

Package ‘progressr’

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Title An Inclusive, Unifying API for Progress Updates

Description A minimal, unifying API for scripts and packages to report progress updates from anywhere including when using parallel processing. The package is designed such that the developer can focus on what progress should be reported on without having to worry about how to present it. The end user has full control of how, where, and when to render these progress updates, e.g. in the terminal using `utils::txtProgressBar()`, `cli::cli_progress_bar()`, in a graphical user interface using `utils::winProgressBar()`, `tcltk::tkProgressBar()` or `shiny::withProgress()`, via the speakers using `beepr::beep()`, or on a file system via the size of a file. Anyone can add additional, customized, progression handlers. The 'progressr' package uses R's condition framework for signaling progress updated. Because of this, progress can be reported from almost anywhere in R, e.g. from classical for and while loops, from map-reduce API:s like the `lapply()` family of functions, 'purrr', 'plyr', and 'foreach'. It will also work with parallel processing via the 'future' framework, e.g. `'lapply(...)' |> futurize()` and `'purrr::map(...)' |> futurize()`, which uses `future.apply::future_lapply()` and `furrr::future_map()` internally. The package is compatible with Shiny applications.

License GPL (>= 3)

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handlers *Control How Progress is Reported*

Description

Control How Progress is Reported

Usage

```
handlers(
  ...,
  append = FALSE,
  on_missing = c("error", "warning", "ignore"),
  default = handler_txtprogressbar,
  global = NULL
)
```

Arguments

| | |
|------------|--|
| append | (logical) If FALSE, the specified progression handlers replace the current ones, otherwise they are appended to them. |
| on_missing | (character) If "error", an error is thrown if one of the progression handlers does not exist. If "warning", a warning is produced and the missing handler is ignored. If "ignore", the missing handler is ignored. |
| default | The default progression calling handler to use if none are set. |
| global | If TRUE, then the global progression handler is enabled. If FALSE, it is disabled. If NA, then TRUE is returned if it is enabled, otherwise FALSE. |
| ... | One or more progression handlers. Alternatively, this function also accepts a single vector of progression handlers as input. If this vector is empty, then an empty set of progression handlers will be set. |

Details

This function provides a convenient alternative for getting and setting option 'progressr.handlers'.

Value

(invisibly) the previous list of progression handlers set. If no arguments are specified, then the current set of progression handlers is returned. If `global` is specified, then TRUE is returned if the global progression handler is enabled, otherwise FALSE. If both `handlers` and `global` are specified, then the previous list of progression handlers is returned.

For package developers

IMPORTANT: Setting progression handlers is a privilege that should be left to the end user. It should not be used by R packages, whose only task is to *signal* progress updates, not to decide if, when, and how progress should be reported.

If you have to set or modify the progression handlers inside a function, please make sure to undo the settings afterward. If not, you will break whatever progression settings the user already has for other purposes used elsewhere. To undo your settings, you can do:

```
old_handlers <- handlers(c("beep", "progress"))
on.exit(handlers(old_handlers), add = TRUE)
```

Configuring progression handling during R startup

A convenient place to configure the default progression handler and to enable global progression reporting by default is in the ‘~/Rprofile’ startup file. For example, the following will (i) cause your interactive R session to use global progression handler by default, and (ii) report progress via the **progress** package when in the terminal and via the RStudio Jobs progress bar when in the RStudio Console. To configure this, add the following to your ‘~/Rprofile’ startup file:

```
if (interactive() && requireNamespace("progressr", quietly = TRUE)) {
  ## Enable global progression updates
  if (getRversion() >= 4) progressr::handlers(global = TRUE)

  ## In RStudio Console, or not?
  if (Sys.getenv("RSTUDIO") == "1" && !nzchar(Sys.getenv("RSTUDIO_TERM"))) {
    options(progressr.handlers = progressr::handler_rstudio)
  } else {
    options(progressr.handlers = progressr::handler_progress)
  }
}
```

Examples

```
handlers("txtprogressbar")
if (requireNamespace("beep", quietly = TRUE))
  handlers("beep", append = TRUE)

with_progress({ y <- slow_sum(1:5) })
print(y)

if (getRversion() >= "4.0.0") {

  handlers(global = TRUE)
  y <- slow_sum(1:4)
  z <- slow_sum(6:9)

  handlers(global = FALSE)
}
```

handler_ascii_alert *Progression Handler: Progress Reported as ASCII BEL Symbols (Audio or Blink) in the Terminal*

Description

A progression handler based on `cat("\a", file=stderr())`.

Usage

```

handler_ascii_alert(
  symbol = "\a",
  file = stderr(),
  intrusiveness = getOption("progressr.intrusiveness.audio", 5),
  target = c("terminal", "audio"),
  ...
)

```

Arguments

| | |
|---------------|---|
| symbol | (character string) The character symbol to be outputted, which by default is the ASCII BEL character (' <code>\a</code> ' = ' <code>\007</code> ') character. |
| file | (connection) A <code>base::connection</code> to where output should be sent. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| ... | Additional arguments passed to <code>make_progression_handler()</code> . |

Examples

```

handlers("ascii_alert")
with_progress({ y <- slow_sum(1:10) })
print(y)

```

 handler_beepr

Progression Handler: Progress Reported as 'beep' Sounds (Audio)

Description

A progression handler for `beepr::beep()`.

