

Package ‘crew’

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Title A Distributed Worker Launcher Framework

Description In computationally demanding analysis projects, statisticians and data scientists asynchronously deploy long-running tasks to distributed systems, ranging from traditional clusters to cloud services. The ‘NNG’-powered ‘mirai’ R package by Gao (2023) <[doi:10.5281/zenodo.7912722](https://doi.org/10.5281/zenodo.7912722)> is a sleek and sophisticated scheduler that efficiently processes these intense workloads. The ‘crew’ package extends ‘mirai’ with a unifying interface for third-party worker launchers. Inspiration also comes from packages. ‘future’ by Bengtsson (2021) <[doi:10.32614/RJ-2021-048](https://doi.org/10.32614/RJ-2021-048)>, ‘rrq’ by FitzJohn and Ashton (2023) <<https://github.com/mrc-ide/rrq>>, ‘clustermq’ by Schubert (2019) <[doi:10.1093/bioinformatics/btz284](https://doi.org/10.1093/bioinformatics/btz284)>, and ‘batchtools’ by Lang, Bischel, and Surmann (2017) <[doi:10.21105/joss.00135](https://doi.org/10.21105/joss.00135)>.

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BugReports <https://github.com/wlandau/crew/issues>

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crew-package	<i>crew: a distributed worker launcher framework</i>
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Description

In computationally demanding analysis projects, statisticians and data scientists asynchronously deploy long-running tasks to distributed systems, ranging from traditional clusters to cloud services. The **NNG**-powered **mirai** R package is a sleek and sophisticated scheduler that efficiently processes these intense workloads. The crew package extends **mirai** with a unifying interface for third-party worker launchers. Inspiration also comes from packages **future**, **rrq**, **clustermq**, and **batchtools**.

crew_assert	<i>Crew assertion</i>
-------------	-----------------------

Description

Assert that a condition is true.

Usage

```
crew_assert(value = NULL, ..., message = NULL, envir = parent.frame())
```

Arguments

- | | |
|---------|--|
| value | An object or condition. |
| ... | Conditions that use the "." symbol to refer to the object. |
| message | Optional message to print on error. |
| envir | Environment to evaluate the condition. |

Value

NULL (invisibly). Throws an error if the condition is not true.

See Also

Other utility: [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_eval\(\)](#), [crew_random_name\(\)](#), [crew_retry\(\)](#), [crew_terminate_process\(\)](#), [crew_terminate_signal\(\)](#), [crew_worker\(\)](#)

Examples

```
crew_assert(1 < 2)
crew_assert("object", !anyNA(.), nzchar())
tryCatch(
  crew_assert(2 < 1),
  crew_error = function(condition) message("false")
)
```

crew_async

Local asynchronous client object.

Description

Create an R6 object to manage local asynchronous quick tasks with error detection.

Usage

```
crew_async(workers = NULL)
```

Arguments

workers	Number of local mirai daemons to run asynchronous tasks. If NULL, then tasks will be evaluated synchronously.
---------	---

Details

[crew_async\(\)](#) objects are created inside launchers to allow launcher plugins to run local tasks asynchronously, such as calls to cloud APIs to launch serious remote workers.

Value

An R6 async client object.

See Also

Other async: [crew_class_async](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  x <- crew_async()
  x$start()
  out <- x$eval(1 + 1)
  mirai::call_mirai(out)
  out$data # 2
  x$terminate()
}
```

crew_class_async	R6 <i>async</i> class.
------------------	------------------------

Description

R6 class for async configuration.

Details

See [crew_async\(\)](#).

Active bindings

workers See [crew_async\(\)](#).

instance Name of the current instance.

Methods

Public methods:

- [crew_class_async\\$new\(\)](#)
- [crew_class_async\\$validate\(\)](#)
- [crew_class_async\\$start\(\)](#)
- [crew_class_async\\$terminate\(\)](#)
- [crew_class_async\\$started\(\)](#)
- [crew_class_async\\$asynchronous\(\)](#)
- [crew_class_async\\$eval\(\)](#)

Method [new\(\)](#): TLS configuration constructor.

Usage:

```
crew_class_async$new(workers = NULL)
```

Arguments:

workers Argument passed from [crew_async\(\)](#).

Returns: An R6 object with TLS configuration.

Method [validate\(\)](#): Validate the object.

Usage:

```
crew_class_async$validate()
```

Returns: NULL (invisibly).

Method [start\(\)](#): Start the local workers and error handling socket.

Usage:

```
crew_class_async$start()
```

Details: Does not create workers or an error handling socket if workers is NULL or the object is already started.

Returns: NULL (invisibly).

Method terminate(): Start the local workers and error handling socket.

Usage:

```
crew_class_async$terminate()
```

Details: Waits for existing tasks to complete first.

Returns: NULL (invisibly).

Method started(): Show whether the object is started.

Usage:

```
crew_class_async$started()
```

Returns: Logical of length 1, whether the object is started.

Method asynchronous(): Show whether the object is asynchronous (has real workers).

Usage:

```
crew_class_async$asynchronous()
```

Returns: Logical of length 1, whether the object is asynchronous.

Method eval(): Run a local asynchronous task using a local compute profile.

Usage:

```
crew_class_async$eval(
  command,
  substitute = TRUE,
  data = list(),
  packages = character(0L),
  library = NULL
)
```

Arguments:

command R code to run.

substitute Logical of length 1, whether to substitute command. If FALSE, then command must be an expression object or language object.

data Named list of data objects required to run command.

packages Character vector of packages to load.

library Character vector of library paths to load the packages from.

Details: Used for launcher plugins with asynchronous launches and terminations. If processes is NULL, the task will run locally. Otherwise, the task will run on a local process in the local mirai compute profile.

Returns: If the processes field is NULL, a list with an object named data containing the result of evaluating expr synchronously. Otherwise, the task is evaluated asynchronously, and the result is a mirai task object. Either way, the data element of the return value will contain the result of the task.

See Also

Other async: [crew_async\(\)](#)

crew_class_client	R6 <i>client class</i> .
-------------------	--------------------------

Description

R6 class for mirai clients.

Details

See [crew_client\(\)](#).

Active bindings

host See [crew_client\(\)](#).

port See [crew_client\(\)](#).

tls See [crew_client\(\)](#).

serialization See [crew_client\(\)](#).

seconds_interval See [crew_client\(\)](#).

seconds_timeout See [crew_client\(\)](#).

relay Relay object for event-driven programming on a downstream condition variable.

started Whether the client is started.

url Client websocket URL.

profile Compute profile of the client.

condition Condition variable of the client.

client Process ID of the local process running the client.

dispatcher Process ID of the mirai dispatcher

Methods

Public methods:

- [crew_class_client\\$new\(\)](#)
- [crew_class_client\\$validate\(\)](#)
- [crew_class_client\\$set_started\(\)](#)
- [crew_class_client\\$start\(\)](#)
- [crew_class_client\\$terminate\(\)](#)
- [crew_class_client\\$resolved\(\)](#)
- [crew_class_client\\$status\(\)](#)
- [crew_class_client\\$pids\(\)](#)

Method [new\(\)](#): mirai client constructor.

Usage:

```

crew_class_client$new(
  host = NULL,
  port = NULL,
  tls = NULL,
  serialization = NULL,
  seconds_interval = NULL,
  seconds_timeout = NULL,
  relay = NULL
)

```

Arguments:

host Argument passed from `crew_client()`.
 port Argument passed from `crew_client()`.
 tls Argument passed from `crew_client()`.
 serialization Argument passed from `crew_client()`.
 seconds_interval Argument passed from `crew_client()`.
 seconds_timeout Argument passed from `crew_client()`.
 relay Argument passed from `crew_client()`.

Returns: An R6 object with the client.

Examples:

```

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  client$log()
  client$terminate()
}

```

Method `validate()`: Validate the client.

Usage:

```
crew_class_client$validate()
```

Returns: NULL (invisibly).

Method `set_started()`: Register the client as started.

Usage:

```
crew_class_client$set_started()
```

Details: Exported to implement the sequential controller. Only meant to be called manually inside the client or the sequential controller.

Returns: NULL (invisibly).

Method `start()`: Start listening for workers on the available sockets.

Usage:

```
crew_class_client$start()
```

Returns: NULL (invisibly).

Method `terminate()`: Stop the mirai client and disconnect from the worker websockets.

Usage:

```
crew_class_client$terminate()
```

Returns: NULL (invisibly).

Method resolved(): Get the true value of the nanonext condition variable.

Usage:

```
crew_class_client$resolved()
```

Returns: The value of the nanonext condition variable.

Method status(): Internal function: return the mirai status of the compute profile.

Usage:

```
crew_class_client$status()
```

Details: Should only be called by the launcher, never by the user. The returned events field changes on every call and must be interpreted by the launcher before it vanishes.

Returns: A list with status information.

Method pids(): Get the process IDs of the local process and the mirai dispatcher (if started).

Usage:

```
crew_class_client$pids()
```

Returns: An integer vector of process IDs of the local process and the mirai dispatcher (if started).

See Also

Other client: [crew_client\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  client$log()
  client$terminate()
}
```

```
## -----
## Method `crew_class_client$new`
## -----
```

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  client$log()
  client$terminate()
}
```

crew_class_controller *Controller class*

Description

R6 class for controllers.

Details

See [crew_controller\(\)](#).

Active bindings

client Client object.

launcher Launcher object.

tasks A list of `mirai::mirai()` task objects.

pushed Number of tasks pushed since the controller was started.

popped Number of tasks popped since the controller was started.

reset_globals See [crew_controller\(\)](#). since the controller was started.

reset_packages See [crew_controller\(\)](#). since the controller was started.

reset_options See [crew_controller\(\)](#). since the controller was started.

garbage_collection See [crew_controller\(\)](#). since the controller was started.

crashes_max See [crew_controller\(\)](#).

backup See [crew_controller\(\)](#).

error Tibble of task results (with one result per row) from the last call to `map(error = "stop")`.

backlog A [crew_queue\(\)](#) object tracking explicitly backlogged tasks.

autoscaling TRUE or FALSE, whether async later-based auto-scaling is currently running

queue Queue of resolved unpopped/uncollected tasks.

Methods

Public methods:

- [crew_class_controller\\$new\(\)](#)
- [crew_class_controller\\$validate\(\)](#)
- [crew_class_controller\\$empty\(\)](#)
- [crew_class_controller\\$nonempty\(\)](#)
- [crew_class_controller\\$resolved\(\)](#)
- [crew_class_controller\\$unresolved\(\)](#)
- [crew_class_controller\\$unpopped\(\)](#)
- [crew_class_controller\\$saturated\(\)](#)
- [crew_class_controller\\$start\(\)](#)

- `crew_class_controller$started()`
- `crew_class_controller$launch()`
- `crew_class_controller$scale()`
- `crew_class_controller$autoscale()`
- `crew_class_controller$descale()`
- `crew_class_controller$crashes()`
- `crew_class_controller$push()`
- `crew_class_controller$walk()`
- `crew_class_controller$map()`
- `crew_class_controller$pop()`
- `crew_class_controller$collect()`
- `crew_class_controller$promise()`
- `crew_class_controller$wait()`
- `crew_class_controller$push_backlog()`
- `crew_class_controller$pop_backlog()`
- `crew_class_controller$summary()`
- `crew_class_controller$cancel()`
- `crew_class_controller$pids()`
- `crew_class_controller$terminate()`

Method `new()`: mirai controller constructor.

Usage:

```
crew_class_controller$new(  
  client = NULL,  
  launcher = NULL,  
  reset_globals = NULL,  
  reset_packages = NULL,  
  reset_options = NULL,  
  garbage_collection = NULL,  
  crashes_max = NULL,  
  backup = NULL  
)
```

Arguments:

`client` Client object. See `crew_controller()`.
`launcher` Launcher object. See `crew_controller()`.
`reset_globals` See `crew_controller()`.
`reset_packages` See `crew_controller()`.
`reset_options` See `crew_controller()`.
`garbage_collection` See `crew_controller()`.
`crashes_max` See `crew_controller()`.
`backup` See `crew_controller()`.

Returns: An R6 controller object.

Examples:

```

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  launcher <- crew_launcher_local()
  controller <- crew_controller(client = client, launcher = launcher)
  controller$start()
  controller$push(name = "task", command = sqrt(4))
  controller$wait()
  controller$pop()
  controller$terminate()
}

```

Method `validate()`: Validate the controller.

Usage:

```
crew_class_controller$validate()
```

Returns: NULL (invisibly).

Method `empty()`: Check if the controller is empty.

Usage:

```
crew_class_controller$empty(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: A controller is empty if it has no running tasks or completed tasks waiting to be retrieved with `push()`.

Returns: TRUE if the controller is empty, FALSE otherwise.

Method `nonempty()`: Check if the controller is nonempty.

Usage:

```
crew_class_controller$nonempty(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: A controller is empty if it has no running tasks or completed tasks waiting to be retrieved with `push()`.

Returns: TRUE if the controller is empty, FALSE otherwise.

Method `resolved()`: Number of resolved `mirai()` tasks.

Usage:

```
crew_class_controller$resolved(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: `resolved()` is cumulative: it counts all the resolved tasks over the entire lifetime of the controller session.

Returns: Non-negative integer of length 1, number of resolved `mirai()` tasks. The return value is 0 if the condition variable does not exist (i.e. if the client is not running).

Method `unresolved()`: Number of unresolved `mirai()` tasks.

Usage:

```
crew_class_controller$unresolved(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Non-negative integer of length 1, number of unresolved `mirai()` tasks.

Method `unpopped()`: Number of resolved `mirai()` tasks available via `pop()`.

Usage:

```
crew_class_controller$unpopped(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Non-negative integer of length 1, number of resolved `mirai()` tasks available via `pop()`.

Method `saturated()`: Check if the controller is saturated.

Usage:

```
crew_class_controller$saturated(
  collect = NULL,
  throttle = NULL,
  controller = NULL
)
```

Arguments:

`collect` Deprecated in version 0.5.0.9003 (2023-10-02). Not used.

`throttle` Deprecated in version 0.5.0.9003 (2023-10-02). Not used.

`controller` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: A controller is saturated if the number of unresolved tasks is greater than or equal to the maximum number of workers. In other words, in a saturated controller, every available worker has a task. You can still push tasks to a saturated controller, but tools that use crew such as targets may choose not to.

Returns: TRUE if the controller is saturated, FALSE otherwise.

Method `start()`: Start the controller if it is not already started.

Usage:

```
crew_class_controller$start(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: Register the mirai client and register worker websockets with the launcher.

Returns: NULL (invisibly).

Method started(): Check whether the controller is started.

Usage:

```
crew_class_controller$started(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: Actually checks whether the client is started.

Returns: TRUE if the controller is started, FALSE otherwise.

Method launch(): Launch one or more workers.

Usage:

```
crew_class_controller$launch(n = 1L, controllers = NULL)
```

Arguments:

n Number of workers to launch.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

Method scale(): Auto-scale workers out to meet the demand of tasks.

Usage:

```
crew_class_controller$scale(throttle = TRUE, controllers = NULL)
```

Arguments:

throttle TRUE to skip auto-scaling if it already happened within the last seconds_interval seconds. FALSE to auto-scale every time scale() is called. Throttling avoids overburdening the mirai dispatcher and other resources.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: The scale() method launches new workers to run tasks if needed.

Returns: Invisibly returns TRUE if there was any relevant auto-scaling activity (new worker launches or worker connection/disconnection events) (FALSE otherwise).

Method autoscale(): Run worker auto-scaling in a private later loop every controller\$client\$seconds_interval seconds.

Usage:

```
crew_class_controller$autoscale(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: Call controller\$descale() to terminate the auto-scaling loop.

Returns: NULL (invisibly).

Method `descale()`: Terminate the auto-scaling loop started by `controller$autoscale()`.

Usage:

```
crew_class_controller$descale(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

Method `crashes()`: Report the number of consecutive crashes of a task.

Usage:

```
crew_class_controller$crashes(name, controllers = NULL)
```

Arguments:

`name` Character string, name of the task to check.

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: See the `crashes_max` argument of `crew_controller()`.

Returns: Non-negative integer, number of consecutive times the task crashed.

Method `push()`: Push a task to the head of the task list.

Usage:

```
crew_class_controller$push(
  command,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
  packages = character(),
  library = NULL,
  seconds_timeout = NULL,
  scale = TRUE,
  throttle = TRUE,
  name = NULL,
  save_command = NULL,
  controller = NULL
)
```

Arguments:

`command` Language object with R code to run.

`data` Named list of local data objects in the evaluation environment.

