requestDetail)
- function messageListener (message, sender, sendResponse)

2.27.1 Function Documentation

2.27.1.1 addListener()

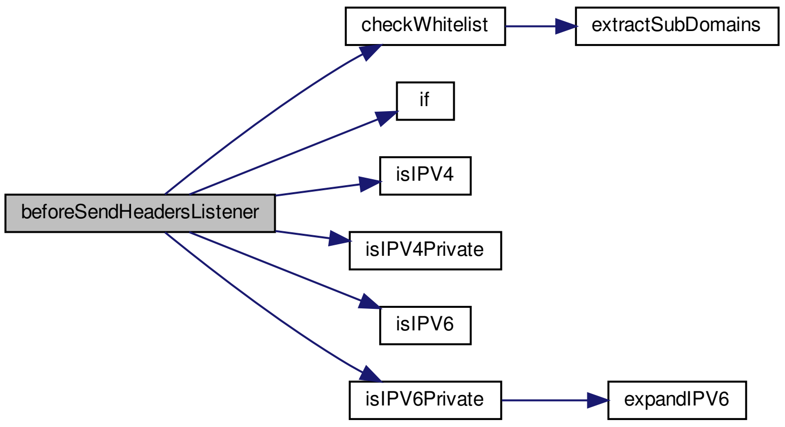
```
browser runtime onMessage addListener (
            messageListener )
```

Implementation of HTTP webRequest shield, file: http_shield_firefox.js Contains Firefox specific functions Event handlers for webRequest API, notifications and messaging webRequest event listener Listens to onBeforeSend↩ Headers event, receives detail of HTTP request in requestDetail Catches the request, analyzes it's origin and target URLs and blocks it/permits it based on their IP adresses. Requests coming from public IP ranges targeting the private IPs are blocked by default. Others are permitted by default.

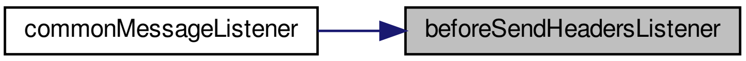
2.27.1.2 beforeSendHeadersListener()

```
function async beforeSendHeadersListener (
              requestDetail )
```

Here is the call graph for this function:



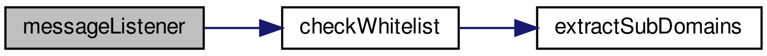
Here is the caller graph for this function:



2.27.1.3 messageListener()

```
function messageListener (
              message,
              sender,
              sendResponse )
```

Event listener hooked up to webExtensions onMessage event Receives full message in message, sender of the message in sender, function for sending response in sendResponse Does appropriate action based on message Here is the call graph for this function:



2.28 firefox/level_cache.js File Reference

Functions

- function contentScriptLevelSetter (message)
- browser runtime onMessage addListener (contentScriptLevelSetter)

Variables

- var domains_bug1267027 = {}

2.28.1 Function Documentation

2.28.1.1 addListener()

```
browser runtime onMessage addListener (
             contentScriptLevelSetter  )
```

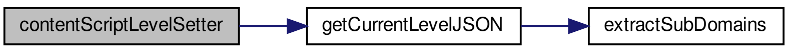
2.28.1.2 contentScriptLevelSetter()

```
function contentScriptLevelSetter (
              message )
```

Messaging with content script.

@message The message from consent script.

Returns the promise with the message returned to the content script. Here is the call graph for this function:



2.28.2 Variable Documentation

2.28.2.1 domains_bug1267027

```
var domains_bug1267027 = {}
```

Keep list of domains that are known (not) to be affected by the Firefox bug 1267027.

2.29 chrome/level_cache.js File Reference

Functions

- function contentScriptLevelSetter (message, sender, sendResponse)
- browser runtime onMessage addListener (contentScriptLevelSetter)

2.29.1 Function Documentation

2.29.1.1 addListener()

```
browser runtime onMessage addListener (
            contentScriptLevelSetter  )
```

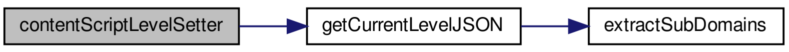
2.29.1.2 contentScriptLevelSetter()

```
function contentScriptLevelSetter (
              message,
              sender,
              sendResponse )
```

Messaging with content script.

@message The message from consent script.

Sends back the wrapping code. Here is the call graph for this function:



2.30 firefox/manifest.json File Reference

2.31 chrome/manifest.json File Reference

Index