Package: webqueue (via r-universe)

March 17, 2025

Type Package

Title Multicore HTTP Server

Version 1.0.0

Date 2025-03-12

Description Distributes HTTP requests among a pool of background R processes. Supports timeouts and interrupts of requests to ensure that CPU cores are utilized effectively.

URL https://cmmr.github.io/webqueue/, https://github.com/cmmr/webqueue

BugReports https://github.com/cmmr/webqueue/issues

License MIT + file LICENSE

Encoding UTF-8

RoxygenNote 7.3.2

VignetteBuilder knitr

Config/testthat/edition 3

Depends R (>= 4.2.0)

Imports cli, httpuv, jsonlite, jobqueue, later, parallelly, promises, R6, rlang, semaphore, webutils, utils

Suggests httr2, knitr, RCurl, rmarkdown, testthat (>= 3.0.0), withr

NeedsCompilation no

Author Daniel P. Smith [aut, cre] (<https://orcid.org/0000-0002-2479-2044>), Alkek Center for Metagenomics and Microbiome Research [cph, fnd]

Maintainer Daniel P. Smith <dansmith01@gmail.com>

Date/Publication 2025-03-13 21:10:02 UTC

Additional_repositories https://cranhaven.r-universe.dev

Config/pak/sysreqs make libssl-dev zlib1g-dev

Repository https://cranhaven.r-universe.dev

RemoteUrl https://github.com/cranhaven/cranhaven.r-universe.dev

RemoteRef package/webqueue

RemoteSha 9c15dd1fae55211c1f74846b658c57cfdfe1d7aa

RemoteSubdir webqueue

Contents

`cookie` *Assemble an HTTP cookie.*

Description

See https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/Set-Cookie for a more in-depth description of each parameter's purpose.

Usage

```
cookie(
  ...,
  max_age = NULL,
  domain = NULL,
  path = NULL,
  same_site = "Lax",
  secure = FALSE,
  http_only = FALSE,
  partitioned = FALSE,
  name = ...names(),
  value = ..1
)
```

Arguments

`...`	A single key-value pair.
`max_age`	The number of seconds until expiration. Omit to create a session cookie. `Inf` is mapped to 34560000L (400 days).
`domain`	Send with requests to this host.
`path`	Send with requests to this path.
`same_site`	`'Strict'`, `'Lax'`, or `'None'`. `secure` required for `'None'`.

secure	Only send over HTTPS.
http_only	Disallow javascript access.
partitioned	Use partitioned storage. secure required.
name	Explicitly set the name (key) in the key-value pair.
value	Explicitly set the value in the key-value pair.

Value

A 'header' object that can be passed to response().

Examples

```
library(webqueue)

cookie(xyz = 123, max_age = 3600, http_only = TRUE)

token <- 'randomstring123'
cookie(token)

response(cookie(token = 'randomstring123'))
```

---

header *Assemble an HTTP header.*

Description

See https://developer.mozilla.org/en-US/docs/Glossary/Response_header for example response headers and their purpose.

Usage

```
header(..., expose = FALSE, name = ...names(), value = ..1)
```

Arguments

...	A single key-value pair.
expose	Allow javascript to read this header.
name	Explicitly set the name (key) in the key-value pair.
value	Explicitly set the value in the key-value pair.

Value

A 'header' object that can be passed to response().

Examples

```
library(webqueue)

header(name = 'Location', value = '/index.html')

Location <- '/index.html'
header(Location)

response(307L, header(Location = '/index.html'))

# Allow javascript to access a header value
header('x-user-id' = 100, expose = TRUE)
```

---

js_obj *Ensure a list becomes a JSON object.*

Description

This function returns a list that `jsonlite::toJSON()` will always encode as `{}`.

Usage

```
js_obj(x = list())
```

Arguments

x	A list, or list-like object.

Value

A list with the names attribute set.

Examples

```
library(webqueue)

updates <- list()

response(list(updates = updates))

response(list(updates = js_obj(updates)))
```

`response` *Compile an HTTP response.*

Description

If your WebQueue's `handler` function returns a list, json object, character vector, or scalar integer, `response()` will be used to transform that result into an HTTP response.

You may also call `response()` within your handler to better customize the HTTP response. Or, return a result of class 'AsIs' to have that object passed directly on to 'httpuv'.

Usage

```
response(body = NULL, status = 200L, headers = NULL, ...)
```

Arguments

`body`	The content. A list will be encoded as JSON. A scalar integer will be interpreted as a status. A character vector will be concatenated with no separator.
`status`	A HTTP response status code.
`headers`	A named character vector of HTTP headers. A list-like object is acceptable if all elements are simple strings.
`...`	Objects created by `header()` and/or `cookie()`. Or key-value pairs to add to `headers`.

Value

A `<response/AsIs>` object. Essentially a list with elements named `body`, `status`, and `headers` formatted as 'httpuv' expects.