`globals` Named list of objects to temporarily assign to the global environment for the task. This list should include any functions you previously defined in the global environment which are required to run tasks. See the `reset_globals` argument of `crew_controller_local()`.

- substitute** Logical of length 1, whether to call `base::substitute()` on the supplied value of the `command` argument. If `TRUE` (default) then `command` is quoted literally as you write it, e.g. `push(command = your_function_call())`. If `FALSE`, then `crew` assumes `command` is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. `substitute = TRUE` is appropriate for interactive use, whereas `substitute = FALSE` is meant for automated R programs that invoke `crew` controllers.
- seed** Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the `seed` argument of `set.seed()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.
- algorithm** Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the `kind` argument of `RNGkind()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.
- packages** Character vector of packages to load for the task.
- library** Library path to load the packages. See the `lib.loc` argument of `require()`.
- seconds_timeout** Optional task timeout passed to the `.timeout` argument of `mirai::mirai()` (after converting to milliseconds).
- scale** Logical, whether to automatically call `scale()` to auto-scale workers to meet the demand of the task load. Also see the `throttle` argument.
- throttle** `TRUE` to skip auto-scaling if it already happened within the last `seconds_interval` seconds. `FALSE` to auto-scale every time `scale()` is called. Throttling avoids overburdening the `mirai` dispatcher and other resources.
- name** Character string, name of the task. If `NULL`, then a random name is generated automatically. The name of the task must not conflict with the name of another task pushed to the controller. Any previous task with the same name must first be popped before a new task with that name can be pushed.
- save_command** Deprecated on 2025-01-22 (crew version 0.10.2.9004) and no longer used.
- controller** Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Invisibly return the `mirai` object of the pushed task. This allows you to interact with the task directly, e.g. to create a promise object with `promises::as.promise()`.

Method walk(): Apply a single command to multiple inputs, and return control to the user without waiting for any task to complete.

Usage:

```
crew_class_controller$walk(
  command,
  iterate,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
```



```

    packages = character(0),
    library = NULL,
    seconds_timeout = NULL,
    names = NULL,
    save_command = NULL,
    verbose = interactive(),
    scale = TRUE,
    throttle = TRUE,
    controller = NULL
  )

```

Arguments:

command Language object with R code to run.

iterate Named list of vectors or lists to iterate over. For example, to run function calls $f(x = 1, y = "a")$ and $f(x = 2, y = "b")$, set **command** to $f(x, y)$, and set **iterate** to $\text{list}(x = c(1, 2), y = c("a", "b"))$. The individual function calls are evaluated as $f(x = \text{iterate}\$x[[1]], y = \text{iterate}\$y[[1]])$ and $f(x = \text{iterate}\$x[[2]], y = \text{iterate}\$y[[2]])$. All the elements of **iterate** must have the same length. If there are any name conflicts between **iterate** and **data**, **iterate** takes precedence.

data Named list of constant local data objects in the evaluation environment. Objects in this list are treated as single values and are held constant for each iteration of the map.

globals Named list of constant objects to temporarily assign to the global environment for each task. This list should include any functions you previously defined in the global environment which are required to run tasks. See the `reset_globals` argument of `crew_controller_local()`. Objects in this list are treated as single values and are held constant for each iteration of the map.

substitute Logical of length 1, whether to call `base::substitute()` on the supplied value of the **command** argument. If **TRUE** (default) then **command** is quoted literally as you write it, e.g. `push(command = your_function_call())`. If **FALSE**, then **crew** assumes **command** is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. **substitute = TRUE** is appropriate for interactive use, whereas **substitute = FALSE** is meant for automated R programs that invoke **crew** controllers.

seed Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the `seed` argument of `set.seed()` if not **NULL**. If **algorithm** and **seed** are both **NULL**, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.

algorithm Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the `kind` argument of `RNGkind()` if not **NULL**. If **algorithm** and **seed** are both **NULL**, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.

packages Character vector of packages to load for the task.

library Library path to load the packages. See the `lib.loc` argument of `require()`.

seconds_timeout Optional task timeout passed to the `.timeout` argument of `mirai::mirai()` (after converting to milliseconds).

names Optional character of length 1, name of the element of **iterate** with names for the tasks. If **names** is supplied, then `iterate[[names]]` must be a character vector.

`save_command` Deprecated on 2025-01-22 (crew version 0.10.2.9004). The command is always saved now.

`verbose` Logical of length 1, whether to print to a progress bar when pushing tasks.

`scale` Logical, whether to automatically scale workers to meet demand. See also the `throttle` argument.

`throttle` TRUE to skip auto-scaling if it already happened within the last `seconds_interval` seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the mirai dispatcher and other resources.

`controller` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: In contrast to `walk()`, `map()` blocks the local R session and waits for all tasks to complete.

Returns: Invisibly returns a list of mirai task objects for the newly created tasks. The order of tasks in the list matches the order of data in the `iterate` argument.

Method `map()`: Apply a single command to multiple inputs, wait for all tasks to complete, and return the results of all tasks.

Usage:

```
crew_class_controller$map(
  command,
  iterate,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
  packages = character(),
  library = NULL,
  seconds_interval = NULL,
  seconds_timeout = NULL,
  names = NULL,
  save_command = NULL,
  error = "stop",
  warnings = TRUE,
  verbose = interactive(),
  scale = TRUE,
  throttle = TRUE,
  controller = NULL
)
```

Arguments:

`command` Language object with R code to run.

`iterate` Named list of vectors or lists to iterate over. For example, to run function calls `f(x = 1, y = "a")` and `f(x = 2, y = "b")`, set `command` to `f(x, y)`, and set `iterate` to `list(x = c(1, 2), y = c("a", "b"))`. The individual function calls are evaluated as `f(x = iterate$x[[1]], y = iterate$y[[1]])` and `f(x = iterate$x[[2]], y = iterate$y[[2]])`. All the elements of `iterate` must have the same length. If there are any name conflicts between `iterate` and `data`, `iterate` takes precedence.

- data** Named list of constant local data objects in the evaluation environment. Objects in this list are treated as single values and are held constant for each iteration of the map.
- globals** Named list of constant objects to temporarily assign to the global environment for each task. This list should include any functions you previously defined in the global environment which are required to run tasks. See the `reset_globals` argument of [crew_controller_local\(\)](#). Objects in this list are treated as single values and are held constant for each iteration of the map.
- substitute** Logical of length 1, whether to call `base::substitute()` on the supplied value of the `command` argument. If `TRUE` (default) then `command` is quoted literally as you write it, e.g. `push(command = your_function_call())`. If `FALSE`, then `crew` assumes `command` is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. `substitute = TRUE` is appropriate for interactive use, whereas `substitute = FALSE` is meant for automated R programs that invoke `crew` controllers.
- seed** Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the `seed` argument of `set.seed()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.
- algorithm** Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the `kind` argument of `RNGkind()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.
- packages** Character vector of packages to load for the task.
- library** Library path to load the packages. See the `lib.loc` argument of `require()`.
- seconds_interval** Deprecated on 2025-01-17 (crew version 0.10.2.9003). Instead, the `seconds_interval` argument passed to [crew_controller_group\(\)](#) is used as `seconds_max` in a [crew_throttle\(\)](#) object which orchestrates exponential backoff.
- seconds_timeout** Optional task timeout passed to the `.timeout` argument of `mirai::mirai()` (after converting to milliseconds).
- names** Optional character string, name of the element of `iterate` with names for the tasks. If `names` is supplied, then `iterate[[names]]` must be a character vector.
- save_command** Deprecated on 2025-01-22 (crew version 0.10.2.9004). The command is always saved now.
- error** Character of length 1, choice of action if a task was not successful. Possible values:
- `"stop"`: throw an error in the main R session instead of returning a value. In case of an error, the results from the last errored `map()` are in the `error` field of the controller, e.g. `controller_object$error`. To reduce memory consumption, set `controller_object$error <- NULL` after you are finished troubleshooting.
 - `"warn"`: throw a warning. This allows the return value with all the error messages and tracebacks to be generated.
 - `"silent"`: do nothing special. NOTE: the only kinds of errors considered here are errors at the R level. A crashed tasks will return a status of `"crash"` in the output and not trigger an error in `map()` unless `crashes_max` is reached.
- warnings** Logical of length 1, whether to throw a warning in the interactive session if at least one task encounters an error.

verbose Logical of length 1, whether to print to a progress bar as tasks resolve.

scale Logical, whether to automatically scale workers to meet demand. See also the *throttle* argument.

throttle TRUE to skip auto-scaling if it already happened within the last *seconds_interval* seconds. FALSE to auto-scale every time *scale()* is called. Throttling avoids overburdening the mirai dispatcher and other resources.

controller Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: *map()* cannot be used unless all prior tasks are completed and popped. You may need to wait and then pop them manually. Alternatively, you can start over: either call *terminate()* on the current controller object to reset it, or create a new controller object entirely.

Returns: A tibble of results and metadata: one row per task and columns corresponding to the output of *pop()*.

Method *pop()*: Pop a completed task from the results data frame.

Usage:

```
crew_class_controller$pop(
  scale = TRUE,
  collect = NULL,
  throttle = TRUE,
  error = NULL,
  controllers = NULL
)
```

Arguments:

scale Logical of length 1, whether to automatically call *scale()* to auto-scale workers to meet the demand of the task load. Scaling up on *pop()* may be important for transient or nearly transient workers that tend to drop off quickly after doing little work. See also the *throttle* argument.

collect Deprecated in version 0.5.0.9003 (2023-10-02).

throttle TRUE to skip auto-scaling if it already happened within the last *seconds_interval* seconds. FALSE to auto-scale every time *scale()* is called. Throttling avoids overburdening the mirai dispatcher and other resources.

error NULL or character of length 1, choice of action if the popped task threw an error. Possible values:

- "stop": throw an error in the main R session instead of returning a value.
- "warn": throw a warning.
- NULL or "silent": do not react to errors. NOTE: the only kinds of errors considered here are errors at the R level. A crashed tasks will return a status of "crash" in the output and not trigger an error in *pop()* unless *crashes_max* is reached.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: If not task is currently completed, *pop()* will attempt to auto-scale workers as needed.

Returns: If there is no task to collect, return NULL. Otherwise, return a one-row tibble with the following columns.

- name: the task name.

- **command**: a character string with the R command.
- **result**: a list containing the return value of the R command. NA if the task failed.
- **status**: a character string. "success" if the task succeeded, "cancel" if the task was canceled with the `cancel()` controller method, "crash" if the worker running the task exited before it could complete the task, or "error" for any other kind of error.
- **error**: the first 2048 characters of the error message if the task status is not "success", NA otherwise. Messages for crashes and cancellations are captured here alongside ordinary R-level errors.
- **code**: an integer code denoting the specific exit status: 0 for successful tasks, -1 for tasks with an error in the R command of the task, and another positive integer with an NNG status code if there is an error at the NNG/nanonext level. `nanonext::nng_error()` can interpret these codes.
- **trace**: the first 2048 characters of the text of the traceback if the task threw an error, NA otherwise.
- **warnings**: the first 2048 characters. of the text of warning messages that the task may have generated, NA otherwise.
- **seconds**: number of seconds that the task ran.
- **seed**: the single integer originally supplied to `push()`, NA otherwise. The pseudo-random number generator state just prior to the task can be restored using `set.seed(seed = seed, kind = algorithm)`, where `seed` and `algorithm` are part of this output.
- **algorithm**: name of the pseudo-random number generator algorithm originally supplied to `push()`, NA otherwise. The pseudo-random number generator state just prior to the task can be restored using `set.seed(seed = seed, kind = algorithm)`, where `seed` and `algorithm` are part of this output.
- **controller**: name of the crew controller where the task ran.
- **worker**: name of the crew worker that ran the task.

Method `collect()`: Pop all available task results and return them in a tidy tibble.

Usage:

```
crew_class_controller$collect(
  scale = TRUE,
  throttle = TRUE,
  error = NULL,
  controllers = NULL
)
```

Arguments:

scale Logical of length 1, whether to automatically call `scale()` to auto-scale workers to meet the demand of the task load.

throttle TRUE to skip auto-scaling if it already happened within the last `seconds_interval` seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the mirai dispatcher and other resources.

error NULL or character of length 1, choice of action if the popped task threw an error. Possible values: * "stop": throw an error in the main R session instead of returning a value. * "warn": throw a warning. * NULL or "silent": do not react to errors. NOTE: the only kinds of errors considered here are errors at the R level. A crashed tasks will return a status of "crash" in the output and not trigger an error in `collect()` unless `crashes_max` is reached.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: A tibble of results and metadata of all resolved tasks, with one row per task. Returns NULL if there are no tasks to collect. See `pop()` for details on the columns of the returned tibble.

Method `promise()`: Create a `promises::promise()` object to asynchronously pop or collect one or more tasks.

Usage:

```
crew_class_controller$promise(  
  mode = "one",  
  seconds_interval = 1,  
  scale = NULL,  
  throttle = NULL,  
  controllers = NULL  
)
```

Arguments:

mode Character of length 1, what kind of promise to create. mode must be "one" or "all".

Details:

- If mode is "one", then the promise is fulfilled (or rejected) when at least one task is resolved and available to `pop()`. When that happens, `pop()` runs asynchronously, pops a result off the task list, and returns a value. If the task succeeded, then the promise is fulfilled and its value is the result of `pop()` (a one-row tibble with the result and metadata). If the task threw an error, the error message of the task is forwarded to any error callbacks registered with the promise.
- If mode is "all", then the promise is fulfilled (or rejected) when there are no unresolved tasks left in the controller. (Be careful: this condition is trivially met in the moment if the controller is empty and you have not submitted any tasks, so it is best to create this kind of promise only after you submit tasks.) When there are no unresolved tasks left, `collect()` runs asynchronously, pops all available results off the task list, and returns a value. If the task succeeded, then the promise is fulfilled and its value is the result of `collect()` (a tibble with one row per task result). If any of the tasks threw an error, then the first error message detected is forwarded to any error callbacks registered with the promise.

seconds_interval Positive numeric of length 1, delay in the `later::later()` polling interval to asynchronously check if the promise can be resolved.

scale Deprecated on 2024-04-10 (version 0.9.1.9003) and no longer used. Now, `promise()` always turns on auto-scaling in a private later loop (if not already activated).

throttle Deprecated on 2024-04-10 (version 0.9.1.9003) and no longer used. Now, `promise()` always turns on auto-scaling in a private later loop (if not already activated).

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: Please be aware that `pop()` or `collect()` will happen asynchronously at a some unpredictable time after the promise object is created, even if your local R process appears to be doing something completely different. This behavior is highly desirable in a Shiny reactive context, but please be careful as it may be surprising in other situations.

Returns: A `promises::promise()` object whose eventual value will be a tibble with results from one or more popped tasks. If `mode = "one"`, only one task is popped and returned (one row). If `mode = "all"`, then all the tasks are returned in a tibble with one row per task (or NULL is returned if there are no tasks to pop).

Method `wait()`: Wait for tasks.

Usage:

```
crew_class_controller$wait(
  mode = "all",
  seconds_interval = NULL,
  seconds_timeout = Inf,
  scale = TRUE,
  throttle = TRUE,
  controllers = NULL
)
```

Arguments:

`mode` Character of length 1: "all" to wait for all tasks to complete, "one" to wait for a single task to complete.

`seconds_interval` Deprecated on 2025-01-17 (crew version 0.10.2.9003). Instead, the `seconds_interval` argument passed to `crew_controller_group()` is used as `seconds_max` in a `crew_throttle()` object which orchestrates exponential backoff.

`seconds_timeout` Timeout length in seconds waiting for tasks.

`scale` Logical, whether to automatically call `scale()` to auto-scale workers to meet the demand of the task load. See also the `throttle` argument.

`throttle` TRUE to skip auto-scaling if it already happened within the last `seconds_interval` seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the mirai dispatcher and other resources.

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: The `wait()` method blocks the calling R session and repeatedly auto-scales workers for tasks that need them. The function runs until it either times out or the condition in `mode` is met.

Returns: A logical of length 1, invisibly. TRUE if the condition in `mode` was met, FALSE otherwise.

Method `push_backlog()`: Push the name of a task to the backlog.

Usage:

```
crew_class_controller$push_backlog(name, controller = NULL)
```

Arguments:

`name` Character of length 1 with the task name to push to the backlog.

`controller` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: `pop_backlog()` pops the tasks that can be pushed without saturating the controller.

Returns: NULL (invisibly).

Method `pop_backlog()`: Pop the task names from the head of the backlog which can be pushed without saturating the controller.