Usage

```

handler_beepr(
  initiate = 2L,
  update = 10L,
  finish = 11L,
  interrupt = 9L,
  intrusiveness = getOption("progressr.intrusiveness.audio", 5),
  target = "audio",
  ...
)

```

Arguments

initiate, update, finish, interrupt
 (integer) Indices of `beepr::beep()` sounds to play when progress starts, is updated, completes, or is interrupted. For silence, use `NA_integer_`.

intrusiveness (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user.

target (character vector) Specifies where progression updates are rendered.

... Additional arguments passed to `make_progression_handler()`.

Requirements

This progression handler requires the **beep** package.

Examples

```
if (requireNamespace("beep", quietly = TRUE)) {
  handlers("beep")
  with_progress({ y <- slow_sum(1:10) })
  print(y)
}
```

 handler_brrr

Progression Handler: Progress Reported as 'BRRR' Sounds (Audio)

Description

A progression handler for `skrrrahh()` of the **BRRR** package.

Usage

```
handler_brrr(
  initiate = "takeoff",
  update = "bigsean4",
  finish = "khaled3",
  interrupt = "busta",
  intrusiveness = getOption("progressr.intrusiveness.audio", 5),
  target = "audio",
  ...
)
```

Arguments

initiate, update, finish, interrupt
 (integer or character) Indices or names of `skrrrah()` sounds to play when progress starts, is updated, completes, or is interrupted. For silence, use `NA_integer_`.

intrusiveness (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user.

target (character vector) Specifies where progression updates are rendered.

... Additional arguments passed to `make_progression_handler()`.

Requirements

This progression handler requires the **BRRR** package, which is only available from <https://github.com/brooke-watson/BRRR>. This can be installed as `remotes::install_github("brooke-watson/BRRR")`.

Examples

```
pkg <- "BRRR"
if (requireNamespace(pkg, quietly = TRUE)) {

  handlers("brrr")
  with_progress({ y <- slow_sum(1:10) })
  print(y)

}
```

| | |
|-------------|--|
| handler_cli | <i>Progression Handler: Progress Reported via 'cli' Progress Bars (Text) in the Terminal</i> |
|-------------|--|

Description

A progression handler for `cli::cli_progress_bar()`.

Usage

```
handler_cli(
  show_after = 0,
  intrusiveness = getOption("progressr.intrusiveness.terminal", 1),
  target = "terminal",
  ...
)
```

Arguments

show_after (numeric) Number of seconds to wait before displaying the progress bar.

intrusiveness (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user.

target (character vector) Specifies where progression updates are rendered.

... Additional arguments passed to `cli::cli_progress_bar()` and `make_progression_handler()`.

Requirements

This progression handler requires the **cli** package.

Appearance

Below are a few examples on how to use and customize this progress handler. In all cases, we use `handlers(global = TRUE)`.

```
handlers("cli")
y <- slow_sum(1:25)
```

```
handlers(handler_cli(format = "{cli::pb_spin} {cli::pb_bar} {cli::pb_current}/{cli::pb_total} {cli::p
y <- slow_sum(1:25)
```

Examples

```
if (requireNamespace("cli", quietly = TRUE)) {
  handlers(handler_cli(format = "{cli::pb_spin} {cli::pb_bar} {cli::pb_percent} {cli::pb_status}"))
  with_progress({ y <- slow_sum(1:10) })
  print(y)
}
```

| | |
|---------------|---|
| handler_debug | <i>Progression Handler: Progress Reported as Debug Information (Text) in the Terminal</i> |
|---------------|---|

Description

Progression Handler: Progress Reported as Debug Information (Text) in the Terminal

Usage

```
handler_debug(
  interval = getOption("progressr.interval", 0),
  intrusiveness = getOption("progressr.intrusiveness.debug", 0),
  target = "terminal",
  uuid = FALSE,
  ...
)
```

Arguments

| | |
|---------------|---|
| interval | (numeric) The minimum time (in seconds) between successive progression updates from this handler. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| uuid | If TRUE, then the progressor UUID and the owner UUID are shown, otherwise not (default). |
| ... | Additional arguments passed to <code>make_progression_handler()</code> . |

Appearance

Below is how this progress handler renders by default at 0%, 30% and 99% progress:

With `handlers(handler_debug())`:

```
[21:27:11.236] (0.000s => +0.001s) initiate: 0/100 (+0) ' ' {clear=TRUE, enabled=TRUE, status=}
[21:27:11.237] (0.001s => +0.000s) update: 0/100 (+0) 'Starting' {clear=TRUE, enabled=TRUE, status=}
[21:27:14.240] (3.004s => +0.002s) update: 30/100 (+30) 'Importing' {clear=TRUE, enabled=TRUE, status=}
[21:27:16.245] (5.009s => +0.001s) update: 100/100 (+70) 'Summarizing' {clear=TRUE, enabled=TRUE, status=}
[21:27:16.246] (5.010s => +0.003s) update: 100/100 (+0) 'Summarizing' {clear=TRUE, enabled=TRUE, status=}
```