Examples

```
library(webqueue)

response(list(name = unbox('Peter'), pi = pi))

response(307L, Location = '/new/file.html')

# The `body` and `status` slots also handle header objects.
response(cookie(id = 123, http_only = TRUE))

# Allow javascript to access custom headers.
uid <- header('x-user-id'    = 100, expose = TRUE)
sid <- header('x-session-id' = 303, expose = TRUE)
response(uid, sid)
```

WebQueue *Queues and Services HTTP Requests*

Description

Connects the 'httpuv' and 'jobqueue' R packages.

Active bindings

`url` URL where the server is available.

Methods

Public methods:

- `WebQueue$new()`
- `WebQueue$print()`
- `WebQueue$stop()`

Method `new()`**:** Creates an `httpuv::WebServer` with requests handled by a `jobqueue::Queue`.

Usage:

```
WebQueue$new(
  handler,
  host = "0.0.0.0",
  port = 8080L,
  parse = NULL,
  globals = list(),
  packages = NULL,
  namespace = NULL,
  init = NULL,
  max_cpus = availableCores(),
  workers = ceiling(max_cpus * 1.2),
  timeout = NULL,
  hooks = NULL,
  reformat = NULL,
  stop_id = NULL,
  copy_id = NULL,
  bg = TRUE,
  quiet = FALSE,
  onHeaders = NULL,
  staticPaths = NULL,
  staticPathOptions = NULL
)
```

Arguments:

`handler` A `function (request)` that will be run on a background worker process. The returned value will be passed through `reformat`, then sent as the server's response to the web client.

`host` A string that is a valid IPv4 address that is owned by this server, or `'0.0.0.0'` to listen on all IP addresses.

`port` A number or integer that indicates the server port that should be listened on. Note that on most Unix-like systems including Linux and macOS, port numbers smaller than 1024 require root privileges.

`parse` A `function (req)` that is run on the foreground process to transform the HTTP request prior to passing it to `handler`. `req` is the environment object provided by 'httpuv', amended with `$ARGS` and `$COOKIES`. Return value is used as `req` going forward.

`globals` A list of variables to add to `handler`'s evaluation environment.

`packages` Character vector of package names to load on workers.

`namespace` The name of a package to attach to the worker's environment.

`init` A call or R expression wrapped in curly braces to evaluate on each worker just once, immediately after start-up. Will have access to variables defined by `globals` and assets from `packages` and `namespace`. Returned value is ignored.

`max_cpus` Total number of CPU cores that can be reserved by all running Jobs (`sum(cpus)`). Does not enforce limits on actual CPU utilization.

`workers` How many background jobqueue::Worker processes to start. Set to more than `max_cpus` to enable interrupted workers to be quickly swapped out with standby Workers while a replacement Worker boots up.

`timeout` A named numeric vector indicating the maximum number of seconds allowed for each state the job passes through, or 'total' to apply a single timeout from 'submitted' to 'done'. Example: `timeout = c(total = 2.5, running = 1)`.

`hooks` A list of functions to run when the Job state changes, of the form `hooks = list(created = function (job) {...}, done = ~{...})`. See `vignette('hooks')`.

`reformat` A `function (job)` that is run in the foreground process to transform the output from `handler`. The default, `reformat = NULL`, is essentially `function (job) { job$output }`.

`stop_id` A `function (job)`. If two Jobs generate the same value from this function, then the earlier Job will be aborted. If the returned value is `NULL`, no Jobs will be stopped.

`copy_id` A `function (job)`. If two Jobs generate the same value from this function, then the later Job will clone its output from the earlier Job. If the returned value is `NULL`, no Jobs will be cloned.

`bg` Where/how to run the server. `TRUE`: on a separate R process. `FALSE`: blocking on the current R process. `NULL`: non-blocking on the current R process.

`quiet` If `TRUE`, suppress error messages from starting the 'httpuv' server.

`onHeaders` A `function (request)` triggered when headers are received by 'httpuv'. Return NULL to continue normal processing of the request, or a Rook response to send that response, stop processing the request, and ask the client to close the connection. (This can be used to implement upload size limits, for example.)

`staticPaths` A named list of paths that will be served without invoking `handler()` or `onHeaders()`. The name of each one is the URL path, and the value is either a string referring to a local path, or an object created by the `httpuv::staticPath()` function.

`staticPathOptions` A set of default options to use when serving static paths. If not set or NULL, then it will use the result from calling `httpuv::staticPathOptions()` with no arguments.

Returns: A `WebQueue` object.

Method `print()`**:** Print method for a WebQueue.

Usage:

```
WebQueue$print(...)
```

Arguments:

`...` Arguments are not used currently.

Method `stop()`**:** Shuts down the WebQueue and all associated subprocesses. Stopped Jobs will have their `$output` set to a object of class `<interrupt/condition>`

Usage:

```
WebQueue$stop(reason = "server stopped")
```

Arguments:

`reason` A brief message for the condition object.

Returns: This WebQueue, invisibly.

Examples

```
library(webqueue)

wq <- WebQueue$new(function (req) 'Hello World!\n')
readLines(wq$url)
wq$stop()
```

Index