Usage:

```
crew_class_controller$pop_backlog(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Character vector of task names which can be pushed to the controller without saturating it. If the controller is saturated, `character(0L)` is returned.

Method `summary()`: Summarize the workers and tasks of the controller.

Usage:

```
crew_class_controller$summary(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: A data frame of summary statistics on the tasks that ran on a worker and then were returned by `pop()` or `collect()`. It has one row and the following columns:

- `controller`: name of the controller.
- `tasks`: number of tasks.
- `seconds`: total number of runtime in seconds.
- `success`: total number of successful tasks.
- `error`: total number of tasks with errors, either in the R code of the task or an NNG-level error that is not a cancellation or crash.
- `crash`: total number of crashed tasks (where the worker exited unexpectedly while it was running the task).
- `cancel`: total number of tasks interrupted with the `cancel()` controller method.
- `warnings`: total number of tasks with one or more warnings.

Method `cancel()`: Cancel one or more tasks.

Usage:

```
crew_class_controller$cancel(names = character(0L), all = FALSE)
```

Arguments:

`names` Character vector of names of tasks to cancel. Those names must have been manually supplied by `push()`.

`all` TRUE to cancel all tasks, FALSE otherwise. `all = TRUE` supersedes the `names` argument.

Returns: NULL (invisibly).

Method `pids()`: Get the process IDs of the local process and the mirai dispatcher (if started).

Usage:

```
crew_class_controller$pids(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: An integer vector of process IDs of the local process and the mirai dispatcher (if started).

Method terminate(): Terminate the workers and the mirai client.

Usage:

```
crew_class_controller$terminate(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

See Also

Other controller: [crew_controller\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  launcher <- crew_launcher_local()
  controller <- crew_controller(client = client, launcher = launcher)
  controller$start()
  controller$push(name = "task", command = sqrt(4))
  controller$wait()
  controller$pop()
  controller$terminate()
}
```

```
## -----
## Method `crew_class_controller$new`
## -----
```

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  launcher <- crew_launcher_local()
  controller <- crew_controller(client = client, launcher = launcher)
  controller$start()
  controller$push(name = "task", command = sqrt(4))
  controller$wait()
  controller$pop()
  controller$terminate()
}
```

crew_class_controller_group
Controller group class

Description

R6 class for controller groups.

Details

See [crew_controller_group\(\)](#).

Active bindings

controllers List of R6 controller objects.

relay Relay object for event-driven programming on a downstream condition variable.

throttle [crew_throttle\(\)](#) object to orchestrate exponential backoff in the relay and auto-scaling.

Methods

Public methods:

- [crew_class_controller_group\\$new\(\)](#)
- [crew_class_controller_group\\$validate\(\)](#)
- [crew_class_controller_group\\$empty\(\)](#)
- [crew_class_controller_group\\$nonempty\(\)](#)
- [crew_class_controller_group\\$resolved\(\)](#)
- [crew_class_controller_group\\$unresolved\(\)](#)
- [crew_class_controller_group\\$unpopped\(\)](#)
- [crew_class_controller_group\\$saturated\(\)](#)
- [crew_class_controller_group\\$start\(\)](#)
- [crew_class_controller_group\\$started\(\)](#)
- [crew_class_controller_group\\$launch\(\)](#)
- [crew_class_controller_group\\$scale\(\)](#)
- [crew_class_controller_group\\$autoscale\(\)](#)
- [crew_class_controller_group\\$descale\(\)](#)
- [crew_class_controller_group\\$crashes\(\)](#)
- [crew_class_controller_group\\$push\(\)](#)
- [crew_class_controller_group\\$walk\(\)](#)
- [crew_class_controller_group\\$map\(\)](#)
- [crew_class_controller_group\\$pop\(\)](#)
- [crew_class_controller_group\\$collect\(\)](#)
- [crew_class_controller_group\\$promise\(\)](#)
- [crew_class_controller_group\\$wait\(\)](#)

- `crew_class_controller_group$push_backlog()`
- `crew_class_controller_group$pop_backlog()`
- `crew_class_controller_group$summary()`
- `crew_class_controller_group$pids()`
- `crew_class_controller_group$terminate()`

Method `new()`: Multi-controller constructor.

Usage:

```
crew_class_controller_group$new(
  controllers = NULL,
  relay = NULL,
  throttle = NULL
)
```

Arguments:

`controllers` List of R6 controller objects.

`relay` Relay object for event-driven programming on a downstream condition variable.

`throttle` `crew_throttle()` object to orchestrate exponential backoff in the relay and auto-scaling.

Returns: An R6 object with the controller group object.

Examples:

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  persistent <- crew_controller_local(name = "persistent")
  transient <- crew_controller_local(
    name = "transient",
    tasks_max = 1L
  )
  group <- crew_controller_group(persistent, transient)
  group$start()
  group$push(name = "task", command = sqrt(4), controller = "transient")
  group$wait()
  group$pop()
  group$terminate()
}
```

Method `validate()`: Validate the client.

Usage:

```
crew_class_controller_group$validate()
```

Returns: NULL (invisibly).

Method `empty()`: See if the controllers are empty.

Usage:

```
crew_class_controller_group$empty(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Details: A controller is empty if it has no running tasks or completed tasks waiting to be retrieved with `push()`.

Returns: TRUE if all the selected controllers are empty, FALSE otherwise.

Method `nonempty()`: Check if the controller group is nonempty.

Usage:

```
crew_class_controller_group$nonempty(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Details: A controller is empty if it has no running tasks or completed tasks waiting to be retrieved with `push()`.

Returns: TRUE if the controller is empty, FALSE otherwise.

Method `resolved()`: Number of resolved mirai() tasks.

Usage:

```
crew_class_controller_group$resolved(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Details: `resolved()` is cumulative: it counts all the resolved tasks over the entire lifetime of the controller session.

Returns: Non-negative integer of length 1, number of resolved mirai() tasks. The return value is 0 if the condition variable does not exist (i.e. if the client is not running).

Method `unresolved()`: Number of unresolved mirai() tasks.

Usage:

```
crew_class_controller_group$unresolved(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Returns: Non-negative integer of length 1, number of unresolved mirai() tasks.

Method `unpopped()`: Number of resolved mirai() tasks available via `pop()`.

Usage:

```
crew_class_controller_group$unpopped(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Returns: Non-negative integer of length 1, number of resolved mirai() tasks available via `pop()`.

Method `saturated()`: Check if a controller is saturated.

Usage:

```
crew_class_controller_group$saturated(
  collect = NULL,
  throttle = NULL,
  controller = NULL
)
```

Arguments:

collect Deprecated in version 0.5.0.9003 (2023-10-02). Not used.

throttle Deprecated in version 0.5.0.9003 (2023-10-02). Not used.

controller Character vector of length 1 with the controller name. Set to NULL to select the default controller that `push()` would choose.

Details: A controller is saturated if the number of unresolved tasks is greater than or equal to the maximum number of workers. In other words, in a saturated controller, every available worker has a task. You can still push tasks to a saturated controller, but tools that use crew such as targets may choose not to.

Returns: TRUE if all the selected controllers are saturated, FALSE otherwise.

Method `start()`: Start one or more controllers.

Usage:

```
crew_class_controller_group$start(controllers = NULL)
```

Arguments:

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: NULL (invisibly).

Method `started()`: Check whether all the given controllers are started.

Usage:

```
crew_class_controller_group$started(controllers = NULL)
```

Arguments:

controllers Character vector of controller names. Set to NULL to select all controllers.

Details: Actually checks whether all the given clients are started.

Returns: TRUE if the controllers are started, FALSE if any are not.

Method `launch()`: Launch one or more workers on one or more controllers.

Usage:

```
crew_class_controller_group$launch(n = 1L, controllers = NULL)
```

Arguments:

n Number of workers to launch in each controller selected.

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: NULL (invisibly).

Method `scale()`: Automatically scale up the number of workers if needed in one or more controller objects.

Usage:

```
crew_class_controller_group$scale(throttle = TRUE, controllers = NULL)
```

Arguments:

throttle TRUE to skip auto-scaling if it already happened within the last *seconds_interval* seconds. FALSE to auto-scale every time *scale()* is called. Throttling avoids overburdening the mirai dispatcher and other resources.

controllers Character vector of controller names. Set to NULL to select all controllers.

Details: See the *scale()* method in individual controller classes.

Returns: Invisibly returns TRUE if there was any relevant auto-scaling activity (new worker launches or worker connection/disconnection events) (FALSE otherwise).

Method *autoscale()*: Run worker auto-scaling in a private later loop every *controller\$client\$seconds_interval* seconds.

Usage:

```
crew_class_controller_group$autoscale(controllers = NULL)
```

Arguments:

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: NULL (invisibly).

Method *descale()*: Terminate the auto-scaling loop started by *controller\$autoscale()*.

Usage:

```
crew_class_controller_group$descale(controllers = NULL)
```

Arguments:

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: NULL (invisibly).

Method *crashes()*: Report the number of consecutive crashes of a task, summed over all selected controllers in the group.

Usage:

```
crew_class_controller_group$crashes(name, controllers = NULL)
```

Arguments:

name Character string, name of the task to check.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: See the *crashes_max* argument of [crew_controller\(\)](#).

Returns: Number of consecutive crashes of the named task, summed over all the controllers in the group.

Method *push()*: Push a task to the head of the task list.

Usage:

```

crew_class_controller_group$push(
  command,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
  packages = character(),
  library = NULL,
  seconds_timeout = NULL,
  scale = TRUE,
  throttle = TRUE,
  name = NULL,
  save_command = NULL,
  controller = NULL
)

```

Arguments:

command Language object with R code to run.

data Named list of local data objects in the evaluation environment.

globals Named list of objects to temporarily assign to the global environment for the task. See the `reset_globals` argument of `crew_controller_local()`.

substitute Logical of length 1, whether to call `base::substitute()` on the supplied value of the `command` argument. If `TRUE` (default) then `command` is quoted literally as you write it, e.g. `push(command = your_function_call())`. If `FALSE`, then crew assumes `command` is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. `substitute = TRUE` is appropriate for interactive use, whereas `substitute = FALSE` is meant for automated R programs that invoke crew controllers.

seed Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the `seed` argument of `set.seed()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.

algorithm Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the `kind` argument of `RNGkind()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.

packages Character vector of packages to load for the task.

library Library path to load the packages. See the `lib.loc` argument of `require()`.

seconds_timeout Optional task timeout passed to the `.timeout` argument of `mirai::mirai()` (after converting to milliseconds).

scale Logical, whether to automatically scale workers to meet demand. See the `scale` argument of the `push()` method of ordinary single controllers.

throttle `TRUE` to skip auto-scaling if it already happened within the last `seconds_interval` seconds. `FALSE` to auto-scale every time `scale()` is called. Throttling avoids overburdening the `mirai` dispatcher and other resources.

name Character string, name of the task. If NULL, a random name is automatically generated.

The task name must not conflict with an existing task in the controller where it is submitted.

To reuse the name, wait for the existing task to finish, then either `pop()` or `collect()` it to remove it from its controller.

save_command Deprecated on 2025-01-22 (crew version 0.10.2.9004).

controller Character of length 1, name of the controller to submit the task. If NULL, the controller defaults to the first controller in the list.

Returns: Invisibly return the `mirai` object of the pushed task. This allows you to interact with the task directly, e.g. to create a promise object with `promises::as.promise()`.

Method `walk()`: Apply a single command to multiple inputs, and return control to the user without waiting for any task to complete.

Usage:

```
crew_class_controller_group$walk(
  command,
  iterate,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
  packages = character(),
  library = NULL,
  seconds_timeout = NULL,
  names = NULL,
  save_command = NULL,
  verbose = interactive(),
  scale = TRUE,
  throttle = TRUE,
  controller = NULL
)
```

Arguments:

command Language object with R code to run.

iterate Named list of vectors or lists to iterate over. For example, to run function calls `f(x = 1, y = "a")` and `f(x = 2, y = "b")`, set `command` to `f(x, y)`, and set `iterate` to `list(x = c(1, 2), y = c("a", "b"))`. The individual function calls are evaluated as `f(x = iterate$x[[1]], y = iterate$y[[1]])` and `f(x = iterate$x[[2]], y = iterate$y[[2]])`. All the elements of `iterate` must have the same length. If there are any name conflicts between `iterate` and `data`, `iterate` takes precedence.

data Named list of constant local data objects in the evaluation environment. Objects in this list are treated as single values and are held constant for each iteration of the map.

globals Named list of constant objects to temporarily assign to the global environment for each task. This list should include any functions you previously defined in the global environment which are required to run tasks. See the `reset_globals` argument of `crew_controller_local()`. Objects in this list are treated as single values and are held constant for each iteration of the map.

- substitute** Logical of length 1, whether to call `base::substitute()` on the supplied value of the `command` argument. If `TRUE` (default) then `command` is quoted literally as you write it, e.g. `push(command = your_function_call())`. If `FALSE`, then `crew` assumes `command` is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. `substitute = TRUE` is appropriate for interactive use, whereas `substitute = FALSE` is meant for automated R programs that invoke `crew` controllers.
- seed** Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the `seed` argument of `set.seed()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.
- algorithm** Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the `kind` argument of `RNGkind()` if not `NULL`. If `algorithm` and `seed` are both `NULL`, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.
- packages** Character vector of packages to load for the task.
- library** Library path to load the packages. See the `lib.loc` argument of `require()`.
- seconds_timeout** Optional task timeout passed to the `.timeout` argument of `mirai::mirai()` (after converting to milliseconds).
- names** Optional character of length 1, name of the element of `iterate` with names for the tasks. If `names` is supplied, then `iterate[[names]]` must be a character vector.
- save_command** Deprecated on 2025-01-22 (crew version 0.10.2.9004).
- verbose** Logical of length 1, whether to print to a progress bar when pushing tasks.
- scale** Logical, whether to automatically scale workers to meet demand. See also the `throttle` argument.
- throttle** `TRUE` to skip auto-scaling if it already happened within the last `seconds_interval` seconds. `FALSE` to auto-scale every time `scale()` is called. Throttling avoids overburdening the `mirai` dispatcher and other resources.
- controller** Character of length 1, name of the controller to submit the tasks. If `NULL`, the controller defaults to the first controller in the list.

Details: In contrast to `walk()`, `map()` blocks the local R session and waits for all tasks to complete.

Returns: Invisibly returns a list of `mirai` task objects for the newly created tasks. The order of tasks in the list matches the order of data in the `iterate` argument.

Method `map()`: Apply a single command to multiple inputs.

Usage:

```
crew_class_controller_group$map(
  command,
  iterate,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
```

```

packages = character(0),
library = NULL,
seconds_interval = NULL,
seconds_timeout = NULL,
names = NULL,
save_command = NULL,
error = "stop",
warnings = TRUE,
verbose = interactive(),
scale = TRUE,
throttle = TRUE,
controller = NULL
)

```

Arguments:

command Language object with R code to run.

iterate Named list of vectors or lists to iterate over. For example, to run function calls `f(x = 1, y = "a")` and `f(x = 2, y = "b")`, set **command** to `f(x, y)`, and set **iterate** to `list(x = c(1, 2), y = c("a", "b"))`. The individual function calls are evaluated as `f(x = iterate$x[[1]], y = iterate$y[[1]])` and `f(x = iterate$x[[2]], y = iterate$y[[2]])`. All the elements of **iterate** must have the same length. If there are any name conflicts between **iterate** and **data**, **iterate** takes precedence.

data Named list of constant local data objects in the evaluation environment. Objects in this list are treated as single values and are held constant for each iteration of the map.

globals Named list of constant objects to temporarily assign to the global environment for each task. This list should include any functions you previously defined in the global environment which are required to run tasks. See the `reset_globals` argument of `crew_controller_local()`. Objects in this list are treated as single values and are held constant for each iteration of the map.

substitute Logical of length 1, whether to call `base::substitute()` on the supplied value of the **command** argument. If **TRUE** (default) then **command** is quoted literally as you write it, e.g. `push(command = your_function_call())`. If **FALSE**, then **crew** assumes **command** is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. **substitute = TRUE** is appropriate for interactive use, whereas **substitute = FALSE** is meant for automated R programs that invoke **crew** controllers.

seed Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the **seed** argument of `set.seed()` if not **NULL**. If **algorithm** and **seed** are both **NULL**, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.

algorithm Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the **kind** argument of `RNGkind()` if not **NULL**. If **algorithm** and **seed** are both **NULL**, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by `mirai::nextstream()`. See `vignette("parallel", package = "parallel")` for details.

packages Character vector of packages to load for the task.

library Library path to load the packages. See the `lib.loc` argument of `require()`.

`seconds_interval` Deprecated on 2025-01-17 (crew version 0.10.2.9003). Instead, the `seconds_interval` argument passed to `crew_controller_group()` is used as `seconds_max` in a `crew_throttle()` object which orchestrates exponential backoff.

`seconds_timeout` Optional task timeout passed to the `.timeout` argument of `mirai::mirai()` (after converting to milliseconds).

`names` Optional character of length 1, name of the element of `iterate` with names for the tasks. If `names` is supplied, then `iterate[[names]]` must be a character vector.

`save_command` Deprecated on 2025-01-22 (crew version 0.10.2.9004).

`error` Character vector of length 1, choice of action if a task has an error. Possible values:

- "stop": throw an error in the main R session instead of returning a value. In case of an error, the results from the last errored `map()` are in the error field of the controller, e.g. `controller_object$error`. To reduce memory consumption, set `controller_object$error <- NULL` after you are finished troubleshooting.
- "warn": throw a warning. This allows the return value with all the error messages and tracebacks to be generated.
- "silent": do nothing special.

`warnings` Logical of length 1, whether to throw a warning in the interactive session if at least one task encounters an error.

`verbose` Logical of length 1, whether to print progress messages.

`scale` Logical, whether to automatically scale workers to meet demand. See also the `throttle` argument.

`throttle` TRUE to skip auto-scaling if it already happened within the last `seconds_interval` seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the `mirai` dispatcher and other resources.

`controller` Character of length 1, name of the controller to submit the tasks. If NULL, the controller defaults to the first controller in the list.

Details: The idea comes from functional programming: for example, the `map()` function from the `purrr` package.

Returns: A tibble of results and metadata: one row per task and columns corresponding to the output of `pop()`.

Method `pop()`: Pop a completed task from the results data frame.

Usage:

```
crew_class_controller_group$pop(
  scale = TRUE,
  collect = NULL,
  throttle = TRUE,
  error = NULL,
  controllers = NULL
)
```

Arguments:

`scale` Logical, whether to automatically scale workers to meet demand. See the `scale` argument of the `pop()` method of ordinary single controllers.

`collect` Deprecated in version 0.5.0.9003 (2023-10-02). Not used.

throttle TRUE to skip auto-scaling if it already happened within the last `seconds_interval` seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the mirai dispatcher and other resources.

error NULL or character of length 1, choice of action if the popped task threw an error. Possible values:

- "stop": throw an error in the main R session instead of returning a value.
- "warn": throw a warning.
- NULL or "silent": do not react to errors.

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: If there is no task to collect, return NULL. Otherwise, return a one-row tibble with the same columns as `pop()` for ordinary controllers.

Method `collect()`: Pop all available task results and return them in a tidy tibble.

Usage:

```
crew_class_controller_group$collect(
  scale = TRUE,
  throttle = TRUE,
  error = NULL,
  controllers = NULL
)
```

Arguments:

scale Logical of length 1, whether to automatically call `scale()` to auto-scale workers to meet the demand of the task load.

throttle TRUE to skip auto-scaling if it already happened within the last `seconds_interval` seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the mirai dispatcher and other resources.

error NULL or character of length 1, choice of action if the popped task threw an error. Possible values:

- "stop": throw an error in the main R session instead of returning a value.
- "warn": throw a warning.
- NULL or "silent": do not react to errors.

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: A tibble of results and metadata of all resolved tasks, with one row per task. Returns NULL if there are no available results.

Method `promise()`: Create a `promises::promise()` object to asynchronously pop or collect one or more tasks.

Usage:

```
crew_class_controller_group$promise(
  mode = "one",
  seconds_interval = 0.1,
  scale = NULL,
  throttle = NULL,
  controllers = NULL
)
```

Arguments:

mode Character of length 1, what kind of promise to create. mode must be "one" or "all".

Details:

- If mode is "one", then the promise is fulfilled (or rejected) when at least one task is resolved and available to pop(). When that happens, pop() runs asynchronously, pops a result off the task list, and returns a value. If the task succeeded, then the promise is fulfilled and its value is the result of pop() (a one-row tibble with the result and metadata). If the task threw an error, the error message of the task is forwarded to any error callbacks registered with the promise.
- If mode is "all", then the promise is fulfilled (or rejected) when there are no unresolved tasks left in the controller. (Be careful: this condition is trivially met in the moment if the controller is empty and you have not submitted any tasks, so it is best to create this kind of promise only after you submit tasks.) When there are no unresolved tasks left, collect() runs asynchronously, pops all available results off the task list, and returns a value. If the task succeeded, then the promise is fulfilled and its value is the result of collect() (a tibble with one row per task result). If any of the tasks threw an error, then the first error message detected is forwarded to any error callbacks registered with the promise.

seconds_interval Positive numeric of length 1, delay in the later::later() polling interval to asynchronously check if the promise can be resolved.

scale Deprecated on 2024-04-10 (version 0.9.1.9003) and no longer used. Now, promise() always turns on auto-scaling in a private later loop (if not already activated).

throttle Deprecated on 2024-04-10 (version 0.9.1.9003) and no longer used. Now, promise() always turns on auto-scaling in a private later loop (if not already activated).

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: Please be aware that pop() or collect() will happen asynchronously at a some unpredictable time after the promise object is created, even if your local R process appears to be doing something completely different. This behavior is highly desirable in a Shiny reactive context, but please be careful as it may be surprising in other situations.

Returns: A promises::promise() object whose eventual value will be a tibble with results from one or more popped tasks. If mode = "one", only one task is popped and returned (one row). If mode = "all", then all the tasks are returned in a tibble with one row per task (or NULL is returned if there are no tasks to pop).

Method wait(): Wait for tasks.

Usage:

```
crew_class_controller_group$wait(
  mode = "all",
  seconds_interval = NULL,
  seconds_timeout = Inf,
  scale = TRUE,
  throttle = TRUE,
  controllers = NULL
)
```

Arguments:

mode Character of length 1: "all" to wait for all tasks in all controllers to complete, "one" to wait for a single task in a single controller to complete. In this scheme, the timeout limit is applied to each controller sequentially, and a timeout is treated the same as a completed controller.

seconds_interval Deprecated on 2025-01-17 (crew version 0.10.2.9003). Instead, the **seconds_interval** argument passed to `crew_controller_group()` is used as **seconds_max** in a `crew_throttle()` object which orchestrates exponential backoff.

seconds_timeout Timeout length in seconds waiting for results to become available.

scale Logical of length 1, whether to call `scale_later()` on each selected controller to schedule auto-scaling. See the **scale** argument of the `wait()` method of ordinary single controllers.

throttle TRUE to skip auto-scaling if it already happened within the last **seconds_interval** seconds. FALSE to auto-scale every time `scale()` is called. Throttling avoids overburdening the mirai dispatcher and other resources.

controllers Character vector of controller names. Set to NULL to select all controllers.

Details: The `wait()` method blocks the calling R session and repeatedly auto-scales workers for tasks that need them. The function runs until it either times out or the condition in **mode** is met.

Returns: A logical of length 1, invisibly. TRUE if the condition in **mode** was met, FALSE otherwise.

Method `push_backlog()`: Push the name of a task to the backlog.

Usage:

```
crew_class_controller_group$push_backlog(name, controller = NULL)
```

Arguments:

name Character of length 1 with the task name to push to the backlog.

controller Character vector of length 1 with the controller name. Set to NULL to select the default controller that `push_backlog()` would choose.

Details: `pop_backlog()` pops the tasks that can be pushed without saturating the controller.

Returns: NULL (invisibly).

Method `pop_backlog()`: Pop the task names from the head of the backlog which can be pushed without saturating the controller.

Usage:

```
crew_class_controller_group$pop_backlog(controllers = NULL)
```

Arguments:

controllers Character vector of controller names. Set to NULL to select all controllers.

Returns: Character vector of task names which can be pushed to the controller without saturating it. If the controller is saturated, character(0L) is returned.

Method `summary()`: Summarize the workers of one or more controllers.

Usage:

```
crew_class_controller_group$summary(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Returns: A data frame of aggregated worker summary statistics of all the selected controllers. It has one row per worker, and the rows are grouped by controller. See the documentation of the `summary()` method of the controller class for specific information about the columns in the output.

Method `pids()`: Get the process IDs of the local process and the mirai dispatchers (if started).

Usage:

```
crew_class_controller_group$pids(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Returns: An integer vector of process IDs of the local process and the mirai dispatcher (if started).

Method `terminate()`: Terminate the workers and disconnect the client for one or more controllers.

Usage:

```
crew_class_controller_group$terminate(controllers = NULL)
```

Arguments:

`controllers` Character vector of controller names. Set to NULL to select all controllers.

Returns: NULL (invisibly).

See Also

Other controller_group: [crew_controller_group\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  persistent <- crew_controller_local(name = "persistent")
  transient <- crew_controller_local(
    name = "transient",
    tasks_max = 1L
  )
  group <- crew_controller_group(persistent, transient)
  group$start()
  group$push(name = "task", command = sqrt(4), controller = "transient")
  group$wait()
  group$pop()
  group$terminate()
}

## -----
## Method `crew_class_controller_group$new`
## -----
```

```

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  persistent <- crew_controller_local(name = "persistent")
  transient <- crew_controller_local(
    name = "transient",
    tasks_max = 1L
  )
  group <- crew_controller_group(persistent, transient)
  group$start()
  group$push(name = "task", command = sqrt(4), controller = "transient")
  group$wait()
  group$pop()
  group$terminate()
}

```

```

crew_class_controller_sequential
  Sequential controller class

```

Description

R6 class for sequential controllers.

Details

See [crew_controller_sequential\(\)](#).

Super class

[crew::crew_class_controller](#) -> [crew_class_controller_sequential](#)

Methods

Public methods:

- [crew_class_controller_sequential\\$start\(\)](#)
- [crew_class_controller_sequential\\$launch\(\)](#)
- [crew_class_controller_sequential\\$scale\(\)](#)
- [crew_class_controller_sequential\\$autoscale\(\)](#)
- [crew_class_controller_sequential\\$descale\(\)](#)
- [crew_class_controller_sequential\\$push\(\)](#)
- [crew_class_controller_sequential\\$wait\(\)](#)
- [crew_class_controller_sequential\\$push_backlog\(\)](#)
- [crew_class_controller_sequential\\$pop_backlog\(\)](#)
- [crew_class_controller_sequential\\$cancel\(\)](#)

Method [start\(\)](#): Start the controller if it is not already started.

Usage:


```
crew_class_controller_sequential$start(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Details: For the sequential controller, there is nothing to do except register the client as started.

Returns: NULL (invisibly).

Method `launch()`: Does nothing for the sequential controller.

Usage:

```
crew_class_controller_sequential$launch(n = 1L, controllers = NULL)
```

Arguments:

n Number of workers to launch.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

Method `scale()`: Does nothing for the sequential controller.

Usage:

```
crew_class_controller_sequential$scale(throttle = TRUE, controllers = NULL)
```

Arguments:

throttle Not applicable to the sequential controller.

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Invisibly returns FALSE.

Method `autoscale()`: Not applicable to the sequential controller.

Usage:

```
crew_class_controller_sequential$autoscale(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

Method `descale()`: Not applicable to the sequential controller.

Usage:

```
crew_class_controller_sequential$descale(controllers = NULL)
```

Arguments:

controllers Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

Method `push()`: Push a task to the head of the task list.

Usage:

```
crew_class_controller_sequential$push(
  command,
  data = list(),
  globals = list(),
  substitute = TRUE,
  seed = NULL,
  algorithm = NULL,
  packages = character(0),
  library = NULL,
  seconds_timeout = NULL,
  scale = TRUE,
  throttle = TRUE,
  name = NULL,
  save_command = NULL,
  controller = NULL
)
```

Arguments:

command Language object with R code to run.

data Named list of local data objects in the evaluation environment.

globals Named list of objects to temporarily assign to the global environment for the task. This list should include any functions you previously defined in the global environment which are required to run tasks. See the `reset_globals` argument of `crew_controller_local()`.

substitute Logical of length 1, whether to call `base::substitute()` on the supplied value of the `command` argument. If `TRUE` (default) then `command` is quoted literally as you write it, e.g. `push(command = your_function_call())`. If `FALSE`, then `crew` assumes `command` is a language object and you are passing its value, e.g. `push(command = quote(your_function_call()))`. `substitute = TRUE` is appropriate for interactive use, whereas `substitute = FALSE` is meant for automated R programs that invoke `crew` controllers.

seed Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the `seed` argument of `set.seed()` if not `NULL`. If `algorithm` and `seed` are both `NULL` for the sequential controller, then the random number generator defaults to the current RNG of the local R session where the sequential controller lives.

algorithm Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the `kind` argument of `RNGkind()` if not `NULL`. If `algorithm` and `seed` are both `NULL` for the sequential controller, then the random number generator defaults to the current RNG of the local R session where the sequential controller lives.

packages Character vector of packages to load for the task.

library Library path to load the packages. See the `lib.loc` argument of `require()`.

seconds_timeout Not used in the sequential controller.

scale Not used in the sequential controller.

throttle Not used in the sequential controller.

name Character string, name of the task. If `NULL`, then a random name is generated automatically. The name of the task must not conflict with the name of another task pushed to the controller. Any previous task with the same name must first be popped before a new task with that name can be pushed.

`save_command` Deprecated on 2025-01-22 (crew version 0.10.2.9004) and no longer used.
`controller` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Invisibly returns a mirai-like list where the data element is the result of the task.

Method `wait()`: Not applicable to the sequential controller.

Usage:

```
crew_class_controller_sequential$wait(  
  mode = "all",  
  seconds_interval = NULL,  
  seconds_timeout = Inf,  
  scale = TRUE,  
  throttle = TRUE,  
  controllers = NULL  
)
```

Arguments:

`mode` Not applicable to the sequential controller.
`seconds_interval` Not applicable to the sequential controller.
`seconds_timeout` Not applicable to the sequential controller.
`scale` Not applicable to the sequential controller.
`throttle` Not applicable to the sequential controller.
`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Always returns TRUE (invisibly) for the sequential controller.

Method `push_backlog()`: Not applicable to the sequential controller.

Usage:

```
crew_class_controller_sequential$push_backlog(name, controller = NULL)
```

Arguments:

`name` Character of length 1 with the task name to push to the backlog.
`controller` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: NULL (invisibly).

Method `pop_backlog()`: Not applicable to the sequential controller.

Usage:

```
crew_class_controller_sequential$pop_backlog(controllers = NULL)
```

Arguments:

`controllers` Not used. Included to ensure the signature is compatible with the analogous method of controller groups.

Returns: Always character(0L) for the sequential controller.

Method `cancel()`: Not applicable to the sequential controller.

Usage:

```
crew_class_controller_sequential$cancel(names = character(0L), all = FALSE)
```

Arguments:

names Not applicable to the sequential controller.

all Not applicable to the sequential controller.

See Also

Other sequential controllers: [crew_controller_sequential\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  controller <- crew_controller_sequential()
  controller$push(name = "task", command = sqrt(4))
  controller$pop()
}
```

crew_class_launcher *Launcher abstract class*

Description

R6 abstract class to build other subclasses which launch and manage workers.

Active bindings

name See [crew_launcher\(\)](#).
workers See [crew_launcher\(\)](#).
seconds_interval See [crew_launcher\(\)](#).
seconds_timeout See [crew_launcher\(\)](#).
seconds_launch See [crew_launcher\(\)](#).
seconds_idle See [crew_launcher\(\)](#).
seconds_wall See [crew_launcher\(\)](#).
tasks_max See [crew_launcher\(\)](#).
tasks_timers See [crew_launcher\(\)](#).
tls See [crew_launcher\(\)](#).
processes See [crew_launcher\(\)](#). asynchronously.
r_arguments See [crew_launcher\(\)](#).
options_metrics See [crew_launcher\(\)](#).
url Websocket URL for worker connections.
profile mirai compute profile of the launcher.
instances Data frame of worker instance information.
id Integer worker ID from the last call to [settings\(\)](#).
async A [crew_async\(\)](#) object to run low-level launcher tasks asynchronously.
throttle A [crew_throttle\(\)](#) object to throttle scaling.

Methods

Public methods:

- `crew_class_launcher$new()`
- `crew_class_launcher$validate()`
- `crew_class_launcher$poll()`
- `crew_class_launcher$settings()`
- `crew_class_launcher$call()`
- `crew_class_launcher$start()`
- `crew_class_launcher$terminate()`
- `crew_class_launcher$resolve()`
- `crew_class_launcher$update()`
- `crew_class_launcher$launch()`
- `crew_class_launcher$scale()`
- `crew_class_launcher$launch_worker()`
- `crew_class_launcher$terminate_worker()`
- `crew_class_launcher$terminate_workers()`
- `crew_class_launcher$crashes()`
- `crew_class_launcher$set_name()`

Method `new()`: Launcher constructor.

Usage:

```
crew_class_launcher$new(  
  name = NULL,  
  workers = NULL,  
  seconds_interval = NULL,  
  seconds_timeout = NULL,  
  seconds_launch = NULL,  
  seconds_idle = NULL,  
  seconds_wall = NULL,  
  seconds_exit = NULL,  
  tasks_max = NULL,  
  tasks_timers = NULL,  
  reset_globals = NULL,  
  reset_packages = NULL,  
  reset_options = NULL,  
  garbage_collection = NULL,  
  crashes_error = NULL,  
  launch_max = NULL,  
  tls = NULL,  
  processes = NULL,  
  r_arguments = NULL,  
  options_metrics = NULL  
)
```

Arguments:

name See `crew_launcher()`.

workers See [crew_launcher\(\)](#).
 seconds_interval See [crew_launcher\(\)](#).
 seconds_timeout See [crew_launcher\(\)](#).
 seconds_launch See [crew_launcher\(\)](#).
 seconds_idle See [crew_launcher\(\)](#).
 seconds_wall See [crew_launcher\(\)](#).
 seconds_exit See [crew_launcher\(\)](#).
 tasks_max See [crew_launcher\(\)](#).
 tasks_timers See [crew_launcher\(\)](#).
 reset_globals Deprecated. See [crew_launcher\(\)](#).
 reset_packages Deprecated. See [crew_launcher\(\)](#).
 reset_options Deprecated. See [crew_launcher\(\)](#).
 garbage_collection Deprecated. See [crew_launcher\(\)](#).
 crashes_error See [crew_launcher\(\)](#).
 launch_max Deprecated.
 tls See [crew_launcher\(\)](#).
 processes See [crew_launcher\(\)](#).
 r_arguments See [crew_launcher\(\)](#).
 options_metrics See [crew_launcher\(\)](#).

Returns: An R6 object with the launcher.

Examples:

```

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  launcher <- crew_launcher_local()
  launcher$start(url = client$url, profile = client$profile)
  launcher$launch()
  task <- mirai::mirai("result", .compute = client$profile)
  mirai::call_mirai(task)
  task$data
  client$terminate()
}

```

Method `validate()`: Validate the launcher.

Usage:

```
crew_class_launcher$validate()
```

Returns: NULL (invisibly).

Method `poll()`: Poll the throttle.

Usage:

```
crew_class_launcher$poll()
```

Returns: TRUE to run whatever work comes next, FALSE to skip until the appropriate time.

Method `settings()`: List of arguments for `mirai::daemon()`.

Usage:

```
crew_class_launcher$settings()
```

Returns: List of arguments for `mirai::daemon()`.

Method `call()`: Create a call to `crew_worker()` to help create custom launchers.

Usage:

```
crew_class_launcher$call(  
  worker,  
  socket = NULL,  
  launcher = NULL,  
  instance = NULL  
)
```

Arguments:

`worker` Character string, name of the worker.

`socket` Deprecated on 2025-01-28 (crew version 1.0.0).

`launcher` Deprecated on 2025-01-28 (crew version 1.0.0).

`instance` Deprecated on 2025-01-28 (crew version 1.0.0).

Returns: Character string with a call to `crew_worker()`.

Examples:

```
launcher <- crew_launcher_local()  
launcher$start(url = "tcp://127.0.0.1:57000", profile = "profile")  
launcher$call(worker = "worker_name")  
launcher$terminate()
```

Method `start()`: Start the launcher.

Usage:

```
crew_class_launcher$start(url = NULL, profile = NULL, sockets = NULL)
```

Arguments:

`url` Character string, websocket URL for worker connections.

`profile` Character string, mirai compute profile.

`sockets` Deprecated on 2025-01-28 (crew version 1.0.0).

Returns: NULL (invisibly).

Method `terminate()`: Terminate the whole launcher, including all workers.

Usage:

```
crew_class_launcher$terminate()
```

Returns: NULL (invisibly).

Method `resolve()`: Resolve asynchronous worker submissions.

Usage:

```
crew_class_launcher$resolve()
```

Returns: NULL (invisibly). Throw an error if there were any asynchronous worker submission errors.'

Method `update()`: Update worker metadata, resolve asynchronous worker submissions, and terminate lost workers.

Usage:

```
crew_class_launcher$update(status)
```

Arguments:

`status` A mirai status list.

Returns: NULL (invisibly).

Method `launch()`: Launch a worker.

Usage:

```
crew_class_launcher$launch()
```

Returns: Handle of the launched worker.

Method `scale()`: Auto-scale workers out to meet the demand of tasks.

Usage:

```
crew_class_launcher$scale(status, throttle = NULL)
```

Arguments:

`status` A mirai status list with worker and task information.

`throttle` Deprecated, only used in the controller as of 2025-01-16 (crew version 0.10.2.9003).

Returns: Invisibly returns TRUE if there was any relevant auto-scaling activity (new worker launches or worker connection/disconnection events) (FALSE otherwise).

Method `launch_worker()`: Abstract worker launch method.

Usage:

```
crew_class_launcher$launch_worker(call, name, launcher, worker)
```

Arguments:

`call` Character of length 1 with a namespaced call to `crew_worker()` which will run in the worker and accept tasks.

`name` Character of length 1 with an informative worker name.

`launcher` Character of length 1, name of the launcher.

`worker` Positive integer of length 1, index of the worker. This worker index remains the same even when the current instance of the worker exits and a new instance launches. It is always between 1 and the maximum number of concurrent workers.

Details: Launcher plugins will overwrite this method.

Returns: A handle to mock the worker launch.

Method `terminate_worker()`: Abstract worker termination method.

Usage:

```
crew_class_launcher$terminate_worker(handle)
```

Arguments:

`handle` A handle object previously returned by `launch_worker()` which allows the termination of the worker.

Details: Launcher plugins will overwrite this method.

Returns: A handle to mock worker termination.

Method `terminate_workers()`: Terminate all workers.

Usage:

```
crew_class_launcher$terminate_workers()
```

Returns: NULL (invisibly).

Method `crashes()`: Deprecated on 2025-01-28 (crew version 1.0.0).

Usage:

```
crew_class_launcher$crashes(index = NULL)
```

Arguments:

`index` Unused argument.

Returns: The integer 1, for compatibility.

Method `set_name()`: Deprecated on 2025-01-28 (crew version 1.0.0).

Usage:

```
crew_class_launcher$set_name(name)
```

Arguments:

`name` Name to set for the launcher.

Returns: NULL (invisibly).

See Also

Other launcher: [crew_launcher\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  launcher <- crew_launcher_local()
  launcher$start(url = client$url, profile = client$profile)
  launcher$launch()
  task <- mirai::mirai("result", .compute = client$profile)
  mirai::call_mirai(task)
  task$data
  client$terminate()
}
```

```
## -----
## Method `crew_class_launcher$new`
## -----
```

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
```

```

launcher <- crew_launcher_local()
launcher$start(url = client$url, profile = client$profile)
launcher$launch()
task <- mirai::mirai("result", .compute = client$profile)
mirai::call_mirai(task)
task$data
client$terminate()
}

## -----
## Method `crew_class_launcher$call`
## -----

launcher <- crew_launcher_local()
launcher$start(url = "tcp://127.0.0.1:57000", profile = "profile")
launcher$call(worker = "worker_name")
launcher$terminate()

```

crew_class_launcher_local

Local process launcher class

Description

R6 class to launch and manage local process workers.

Details

See [crew_launcher_local\(\)](#).

Super class

[crew::crew_class_launcher](#) -> crew_class_launcher_local

Active bindings

options_local See [crew_launcher_local\(\)](#).

Methods

Public methods:

- [crew_class_launcher_local\\$new\(\)](#)
- [crew_class_launcher_local\\$validate\(\)](#)
- [crew_class_launcher_local\\$launch_worker\(\)](#)
- [crew_class_launcher_local\\$terminate_worker\(\)](#)

Method [new\(\)](#): Local launcher constructor.

Usage:

```
crew_class_launcher_local$new(  
  name = NULL,  
  workers = NULL,  
  seconds_interval = NULL,  
  seconds_timeout = NULL,  
  seconds_launch = NULL,  
  seconds_idle = NULL,  
  seconds_wall = NULL,  
  seconds_exit = NULL,  
  tasks_max = NULL,  
  tasks_timers = NULL,  
  crashes_error = NULL,  
  tls = NULL,  
  processes = NULL,  
  r_arguments = NULL,  
  options_metrics = NULL,  
  options_local = NULL  
)
```

Arguments:

name See [crew_launcher\(\)](#).
workers See [crew_launcher\(\)](#).
seconds_interval See [crew_launcher\(\)](#).
seconds_timeout See [crew_launcher\(\)](#).
seconds_launch See [crew_launcher\(\)](#).
seconds_idle See [crew_launcher\(\)](#).
seconds_wall See [crew_launcher\(\)](#).
seconds_exit See [crew_launcher\(\)](#).
tasks_max See [crew_launcher\(\)](#).
tasks_timers See [crew_launcher\(\)](#).
crashes_error See [crew_launcher\(\)](#).
tls See [crew_launcher\(\)](#).
processes See [crew_launcher\(\)](#).
r_arguments See [crew_launcher\(\)](#).
options_metrics See [crew_launcher_local\(\)](#).
options_local See [crew_launcher_local\(\)](#).
reset_globals Deprecated. See [crew_launcher\(\)](#).
reset_packages Deprecated. See [crew_launcher\(\)](#).
reset_options Deprecated. See [crew_launcher\(\)](#).
garbage_collection Deprecated. See [crew_launcher\(\)](#).

Returns: An R6 object with the local launcher.

Examples:

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {  
  client <- crew_client()  
  client$start()  
}
```

```

launcher <- crew_launcher_local(name = client$name)
launcher$start(url = client$url, profile = client$profile)
launcher$launch()
task <- mirai::mirai("result", .compute = client$profile)
mirai::call_mirai(task)
task$data
client$terminate()
}

```

Method `validate()`: Validate the local launcher.

Usage:

```
crew_class_launcher_local$validate()
```

Returns: NULL (invisibly).

Method `launch_worker()`: Launch a local process worker which will dial into a socket.

Usage:

```
crew_class_launcher_local$launch_worker(call, name, launcher, worker)
```

Arguments:

`call` Character of length 1 with a namespaced call to `crew_worker()` which will run in the worker and accept tasks.

`name` Character of length 1 with a long informative worker name which contains the launcher and worker arguments described below.

`launcher` Character of length 1, name of the launcher.

`worker` Character string, name of the worker within the launcher.

Details: The `call` argument is R code that will run to initiate the worker. Together, the launcher, worker, and instance arguments are useful for constructing informative job names.

Returns: A handle object to allow the termination of the worker later on.

Method `terminate_worker()`: Terminate a local process worker.

Usage:

```
crew_class_launcher_local$terminate_worker(handle)
```

Arguments:

`handle` A process handle object previously returned by `launch_worker()`.

Returns: A list with the process ID of the worker.

See Also

Other plugin_local: [crew_controller_local\(\)](#), [crew_launcher_local\(\)](#)

Examples

```

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  launcher <- crew_launcher_local(name = client$name)
}

```

```

launcher$start(url = client$url, profile = client$profile)
launcher$launch()
task <- mirai::mirai("result", .compute = client$profile)
mirai::call_mirai(task)
task$data
client$terminate()
}

## -----
## Method `crew_class_launcher_local$new`
## -----

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  launcher <- crew_launcher_local(name = client$name)
  launcher$start(url = client$url, profile = client$profile)
  launcher$launch()
  task <- mirai::mirai("result", .compute = client$profile)
  mirai::call_mirai(task)
  task$data
  client$terminate()
}

```

crew_class_monitor_local

Local monitor class

Description

Local monitor R6 class

Details

See [crew_monitor_local\(\)](#).

Methods

Public methods:

- [crew_class_monitor_local\\$dispatchers\(\)](#)
- [crew_class_monitor_local\\$daemons\(\)](#)
- [crew_class_monitor_local\\$workers\(\)](#)
- [crew_class_monitor_local\\$terminate\(\)](#)

Method [dispatchers\(\)](#): List the process IDs of the running mirai dispatcher processes.

Usage:

```
crew_class_monitor_local$dispatchers(user = ps::ps_username())
```

Arguments:

user Character of length 1, user ID to filter on. NULL to list processes of all users (not recommended).

Returns: Integer vector of process IDs of the running mirai dispatcher processes.

Method `daemons()`: List the process IDs of the locally running mirai daemon processes which are not crew workers. The `crew_async()` object can launch such processes: for example, when a positive integer is supplied to the `processes` argument of e.g. `crew.aws.batch::crew_controller_aws_batch()`.

Usage:

```
crew_class_monitor_local$daemons(user = ps::ps_username())
```

Arguments:

user Character of length 1, user ID to filter on. NULL to list processes of all users (not recommended).

Returns: Integer vector of process IDs of the locally running mirai daemon processes which are not crew workers.

Method `workers()`: List the process IDs of locally running crew workers launched by the local controller (`crew_controller_local()`).

Usage:

```
crew_class_monitor_local$workers(user = ps::ps_username())
```

Arguments:

user Character of length 1, user ID to filter on. NULL to list processes of all users (not recommended).

Details: Only the workers running on your local computer are listed. Workers that are not listed include jobs on job schedulers like SLURM or jobs on cloud services like AWS Batch. To monitor those worker processes, please consult the monitor objects in the relevant third-party launcher plugins such as `crew.cluster` and `crew.aws.batch`.

Returns: Integer vector of process IDs of locally running crew workers launched by the local controller (`crew_controller_local()`).

Method `terminate()`: Terminate the given process IDs.

Usage:

```
crew_class_monitor_local$terminate(pids)
```

Arguments:

pids Integer vector of process IDs of local processes to terminate.

Details: Termination happens with the operating system signal given by `crew_terminate_signal()`.

Returns: NULL (invisibly).

See Also

Other monitor: `crew_monitor_local()`

crew_class_queue	R6 <i>queue</i> class
------------------	-----------------------

Description

R6 class for a queue.

Details

See the Details section of [crew_queue\(\)](#). The R6 crew queue class is not portable (for efficiency), so other packages should not inherit from it. The reason for non-portability is efficiency: elements can be directly accessed without `self$` or `private$`, and they can be directly modified with `<<-`. This is especially important for `push()` because `envir$vector[slice] <- x` copies the entire vector in memory, which has $O(n^2)$ complexity and is extremely slow for large vectors.

Active bindings

`data` See [crew_queue\(\)](#).

`head` Non-negative integer pointing to the location of the next element to pop.

`tail` Non-negative integer pointing to the tail of the queue.

`step` See [crew_queue\(\)](#).

Methods

Public methods:

- [crew_class_queue\\$new\(\)](#)
- [crew_class_queue\\$validate\(\)](#)
- [crew_class_queue\\$empty\(\)](#)
- [crew_class_queue\\$nonempty\(\)](#)
- [crew_class_queue\\$list\(\)](#)
- [crew_class_queue\\$reset\(\)](#)
- [crew_class_queue\\$clean\(\)](#)
- [crew_class_queue\\$set\(\)](#)
- [crew_class_queue\\$extend\(\)](#)
- [crew_class_queue\\$push\(\)](#)
- [crew_class_queue\\$pop\(\)](#)
- [crew_class_queue\\$collect\(\)](#)

Method `new()`: Create a queue object.

Usage:

```
crew_class_queue$new(data = NULL, step = NULL)
```

Arguments:

`data` See [crew_queue\(\)](#).

step See `crew_queue()`.

Returns: A queue object.

Method `validate()`: Validate the queue.

Usage:

```
crew_class_queue$validate()
```

Returns: NULL (invisibly). Called for its side effects.

Method `empty()`: Check if the queue is empty.

Usage:

```
crew_class_queue$empty()
```

Returns: TRUE if the queue is empty, FALSE otherwise.

Method `nonempty()`: Check if the queue is empty.

Usage:

```
crew_class_queue$nonempty()
```

Returns: TRUE if the queue is nonempty, FALSE otherwise.

Method `list()`: List available data.

Usage:

```
crew_class_queue$list()
```

Returns: Character vector of available data.

Method `reset()`: Reset the queue.

Usage:

```
crew_class_queue$reset()
```

Returns: NULL (invisibly). Called for its side effects.

Method `clean()`: Remove popped elements from the data in the queue.

Usage:

```
crew_class_queue$clean()
```

Returns: NULL (invisibly).

Method `set()`: Set the data in the queue.

Usage:

```
crew_class_queue$set(data = character(0L))
```

Arguments:

`data` Character vector of data to set.

Returns: NULL (invisibly). Called for its side effects.

Method `extend()`: Extend the queue data by step elements.

Usage:

```
crew_class_queue$extend(n)
```


Arguments:

n Positive integer, number of elements to extend the queue data.

Returns: NULL (invisibly).

Method `push()`: Append new elements to the queue.

Usage:

```
crew_class_queue$push(x)
```

Arguments:

x Character vector of new data to append.

Details: `push()` is the reason the queue class is not portable. According to R6 documentation, members of non-portable classes can be accessed without `self$` or `private$`, and assignment can be done with `<<-`. In the case of `push()`, this prevents each assignment from deep-copying the entire contents of the vector.

Returns: NULL (invisibly).

Method `pop()`: Pop one or more elements off the queue.

Usage:

```
crew_class_queue$pop(n = 1L)
```

Arguments:

n Positive integer, maximum number of elements to pop. Fewer than n are popped if fewer than n are available.

Returns: Character vector of elements popped off the queue. NULL if there are no more elements available to pop.

Method `collect()`: Remove and return all available elements off the queue.

Usage:

```
crew_class_queue$collect()
```

Returns: Character vector, elements collected from the queue. NULL if there are no more elements available to collect.

See Also

Other queue: [crew_queue\(\)](#)

Examples

```
crew_queue()
```

crew_class_relay	R6 relay class.
------------------	-----------------

Description

R6 class for relay configuration.

Details

See [crew_relay\(\)](#).

Active bindings

condition Main condition variable.

from Condition variable to relay from.

to Condition variable to relay to.

throttle A [crew_throttle\(\)](#) object for wait().

Methods

Public methods:

- [crew_class_relay\\$new\(\)](#)
- [crew_class_relay\\$validate\(\)](#)
- [crew_class_relay\\$start\(\)](#)
- [crew_class_relay\\$terminate\(\)](#)
- [crew_class_relay\\$set_from\(\)](#)
- [crew_class_relay\\$set_to\(\)](#)
- [crew_class_relay\\$wait\(\)](#)

Method [new\(\)](#): Relay constructor.

Usage:

```
crew_class_relay$new(throttle)
```

Arguments:

throttle A [crew_throttle\(\)](#) object.

Returns: A [crew_relay\(\)](#) object.

Method [validate\(\)](#): Validate the object.

Usage:

```
crew_class_relay$validate()
```

Returns: NULL (invisibly).

Method [start\(\)](#): Start the relay object.

Usage:

```
crew_class_relay$start()
```

Returns: NULL (invisibly).

Method `terminate()`: Terminate the relay object.

Usage:

```
crew_class_relay$terminate()
```

Returns: NULL (invisibly).

Method `set_from()`: Set the condition variable to relay from.

Usage:

```
crew_class_relay$set_from(from)
```

Arguments:

`from` Condition variable to relay from.

Returns: NULL (invisibly).

Method `set_to()`: Set the condition variable to relay to.

Usage:

```
crew_class_relay$set_to(to)
```

Arguments:

`to` Condition variable to relay to.

Returns: NULL (invisibly).

Method `wait()`: Wait until an unobserved task resolves or the timeout is reached. Use the throttle to determine the waiting time.

Usage:

```
crew_class_relay$wait()
```

Returns: NULL (invisibly).

See Also

Other relay: [crew_relay\(\)](#)

Examples

```
crew_relay()
```

crew_class_throttle R6 *throttle* class.

Description

R6 class for throttle configuration.

Details

See [crew_throttle\(\)](#).

Active bindings

seconds_max See [crew_throttle\(\)](#).

seconds_min See [crew_throttle\(\)](#).

seconds_start See [crew_throttle\(\)](#).

base See [crew_throttle\(\)](#).

seconds_interval Current wait time interval.

polled Positive numeric of length 1, millisecond timestamp of the last time `poll()` returned TRUE.
NULL if `poll()` was never called on the current object.

Methods

Public methods:

- [crew_class_throttle\\$new\(\)](#)
- [crew_class_throttle\\$validate\(\)](#)
- [crew_class_throttle\\$poll\(\)](#)
- [crew_class_throttle\\$accelerate\(\)](#)
- [crew_class_throttle\\$decelerate\(\)](#)
- [crew_class_throttle\\$reset\(\)](#)
- [crew_class_throttle\\$update\(\)](#)

Method `new()`: Throttle constructor.

Usage:

```
crew_class_throttle$new(  
  seconds_max = NULL,  
  seconds_min = NULL,  
  seconds_start = NULL,  
  base = NULL  
)
```

Arguments:

seconds_max See [crew_throttle\(\)](#).

seconds_min See [crew_throttle\(\)](#).

seconds_start See `crew_throttle()`.

base See `crew_throttle()`.

Returns: An R6 object with throttle configuration.

Examples:

```
throttle <- crew_throttle(seconds_max = 1)
throttle$poll()
throttle$poll()
```

Method `validate()`: Validate the object.

Usage:

```
crew_class_throttle$validate()
```

Returns: NULL (invisibly).

Method `poll()`: Poll the throttler.

Usage:

```
crew_class_throttle$poll()
```

Returns: TRUE if `poll()` did not return TRUE in the last max seconds, FALSE otherwise.

Method `accelerate()`: Divide seconds_interval by base.

Usage:

```
crew_class_throttle$accelerate()
```

Returns: NULL (invisibly). Called for its side effects.

Method `decelerate()`: Multiply seconds_interval by base.

Usage:

```
crew_class_throttle$decelerate()
```

Returns: NULL (invisibly). Called for its side effects.

Method `reset()`: Reset the throttle object so the next `poll()` returns TRUE, and reset the wait time interval to its initial value.

Usage:

```
crew_class_throttle$reset()
```

Returns: NULL (invisibly).

Method `update()`: Reset the throttle when there is activity and decelerate it gradually when there is no activity.

Usage:

```
crew_class_throttle$update(activity)
```

Arguments:

activity TRUE if there is activity, FALSE otherwise.

Returns: NULL (invisibly).

See Also

Other throttle: [crew_throttle\(\)](#)

Examples

```
throttle <- crew_throttle(seconds_max = 1)
throttle$poll()
throttle$poll()

## -----
## Method `crew_class_throttle$new`
## -----

throttle <- crew_throttle(seconds_max = 1)
throttle$poll()
throttle$poll()
```

crew_class_tls

R6 TLS class.

Description

R6 class for TLS configuration.

Details

See [crew_tls\(\)](#).

Active bindings

mode See [crew_tls\(\)](#).

key See [crew_tls\(\)](#).

password See [crew_tls\(\)](#).

certificates See [crew_tls\(\)](#).

Methods**Public methods:**

- [crew_class_tls\\$new\(\)](#)
- [crew_class_tls\\$validate\(\)](#)
- [crew_class_tls\\$client\(\)](#)
- [crew_class_tls\\$worker\(\)](#)
- [crew_class_tls\\$url\(\)](#)

Method [new\(\)](#): TLS configuration constructor.

Usage:

```
crew_class_tls$new(  
  mode = NULL,  
  key = NULL,  
  password = NULL,  
  certificates = NULL  
)
```

Arguments:

mode Argument passed from `crew_tls()`.
key Argument passed from `crew_tls()`.
password Argument passed from `crew_tls()`.
certificates Argument passed from `crew_tls()`.

Returns: An R6 object with TLS configuration.

Examples:

```
crew_tls(mode = "automatic")
```

Method `validate()`: Validate the object.

Usage:

```
crew_class_tls$validate(test = TRUE)
```

Arguments:

test Logical of length 1, whether to test the TLS configuration with `nanonext::tls_config()`.

Returns: NULL (invisibly).

Method `client()`: TLS credentials for the crew client.

Usage:

```
crew_class_tls$client()
```

Returns: NULL or character vector, depending on the mode.

Method `worker()`: TLS credentials for crew workers.

Usage:

```
crew_class_tls$worker(profile)
```

Arguments:

profile Character of length 1 with the mirai compute profile.

Returns: NULL or character vector, depending on the mode.

Method `url()`: Form the URL for crew worker connections.

Usage:

```
crew_class_tls$url(host, port)
```

Arguments:

host Character string with the host name or IP address.

port Non-negative integer with the port number (0 to let NNG select a random ephemeral port).

Returns: Character string with the URL.

See Also

Other tls: [crew_tls\(\)](#)

Examples

```
crew_tls(mode = "automatic")

## -----
## Method `crew_class_tls$new`
## -----

crew_tls(mode = "automatic")
```

crew_clean	<i>Terminate dispatchers and/or workers</i>
------------	---

Description

Terminate mirai dispatchers and/or crew workers which may be lingering from previous workloads.

Usage

```
crew_clean(
  dispatchers = TRUE,
  workers = TRUE,
  user = ps::ps_username(),
  seconds_interval = 1,
  seconds_timeout = 60,
  verbose = TRUE
)
```

Arguments

- | | |
|------------------|--|
| dispatchers | Logical of length 1, whether to terminate dispatchers. |
| workers | Logical of length 1, whether to terminate workers. |
| user | Character of length 1. Terminate dispatchers and/or workers associated with this user name. |
| seconds_interval | Seconds to between polling intervals waiting for a process to exit. |
| seconds_timeout | Seconds to wait for a process to exit. |
| verbose | Logical of length 1, whether to print an informative message every time a process is terminated. |

Details

Behind the scenes, mirai uses an external R process called a "dispatcher" to send tasks to crew workers. This dispatcher usually shuts down when you terminate the controller or quit your R session, but sometimes it lingers. Likewise, sometimes crew workers do not shut down on their own. The `crew_clean()` function searches the process table on your local machine and manually terminates any mirai dispatchers and crew workers associated with your user name (or the user name you select in the `user` argument). Unfortunately, it cannot reach remote workers such as those launched by a `crew.cluster` controller.

Value

NULL (invisibly). If `verbose` is TRUE, it does print out a message for every terminated process.

See Also

Other utility: `crew_assert()`, `crew_deprecate()`, `crew_eval()`, `crew_random_name()`, `crew_retry()`, `crew_terminate_process()`, `crew_terminate_signal()`, `crew_worker()`

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  crew_clean()
}
```

crew_client	Create a client object.
-------------	-------------------------

Description

Create an R6 wrapper object to manage the mirai client.

Usage

```
crew_client(
  name = NULL,
  workers = NULL,
  host = NULL,
  port = NULL,
  tls = crew::crew_tls(),
  tls_enable = NULL,
  tls_config = NULL,
  serialization = NULL,
  seconds_interval = 1,
  seconds_timeout = 60,
  retry_tasks = NULL
)
```

Arguments

name	Deprecated on 2025-01-14 (crew version 0.10.2.9002).
workers	Deprecated on 2025-01-13 (crew version 0.10.2.9002).
host	IP address of the mirai client to send and receive tasks. If NULL, the host defaults to <code>nanonext::ip_addr()[1]</code> .
port	TCP port to listen for the workers. If NULL, then an available ephemeral port is automatically chosen. Controllers running simultaneously on the same computer (as in a controller group) must not share the same TCP port.
tls	A TLS configuration object from <code>crew_tls()</code> .
tls_enable	Deprecated on 2023-09-15 in version 0.4.1. Use argument <code>tls</code> instead.
tls_config	Deprecated on 2023-09-15 in version 0.4.1. Use argument <code>tls</code> instead.
serialization	Either NULL (default) or an object produced by <code>mirai::serial_config()</code> to control the serialization of data sent to workers. This can help with either more efficient data transfers or to preserve attributes of otherwise non-exportable objects (such as torch tensors or arrow tables). See <code>?mirai::serial_config</code> for details.
seconds_interval	Number of seconds between polling intervals waiting for certain internal synchronous operations to complete, such as checking <code>mirai::status()</code>
seconds_timeout	Number of seconds until timing out while waiting for certain synchronous operations to complete, such as checking <code>mirai::status()</code> .
retry_tasks	Deprecated on 2025-01-13 (crew version 0.10.2.9002).

See Also

Other client: [crew_class_client](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  client$summary()
  client$terminate()
}
```

crew_controller

Create a controller object from a client and launcher.

Description

This function is for developers of crew launcher plugins. Users should use a specific controller helper such as [crew_controller_local\(\)](#).

Usage

```

crew_controller(
  client,
  launcher,
  reset_globals = TRUE,
  reset_packages = FALSE,
  reset_options = FALSE,
  garbage_collection = FALSE,
  crashes_max = 5L,
  backup = NULL,
  auto_scale = NULL
)

```

Arguments

<code>client</code>	An R6 client object created by <code>crew_client()</code> .
<code>launcher</code>	An R6 launcher object created by one of the <code>crew_launcher_*</code> () functions such as <code>crew_launcher_local()</code> .
<code>reset_globals</code>	TRUE to reset global environment variables between tasks, FALSE to leave them alone.
<code>reset_packages</code>	TRUE to detach any packages loaded during a task (runs between each task), FALSE to leave packages alone. In either case, the namespaces are not detached.
<code>reset_options</code>	TRUE to reset global options to their original state between each task, FALSE otherwise. It is recommended to only set <code>reset_options = TRUE</code> if <code>reset_packages</code> is also TRUE because packages sometimes rely on options they set at loading time. for this and other reasons, <code>reset_options</code> only resets options that were nonempty at the beginning of the task. If your task sets an entirely new option not already in <code>options()</code> , then <code>reset_options = TRUE</code> does not delete the option.
<code>garbage_collection</code>	TRUE to run garbage collection after each task task, FALSE to skip.
<code>crashes_max</code>	<p>In rare cases, a worker may exit unexpectedly before it completes its current task. If this happens, <code>pop()</code> returns a status of "crash" instead of "error" for the task. The controller does not automatically retry the task, but you can retry it manually by calling <code>push()</code> again and using the same task name as before. (However, targets pipelines running crew do automatically retry tasks whose workers crashed.)</p> <p><code>crashes_max</code> is a non-negative integer, and it sets the maximum number of allowable consecutive crashes for a given task. If a task's worker crashes more than <code>crashes_max</code> times in a row, then <code>pop()</code> throws an error when it tries to return the results of the task.</p>
<code>backup</code>	An optional crew controller object, or NULL to omit. If supplied, the backup controller runs any pushed tasks that have already reached <code>crashes_max</code> consecutive crashes. Using <code>backup</code> , you can create a chain of controllers with different levels of resources (such as worker memory and CPUs) so that a task that fails on one controller can retry using incrementally more powerful workers.

All controllers in a backup chain should be part of the same controller group (see [crew_controller_group\(\)](#)) so you can call the group-level `pop()` and `collect()` methods to make sure you get results regardless of which controller actually ended up running the task.

Limitations of backup: * `crashes_max` needs to be positive in order for backup to be used. Otherwise, every task would always skip the current controller and go to backup. * backup cannot be a controller group. It must be an ordinary controller.

`auto_scale` Deprecated. Use the `scale` argument of `push()`, `pop()`, and `wait()` instead.

See Also

Other controller: [crew_class_controller](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  launcher <- crew_launcher_local()
  controller <- crew_controller(client = client, launcher = launcher)
  controller$start()
  controller$push(name = "task", command = sqrt(4))
  controller$wait()
  controller$pop()
  controller$terminate()
}
```

`crew_controller_group` *Create a controller group.*

Description

Create an R6 object to submit tasks and launch workers through multiple crew controllers.

Usage

```
crew_controller_group(..., seconds_interval = 1)
```

Arguments

`...` R6 controller objects or lists of R6 controller objects. Nested lists are allowed, but each element must be a control object or another list.

`seconds_interval` Number of seconds between polling intervals waiting for certain internal synchronous operations to complete, such as checking `mirai::status()`

See Also

Other controller_group: [crew_class_controller_group](#)

Examples

```

if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  persistent <- crew_controller_local(name = "persistent")
  transient <- crew_controller_local(
    name = "transient",
    tasks_max = 1L
  )
  group <- crew_controller_group(persistent, transient)
  group$start()
  group$push(name = "task", command = sqrt(4), controller = "transient")
  group$wait()
  group$pop()
  group$terminate()
}

```

crew_controller_local *Create a controller with a local process launcher.*

Description

Create an R6 object to submit tasks and launch workers on local processes.

Usage

```

crew_controller_local(
  name = NULL,
  workers = 1L,
  host = "127.0.0.1",
  port = NULL,
  tls = crew::crew_tls(),
  tls_enable = NULL,
  tls_config = NULL,
  serialization = NULL,
  seconds_interval = 1,
  seconds_timeout = 60,
  seconds_launch = 30,
  seconds_idle = 300,
  seconds_wall = Inf,
  seconds_exit = NULL,
  retry_tasks = NULL,
  tasks_max = Inf,
  tasks_timers = 0L,
  reset_globals = TRUE,
  reset_packages = FALSE,
  reset_options = FALSE,
  garbage_collection = FALSE,
  crashes_error = NULL,

```

```

    launch_max = NULL,
    r_arguments = c("--no-save", "--no-restore"),
    crashes_max = 5L,
    backup = NULL,
    options_metrics = crew::crew_options_metrics(),
    options_local = crew::crew_options_local(),
    local_log_directory = NULL,
    local_log_join = NULL
)

```

Arguments

name	Character string, name of the launcher. If the name is NULL, then a name is automatically generated when the launcher starts.
workers	Maximum number of workers to run concurrently when auto-scaling, excluding task retries and manual calls to <code>launch()</code> . Special workers allocated for task retries do not count towards this limit, so the number of workers running at a given time may exceed this maximum. A smaller number of workers may run if the number of executing tasks is smaller than the supplied value of the workers argument.
host	IP address of the mirai client to send and receive tasks. If NULL, the host defaults to <code>nanonext::ip_addr()[1]</code> .
port	TCP port to listen for the workers. If NULL, then an available ephemeral port is automatically chosen. Controllers running simultaneously on the same computer (as in a controller group) must not share the same TCP port.
tls	A TLS configuration object from <code>crew_tls()</code> .
tls_enable	Deprecated on 2023-09-15 in version 0.4.1. Use argument <code>tls</code> instead.
tls_config	Deprecated on 2023-09-15 in version 0.4.1. Use argument <code>tls</code> instead.
serialization	Either NULL (default) or an object produced by <code>mirai::serial_config()</code> to control the serialization of data sent to workers. This can help with either more efficient data transfers or to preserve attributes of otherwise non-exportable objects (such as torch tensors or arrow tables). See <code>?mirai::serial_config</code> for details.
seconds_interval	Number of seconds between polling intervals waiting for certain internal synchronous operations to complete. In certain cases, exponential backoff is used with this argument passed to <code>seconds_max</code> in a <code>crew_throttle()</code> object.
seconds_timeout	Number of seconds until timing out while waiting for certain synchronous operations to complete, such as checking <code>mirai::status()</code> .
seconds_launch	Seconds of startup time to allow. A worker is unconditionally assumed to be alive from the moment of its launch until <code>seconds_launch</code> seconds later. After <code>seconds_launch</code> seconds, the worker is only considered alive if it is actively connected to its assign websocket.
seconds_idle	Maximum number of seconds that a worker can idle since the completion of the last task. If exceeded, the worker exits. But the timer does not launch until

	tasks_timers	tasks have completed. See the <code>idletime</code> argument of <code>mirai::daemon()</code> . crew does not excel with perfectly transient workers because it does not micro-manage the assignment of tasks to workers, so please allow enough idle time for a new worker to be delegated a new task.
seconds_wall		Soft wall time in seconds. The timer does not launch until <code>tasks_timers</code> tasks have completed. See the <code>walltime</code> argument of <code>mirai::daemon()</code> .
seconds_exit		Deprecated on 2023-09-21 in version 0.5.0.9002. No longer necessary.
retry_tasks		Deprecated on 2025-01-13 (crew version 0.10.2.9002).
tasks_max		Maximum number of tasks that a worker will do before exiting. See the <code>maxtasks</code> argument of <code>mirai::daemon()</code> . crew does not excel with perfectly transient workers because it does not micromanage the assignment of tasks to workers, it is recommended to set <code>tasks_max</code> to a value greater than 1.
tasks_timers		Number of tasks to do before activating the timers for <code>seconds_idle</code> and <code>seconds_wall</code> . See the <code>timerstart</code> argument of <code>mirai::daemon()</code> .
reset_globals		TRUE to reset global environment variables between tasks, FALSE to leave them alone.
reset_packages		TRUE to detach any packages loaded during a task (runs between each task), FALSE to leave packages alone. In either case, the namespaces are not detached.
reset_options		TRUE to reset global options to their original state between each task, FALSE otherwise. It is recommended to only set <code>reset_options = TRUE</code> if <code>reset_packages</code> is also TRUE because packages sometimes rely on options they set at loading time. for this and other reasons, <code>reset_options</code> only resets options that were nonempty at the beginning of the task. If your task sets an entirely new option not already in <code>options()</code> , then <code>reset_options = TRUE</code> does not delete the option.
garbage_collection		TRUE to run garbage collection after each task task, FALSE to skip.
crashes_error		Deprecated on 2025-01-13 (crew version 0.10.2.9002).
launch_max		Deprecated on 2024-11-04 (crew version 0.10.2.9002).
r_arguments		Optional character vector of command line arguments to pass to Rscript (non-Windows) or <code>Rscript.exe</code> (Windows) when starting a worker. Example: <code>r_arguments = c("--vanilla", "--max-connections=32")</code> .
crashes_max		In rare cases, a worker may exit unexpectedly before it completes its current task. If this happens, <code>pop()</code> returns a status of "crash" instead of "error" for the task. The controller does not automatically retry the task, but you can retry it manually by calling <code>push()</code> again and using the same task name as before. (However, targets pipelines running crew do automatically retry tasks whose workers crashed.) <code>crashes_max</code> is a non-negative integer, and it sets the maximum number of allowable consecutive crashes for a given task. If a task's worker crashes more than <code>crashes_max</code> times in a row, then <code>pop()</code> throws an error when it tries to return the results of the task.
backup		An optional crew controller object, or NULL to omit. If supplied, the backup controller runs any pushed tasks that have already reached <code>crashes_max</code> consecutive crashes. Using <code>backup</code> , you can create a chain of controllers with different levels of resources (such as worker memory and CPUs) so that a task that

fails on one controller can retry using incrementally more powerful workers. All controllers in a backup chain should be part of the same controller group (see [crew_controller_group\(\)](#)) so you can call the group-level `pop()` and `collect()` methods to make sure you get results regardless of which controller actually ended up running the task.

Limitations of backup: * `crashes_max` needs to be positive in order for backup to be used. Otherwise, every task would always skip the current controller and go to backup. * backup cannot be a controller group. It must be an ordinary controller.

`options_metrics`

Either NULL to opt out of resource metric logging for workers, or an object from [crew_options_metrics\(\)](#) to enable and configure resource metric logging for workers. For resource logging to run, the `autometric` R package version 0.1.0 or higher must be installed.

`options_local` An object generated by [crew_options_local\(\)](#) with options specific to the local controller.

`local_log_directory`

Deprecated on 2024-10-08. Use `options_local` instead.

`local_log_join` Deprecated on 2024-10-08. Use `options_local` instead.

See Also

Other plugin_local: [crew_class_launcher_local](#), [crew_launcher_local\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  controller <- crew_controller_local()
  controller$start()
  controller$push(name = "task", command = sqrt(4))
  controller$wait()
  controller$pop()
  controller$terminate()
}
```

`crew_controller_sequential`

Create a sequential controller.

Description

The sequential controller runs tasks on the same R process where the controller object exists. Tasks run sequentially rather than in parallel.

Usage

`crew_controller_sequential()`

See Also

Other sequential controllers: [crew_class_controller_sequential](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  controller <- crew_controller_sequential()
  controller$push(name = "task", command = sqrt(4))
  controller$pop()
}
```

crew_deprecate	<i>Deprecate a crew feature.</i>
----------------	----------------------------------

Description

Show an informative warning when a crew feature is deprecated.

Usage

```
crew_deprecate(
  name,
  date,
  version,
  alternative,
  condition = "warning",
  value = "x",
  skip_cran = FALSE,
  frequency = "always"
)
```

Arguments

name	Name of the feature (function or argument) to deprecate.
date	Date of deprecation.
version	Package version when deprecation was instated.
alternative	Message about an alternative.
condition	Either "warning" or "message" to indicate the type of condition thrown on deprecation.
value	Value of the object. Deprecation is skipped if value is NULL.
skip_cran	Logical of length 1, whether to skip the deprecation warning or message on CRAN.
frequency	Character of length 1, passed to the .frequency argument of rlang::warn().

Value

NULL (invisibly). Throws a warning if a feature is deprecated.

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_eval\(\)](#), [crew_random_name\(\)](#), [crew_retry\(\)](#), [crew_terminate_process\(\)](#), [crew_terminate_signal\(\)](#), [crew_worker\(\)](#)

Examples

```
suppressWarnings(
  crew_deprecate(
    name = "auto_scale",
    date = "2023-05-18",
    version = "0.2.0",
    alternative = "use the scale argument of push(), pop(), and wait()."
  )
)
```

crew_eval

Evaluate an R command and return results as a monad.

Description

Not a user-side function. Do not call directly.

Usage

```
crew_eval(
  command,
  name,
  data = list(),
  globals = list(),
  seed = NULL,
  algorithm = NULL,
  packages = character(),
  library = NULL,
  reset_globals = TRUE,
  reset_packages = FALSE,
  reset_options = FALSE,
  garbage_collection = FALSE
)
```

Arguments

command	Language object with R code to run.
name	Character of length 1, name of the task.
data	Named list of local data objects in the evaluation environment.
globals	Named list of objects to temporarily assign to the global environment for the task.
seed	Integer of length 1 with the pseudo-random number generator seed to set for the evaluation of the task. Passed to the seed argument of <code>set.seed()</code> if not NULL. If algorithm and seed are both NULL, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by <code>mirai::nextstream()</code> . See <code>vignette("parallel", package = "parallel")</code> for details.
algorithm	Integer of length 1 with the pseudo-random number generator algorithm to set for the evaluation of the task. Passed to the kind argument of <code>RNGkind()</code> if not NULL. If algorithm and seed are both NULL, then the random number generator defaults to the recommended widely spaced worker-specific L'Ecuyer streams as supported by <code>mirai::nextstream()</code> . See <code>vignette("parallel", package = "parallel")</code> for details.
packages	Character vector of packages to load for the task.
library	Library path to load the packages. See the <code>lib.loc</code> argument of <code>require()</code> .
reset_globals	TRUE to reset global environment variables between tasks, FALSE to leave them alone.
reset_packages	TRUE to detach any packages loaded during a task (runs between each task), FALSE to leave packages alone. In either case, the namespaces are not detached.
reset_options	TRUE to reset global options to their original state between each task, FALSE otherwise. It is recommended to only set <code>reset_options = TRUE</code> if <code>reset_packages</code> is also TRUE because packages sometimes rely on options they set at loading time. for this and other reasons, <code>reset_options</code> only resets options that were nonempty at the beginning of the task. If your task sets an entirely new option not already in <code>options()</code> , then <code>reset_options = TRUE</code> does not delete the option.
garbage_collection	TRUE to run garbage collection after each task task, FALSE to skip.

Details

The `crew_eval()` function evaluates an R expression in an encapsulated environment and returns a monad with the results, including warnings and error messages if applicable. The random number generator seed, globals, and global options are restored to their original values on exit.

Value

A monad object with results and metadata.

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_random_name\(\)](#), [crew_retry\(\)](#), [crew_terminate_process\(\)](#), [crew_terminate_signal\(\)](#), [crew_worker\(\)](#)

Examples

```
crew_eval(quote(1 + 1), name = "task_name")
```

crew_launcher	<i>Create an abstract launcher.</i>
---------------	-------------------------------------

Description

This function is useful for inheriting argument documentation in functions that create custom third-party launchers. See @inheritParams crew::crew_launcher in the source code file of [crew_launcher_local\(\)](#).

Usage

```
crew_launcher(
  name = NULL,
  workers = 1L,
  seconds_interval = 1,
  seconds_timeout = 60,
  seconds_launch = 30,
  seconds_idle = 300,
  seconds_wall = Inf,
  seconds_exit = NULL,
  tasks_max = Inf,
  tasks_timers = 0L,
  reset_globals = NULL,
  reset_packages = NULL,
  reset_options = NULL,
  garbage_collection = NULL,
  crashes_error = NULL,
  launch_max = NULL,
  tls = crew::crew_tls(),
  processes = NULL,
  r_arguments = c("--no-save", "--no-restore"),
  options_metrics = crew::crew_options_metrics()
)
```

Arguments

name	Character string, name of the launcher. If the name is NULL, then a name is automatically generated when the launcher starts.
------	---

workers	Maximum number of workers to run concurrently when auto-scaling, excluding task retries and manual calls to <code>launch()</code> . Special workers allocated for task retries do not count towards this limit, so the number of workers running at a given time may exceed this maximum. A smaller number of workers may run if the number of executing tasks is smaller than the supplied value of the workers argument.
seconds_interval	Number of seconds between polling intervals waiting for certain internal synchronous operations to complete. In certain cases, exponential backoff is used with this argument passed to <code>seconds_max</code> in a <code>crew_throttle()</code> object.
seconds_timeout	Number of seconds until timing out while waiting for certain synchronous operations to complete, such as checking <code>mirai::status()</code> .
seconds_launch	Seconds of startup time to allow. A worker is unconditionally assumed to be alive from the moment of its launch until <code>seconds_launch</code> seconds later. After <code>seconds_launch</code> seconds, the worker is only considered alive if it is actively connected to its assign websocket.
seconds_idle	Maximum number of seconds that a worker can idle since the completion of the last task. If exceeded, the worker exits. But the timer does not launch until <code>tasks_timers</code> tasks have completed. See the <code>idletime</code> argument of <code>mirai::daemon()</code> . <code>crew</code> does not excel with perfectly transient workers because it does not micro-manage the assignment of tasks to workers, so please allow enough idle time for a new worker to be delegated a new task.
seconds_wall	Soft wall time in seconds. The timer does not launch until <code>tasks_timers</code> tasks have completed. See the <code>walltime</code> argument of <code>mirai::daemon()</code> .
seconds_exit	Deprecated on 2023-09-21 in version 0.5.0.9002. No longer necessary.
tasks_max	Maximum number of tasks that a worker will do before exiting. See the <code>maxtasks</code> argument of <code>mirai::daemon()</code> . <code>crew</code> does not excel with perfectly transient workers because it does not micromanage the assignment of tasks to workers, it is recommended to set <code>tasks_max</code> to a value greater than 1.
tasks_timers	Number of tasks to do before activating the timers for <code>seconds_idle</code> and <code>seconds_wall</code> . See the <code>timerstart</code> argument of <code>mirai::daemon()</code> .
reset_globals	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>reset_globals</code> option of <code>crew_controller()</code> instead.
reset_packages	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>reset_packages</code> option of <code>crew_controller()</code> instead.
reset_options	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>reset_options</code> option of <code>crew_controller()</code> instead.
garbage_collection	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>garbage_collection</code> option of <code>crew_controller()</code> instead.
crashes_error	Deprecated on 2025-01-13 (crew version 0.10.2.9002).
launch_max	Deprecated on 2024-11-04 (crew version 0.10.2.9002).
tls	A TLS configuration object from <code>crew_tls()</code> .

processes	NULL or positive integer of length 1, number of local processes to launch to allow worker launches to happen asynchronously. If NULL, then no local processes are launched. If 1 or greater, then the launcher starts the processes on <code>start()</code> and ends them on <code>terminate()</code> . Plugins that may use these processes should run asynchronous calls using <code>launcher\$async\$eval()</code> and expect a <code>mirai</code> task object as the return value.
r_arguments	Optional character vector of command line arguments to pass to <code>Rscript</code> (non-Windows) or <code>Rscript.exe</code> (Windows) when starting a worker. Example: <code>r_arguments = c("--vanilla", "--max-connections=32")</code> .
options_metrics	Either NULL to opt out of resource metric logging for workers, or an object from <code>crew_options_metrics()</code> to enable and configure resource metric logging for workers. For resource logging to run, the <code>autometric</code> R package version 0.1.0 or higher must be installed.

See Also

Other launcher: [crew_class_launcher](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  launcher <- crew_launcher_local()
  launcher$start(url = client$url, profile = client$profile)
  launcher$launch()
  task <- mirai::mirai("result", .compute = client$profile)
  mirai::call_mirai(task)
  task$data
  client$terminate()
}
```

crew_launcher_local	Create a launcher with local process workers.
---------------------	---

Description

Create an R6 object to launch and maintain local process workers.

Usage

```
crew_launcher_local(
  name = NULL,
  workers = 1L,
  seconds_interval = 1,
  seconds_timeout = 60,
  seconds_launch = 30,
```

```

seconds_idle = Inf,
seconds_wall = Inf,
seconds_exit = NULL,
tasks_max = Inf,
tasks_timers = 0L,
reset_globals = NULL,
reset_packages = NULL,
reset_options = NULL,
garbage_collection = NULL,
crashes_error = NULL,
launch_max = NULL,
tls = crew::crew_tls(),
r_arguments = c("--no-save", "--no-restore"),
options_metrics = crew::crew_options_metrics(),
options_local = crew::crew_options_local(),
local_log_directory = NULL,
local_log_join = NULL
)

```

Arguments

name	Character string, name of the launcher. If the name is NULL, then a name is automatically generated when the launcher starts.
workers	Maximum number of workers to run concurrently when auto-scaling, excluding task retries and manual calls to <code>launch()</code> . Special workers allocated for task retries do not count towards this limit, so the number of workers running at a given time may exceed this maximum. A smaller number of workers may run if the number of executing tasks is smaller than the supplied value of the workers argument.
seconds_interval	Number of seconds between polling intervals waiting for certain internal synchronous operations to complete. In certain cases, exponential backoff is used with this argument passed to <code>seconds_max</code> in a <code>crew_throttle()</code> object.
seconds_timeout	Number of seconds until timing out while waiting for certain synchronous operations to complete, such as checking <code>mirai::status()</code> .
seconds_launch	Seconds of startup time to allow. A worker is unconditionally assumed to be alive from the moment of its launch until <code>seconds_launch</code> seconds later. After <code>seconds_launch</code> seconds, the worker is only considered alive if it is actively connected to its assign websocket.
seconds_idle	Maximum number of seconds that a worker can idle since the completion of the last task. If exceeded, the worker exits. But the timer does not launch until <code>tasks_timers</code> tasks have completed. See the <code>idletime</code> argument of <code>mirai::daemon()</code> . <code>crew</code> does not excel with perfectly transient workers because it does not micro-manage the assignment of tasks to workers, so please allow enough idle time for a new worker to be delegated a new task.
seconds_wall	Soft wall time in seconds. The timer does not launch until <code>tasks_timers</code> tasks have completed. See the <code>walltime</code> argument of <code>mirai::daemon()</code> .

seconds_exit	Deprecated on 2023-09-21 in version 0.5.0.9002. No longer necessary.
tasks_max	Maximum number of tasks that a worker will do before exiting. See the <code>maxtasks</code> argument of <code>mirai::daemon()</code> . <code>crew</code> does not excel with perfectly transient workers because it does not micromanage the assignment of tasks to workers, it is recommended to set <code>tasks_max</code> to a value greater than 1.
tasks_timers	Number of tasks to do before activating the timers for <code>seconds_idle</code> and <code>seconds_wall</code> . See the <code>timerstart</code> argument of <code>mirai::daemon()</code> .
reset_globals	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>reset_globals</code> option of <code>crew_controller()</code> instead.
reset_packages	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>reset_packages</code> option of <code>crew_controller()</code> instead.
reset_options	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>reset_options</code> option of <code>crew_controller()</code> instead.
garbage_collection	Deprecated on 2025-05-30 (crew version 1.1.2.9004). Please use the <code>garbage_collection</code> option of <code>crew_controller()</code> instead.
crashes_error	Deprecated on 2025-01-13 (crew version 0.10.2.9002).
launch_max	Deprecated on 2024-11-04 (crew version 0.10.2.9002).
tls	A TLS configuration object from <code>crew_tls()</code> .
r_arguments	Optional character vector of command line arguments to pass to <code>Rscript</code> (non-Windows) or <code>Rscript.exe</code> (Windows) when starting a worker. Example: <code>r_arguments = c("--vanilla", "--max-connections=32")</code> .
options_metrics	Either <code>NULL</code> to opt out of resource metric logging for workers, or an object from <code>crew_options_metrics()</code> to enable and configure resource metric logging for workers. For resource logging to run, the <code>autometric</code> R package version 0.1.0 or higher must be installed.
options_local	An object generated by <code>crew_options_local()</code> with options specific to the local controller.
local_log_directory	Deprecated on 2024-10-08. Use <code>options_local</code> instead.
local_log_join	Deprecated on 2024-10-08. Use <code>options_local</code> instead.

See Also

Other plugin_local: `crew_class_launcher_local`, `crew_controller_local()`

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {
  client <- crew_client()
  client$start()
  launcher <- crew_launcher_local(name = client$name)
  launcher$start(url = client$url, profile = client$profile)
  launcher$launch()
  task <- mirai::mirai("result", .compute = client$profile)
```



```

mirai::call_mirai(task)
task$data
client$terminate()
}

```

crew_monitor_local *Create a local monitor object.*

Description

Create an R6 object to monitor local processes created by crew and mirai.

Usage

```
crew_monitor_local()
```

See Also

Other monitor: [crew_class_monitor_local](#)

crew_options_local *Local crew launcher options.*

Description

Options for the local crew launcher.

Usage

```
crew_options_local(log_directory = NULL, log_join = TRUE)
```

Arguments

log_directory	Either NULL or a character of length 1 with the file path to a directory to write worker-specific log files with standard output and standard error messages. Each log file represents a single <i>instance</i> of a running worker, so there will be more log files if a given worker starts and terminates a lot. Set to NULL to suppress log files (default).
log_join	Logical of length 1. If TRUE, crew will write standard output and standard error to the same log file for each worker instance. If FALSE, then these two streams will go to different log files with informative suffixes.

Value

A classed list of options for the local launcher.

See Also

Other options: [crew_options_metrics\(\)](#)

Examples

```
crew_options_local()
```

```
crew_options_metrics
```

Options for logging resource usage metrics.

Description

[crew_options_metrics\(\)](#) configures the crew to record resource usage metrics (such as CPU and memory usage) for each running worker. To be activate resource usage logging, the autometric R package version 0.1.0 or higher must be installed.

Logging happens in the background (through a detached POSIX) so as not to disrupt the R session. On Unix-like systems, [crew_options_metrics\(\)](#) can specify `/dev/stdout` or `/dev/stderr` as the log files, which will redirect output to existing logs you are already using. [autometric::log_read\(\)](#) and [autometric::log_plot\(\)](#) can read and visualize resource usage data from multiple log files, even if those files are mixed with other messages.

Usage

```
crew_options_metrics(path = NULL, seconds_interval = 5)
```

Arguments

path Where to write resource metric log entries for workers. `path = NULL` disables logging. `path` equal to `"/dev/stdout"` (or `"/dev/stderr"`) sends log messages to the standard output (or standard error) streams, which is recommended on Unix-like systems because then output will go to the existing log files already configured for the controller, e.g. through [crew_options_local\(\)](#) in the case of [crew_controller_local\(\)](#). If `path` is not `NULL`, `"/dev/stdout"`, or `"/dev/stderr"`, it should be a directory path, in which case each worker instance will write to a new file in that directory.

After running enough tasks in crew, you can call [autometric::log_read\(path\)](#) to read all the data from all the log files in the files or directories at `path`, even if the logs files are mixed with other kinds of messages. Pass that data into [autometric::log_plot\(\)](#) to visualize it.

seconds_interval

Positive number, seconds between resource metric log entries written to `path`.

Value

A classed list of options for logging resource usage metrics.

See Also

Other options: [crew_options_local\(\)](#)

Examples

```
crew_options_metrics()
```

crew_queue	<i>Create a crew queue object.</i>
------------	------------------------------------

Description

Create an R6 crew queue object.

Usage

```
crew_queue(data = character(0L), step = 1000L)
```

Arguments

data	Character vector of initial queue data.
step	Positive integer with the number of elements to extend the queue on each call to the <code>extend()</code> method.

Details

A crew queue is a classical first-in-first-out data structure that extends itself in chunks (of size `step`) to avoid overhead. `crew` uses queues to efficiently track the names of resolved tasks and backlogged tasks.

Value

A queue object.

See Also

Other queue: [crew_class_queue](#)

crew_random_name	<i>Random name</i>
------------------	--------------------

Description

Generate a random string that can be used as a name for a worker or task.

Usage

```
crew_random_name(n = 12L)
```

Arguments

n	Number of bytes of information in the random string hashed to generate the name. Larger n is more likely to generate unique names, but it may be slower to compute.
---	---

Details

The randomness is not reproducible and cannot be set with e.g. `set.seed()` in R.

Value

A random character string.

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_eval\(\)](#), [crew_retry\(\)](#), [crew_terminate_process\(\)](#), [crew_terminate_signal\(\)](#), [crew_worker\(\)](#)

Examples

```
crew_random_name()
```

crew_relay	<i>Create a crew relay object.</i>
------------	------------------------------------

Description

Create an R6 crew relay object.

Usage

```
crew_relay(throttle = crew_throttle())
```

Arguments

throttle A [crew_throttle\(\)](#) object.

Details

A crew relay object keeps the signaling relationships among condition variables.

Value

An R6 crew relay object.

See Also

Other relay: [crew_class_relay](#)

Examples

```
crew_relay()
```

crew_retry	<i>Retry code.</i>
------------	--------------------

Description

Repeatedly retry a function while it keeps returning FALSE and exit the loop when it returns TRUE

Usage

```
crew_retry(  
  fun,  
  args = list(),  
  seconds_interval = 1,  
  seconds_timeout = 60,  
  max_tries = Inf,  
  error = TRUE,  
  message = character(0),  
  envir = parent.frame(),  
  assertions = TRUE  
)
```

Arguments

fun Function that returns FALSE to keep waiting or TRUE to stop waiting.

args A named list of arguments to fun.

seconds_interval Nonnegative numeric of length 1, number of seconds to wait between calls to fun.

seconds_timeout	Nonnegative numeric of length 1, number of seconds to loop before timing out.
max_tries	Maximum number of calls to fun to try before giving up.
error	Whether to throw an error on a timeout or max tries.
message	Character of length 1, optional error message if the wait times out.
envir	Environment to evaluate fun.
assertions	TRUE to run assertions to check if arguments are valid, FALSE otherwise. TRUE is recommended for users.

Value

NULL (invisibly).

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_eval\(\)](#), [crew_random_name\(\)](#), [crew_terminate_process\(\)](#), [crew_terminate_signal\(\)](#), [crew_worker\(\)](#)

Examples

```
crew_retry(fun = function() TRUE)
```

```
crew_terminate_process
```

Manually terminate a local process.

Description

Manually terminate a local process.

Usage

```
crew_terminate_process(pid)
```

Arguments

pid Integer of length 1, process ID to terminate.

Value

NULL (invisibly).

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_eval\(\)](#), [crew_random_name\(\)](#), [crew_retry\(\)](#), [crew_terminate_signal\(\)](#), [crew_worker\(\)](#)

Examples

```
if (identical(Sys.getenv("CREW_EXAMPLES"), "true")) {  
  process <- processx::process$new("sleep", "60")  
  process$is_alive()  
  crew_terminate_process(pid = process$get_pid())  
  process$is_alive()  
}
```

crew_terminate_signal *Get the termination signal.*

Description

Get a supported operating system signal for terminating a local process.

Usage

```
crew_terminate_signal()
```

Value

An integer of length 1: `tools::SIGTERM` if your platform supports `SIGTERM`. If not, then `crew_terminate_signal()` checks `SIGQUIT`, then `SIGINT`, then `SIGKILL`, and then returns the first signal it finds that your operating system can use.

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_eval\(\)](#), [crew_random_name\(\)](#), [crew_retry\(\)](#), [crew_terminate_process\(\)](#), [crew_worker\(\)](#)

Examples

```
crew_terminate_signal()
```

crew_throttle *Create a stateful throttling object.*

Description

Create an R6 object for throttling.

Usage

```
crew_throttle(  
  seconds_max = 1,  
  seconds_min = 0.001,  
  seconds_start = seconds_min,  
  base = 2  
)
```

Arguments

seconds_max	Positive numeric scalar, maximum throttling interval
seconds_min	Positive numeric scalar, minimum throttling interval.
seconds_start	Positive numeric scalar, the initial wait time interval in seconds. The default is min because there is almost always auto-scaling to be done when the controller is created. <code>reset()</code> always sets the current wait interval back to <code>seconds_start</code> .
base	Numeric scalar greater than 1, base of the exponential backoff algorithm. <code>increment()</code> multiplies the waiting interval by base and <code>decrement()</code> divides the waiting interval by base. The default base is 2, which specifies a binary exponential backoff algorithm.

Details

Throttling is a technique that limits how often a function is called in a given period of time. `crew_throttle()` objects support the `throttle` argument of controller methods, which ensures auto-scaling does not induce superfluous overhead. The throttle uses deterministic exponential backoff algorithm (https://en.wikipedia.org/wiki/Exponential_backoff) which increases wait times when there is nothing to do and decreases wait times when there is something to do. The controller decreases or increases the wait time with methods `accelerate()` and `decelerate()` in the throttle object, respectively, by dividing or multiplying by base (but keeping the wait time between `seconds_min` and `seconds_max`). In practice, `crew` calls `reset()` instead of `update()` in order to respond quicker to surges of activity (see the `update()` method).

Value

An R6 object with throttle configuration settings and methods.

See Also

Other throttle: `crew_class_throttle`

Examples

```
throttle <- crew_throttle(seconds_max = 1)  
throttle$poll()  
throttle$poll()
```


crew_tls

*Configure TLS.***Description**

Create an R6 object with transport layer security (TLS) configuration for crew.

Usage

```
crew_tls(
  mode = "none",
  key = NULL,
  password = NULL,
  certificates = NULL,
  validate = TRUE
)
```

Arguments

mode	<p>Character of length 1. Must be one of the following:</p> <ul style="list-style-type: none"> • "none": disable TLS configuration. • "automatic": let mirai create a one-time key pair with a self-signed certificate. • "custom": manually supply a private key pair, an optional password for the private key, a certificate, an optional revocation list.
key	<p>If mode is "none" or "automatic", then key is NULL. If mode is "custom", then key is a character of length 1 with the file path to the private key file.</p>
password	<p>If mode is "none" or "automatic", then password is NULL. If mode is "custom" and the private key is not encrypted, then password is still NULL. If mode is "custom" and the private key is encrypted, then password is a character of length 1 the the password of the private key. In this case, DO NOT SAVE THE PASSWORD IN YOUR R CODE FILES. See the keyring R package for solutions.</p>
certificates	<p>If mode is "none" or "automatic", then certificates is NULL. If mode is "custom", then certificates is a character vector of file paths to certificate files (signed public keys). If the certificate is self-signed or if it is directly signed by a certificate authority (CA), then only the certificate of the CA is needed. But if you have a whole certificate chain which begins at your own certificate and ends with the CA, then you can supply the whole certificate chain as a character vector which begins at your own certificate and ends with the certificate of the CA.</p>
validate	<p>Logical of length 1, whether to validate the configuration object on creation. If FALSE, then validate() can be called later on.</p>

Details

`crew_tls()` objects are input to the `tls` argument of `crew_client()`, `crew_controller_local()`, etc. See <https://wlandau.github.io/crew/articles/risks.html> for details.

Value

An R6 object with TLS configuration settings and methods.

See Also

Other `tls`: `crew_class_tls`

Examples

```
crew_tls(mode = "automatic")
```

<code>crew_worker</code>	<i>Crew worker.</i>
--------------------------	---------------------

Description

Launches a crew worker which runs a mirai daemon. Not a user-side function. Users should not call `crew_worker()` directly. See launcher plugins like `crew_launcher_local()` for examples.

Usage

```
crew_worker(
  settings,
  launcher,
  worker,
  options_metrics = crew::crew_options_metrics()
)
```

Arguments

<code>settings</code>	Named list of arguments to <code>mirai::daemon()</code> .
<code>launcher</code>	Character string, name of the launcher
<code>worker</code>	Character of length 1 to uniquely identify the current worker.
<code>options_metrics</code>	Either NULL to opt out of resource metric logging for workers, or an object from <code>crew_options_metrics()</code> to enable and configure resource metric logging for workers. For resource logging to run, the autometric R package version 0.1.0 or higher must be installed.

Value

NULL (invisibly)

See Also

Other utility: [crew_assert\(\)](#), [crew_clean\(\)](#), [crew_deprecate\(\)](#), [crew_eval\(\)](#), [crew_random_name\(\)](#), [crew_retry\(\)](#), [crew_terminate_process\(\)](#), [crew_terminate_signal\(\)](#)

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