Examples

```
handlers("debug")
with_progress({ y <- slow_sum(1:10) })
print(y)
```

| | |
|------------------|--|
| handler_filesize | <i>Progression Handler: Progress Reported as the Size of a File on the File System</i> |
|------------------|--|

Description

Progression Handler: Progress Reported as the Size of a File on the File System

Usage

```
handler_filesize(
  file = "default.progress",
  intrusiveness = getOption("progressr.intrusiveness.file", 5),
  target = "file",
  enable = getOption("progressr.enable", TRUE),
  ...
)
```

Arguments

| | |
|---------------|---|
| file | (character) A filename. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| enable | (logical) If FALSE, then progress is not reported. |
| ... | Additional arguments passed to <code>make_progression_handler()</code> . |

Details

This progression handler reports progress by updating the size of a file on the file system. This provides a convenient way for an R script running in batch mode to report on the progress such that the user can peek at the file size (by default in 0-100 bytes) to assess the amount of the progress made, e.g. `ls -l -- *.progress`. If the `*.progress` file is accessible via for instance SSH, SFTP, FTPS, HTTPS, etc., then progress can be assessed from a remote location.

Examples

```
## Not run:
handlers(handler_filesize(file = "myscript.progress"))
with_progress(y <- slow_sum(1:100))
print(y)

## End(Not run)
```

| | |
|------------------|---|
| handler_notifier | <i>Progression Handler: Progress Reported via the Operating-System Notification Framework (GUI, Text)</i> |
|------------------|---|

Description

A progression handler for `notify()` of the **notifier** package.

Usage

```
handler_notifier(
  intrusiveness = getOption("progressr.intrusiveness.notifier", 10),
  target = "gui",
  ...
)
```

Arguments

| | |
|---------------|---|
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| ... | Additional arguments passed to <code>make_progression_handler()</code> . |

Requirements

This progression handler requires the **notifier** package, which is only available from <https://github.com/gaborcsardi/notifier>. This can be installed as `remotes::install_github("gaborcsardi/notifier@620`

Examples

```
pkg <- "notifier"
if (requireNamespace(pkg, quietly = TRUE)) {

  handlers("notifier")
  with_progress({ y <- slow_sum(1:10) })
  print(y)

}
```

| | |
|--------------|---|
| handler_ntfy | <i>Progression Handler: Progress Reported via the Ntfy.sh Messaging Service</i> |
|--------------|---|

Description

A progression handler for `ntfy::ntfy_send()` of the **ntfy** package, which sends notifications via the <https://ntfy.sh> framework.

Usage

```
handler_ntfy(
  intrusiveness = getOption("progressr.intrusiveness.ntfy", 5),
  target = "gui",
  ...,
  title = "Progress update from R"
)
```

Arguments

| | |
|----------------------------|--|
| <code>intrusiveness</code> | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| <code>target</code> | (character vector) Specifies where progression updates are rendered. |
| <code>title</code> | title of notification. See https://docs.ntfy.sh/publish/#message-title |
| <code>...</code> | Additional arguments passed to <code>make_progression_handler()</code> . |

Requirements

This progression handler requires the **ntfy** package.

Examples

```

pkg <- "ntfy"
if (requireNamespace(pkg, quietly = TRUE)) {
  ## We need to specify a ntfy.sh topic that progress messages
  ## should be sent to. See help("ntfy_topic", package = "ntfy")
  ## for details
  Sys.setenv(NTFY_TOPIC = "R-my-secret-topic")

  handlers("ntfy")
  with_progress({ y <- slow_sum(1:10) })
  print(y)
}

```

| | |
|----------------|---|
| handler_pbcoll | <i>Progression Handler: Progress Reported as an ANSI Background Color in the Terminal</i> |
|----------------|---|

Description

Progression Handler: Progress Reported as an ANSI Background Color in the Terminal

Usage

```

handler_pbcoll(
  adjust = 0,
  pad = 1L,
  complete = function(s) cli::bg_blue(cli::col_white(s)),
  incomplete = function(s) cli::bg_cyan(cli::col_white(s)),
  intrusiveness = getOption("progressr.intrusiveness.terminal", 1),
  target = "terminal",
  ...
)

```

Arguments

| | |
|----------------------|---|
| adjust | (numeric) The adjustment of the progress update, where <code>adjust = 0</code> positions the message to the very left, and <code>adjust = 1</code> positions the message to the very right. |
| pad | (integer) Amount of padding on each side of the message, where padding is done by spaces. |
| complete, incomplete | (function) Functions that take "complete" and "incomplete" strings that comprise the progress bar as input and annotate them to reflect their two different parts. The default is to annotation them with two different background colors and the same foreground color using the cli package. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |

target (character vector) Specifies where progression updates are rendered.
 ... Additional arguments passed to `make_progression_handler()`.

Requirements

This progression handler requires the **cli** package.

Appearance

Below are a few examples on how to use and customize this progress handler. In all cases, we use `handlers(global = TRUE)`.

```
handlers("pbcol")
y <- slow_sum(1:25)
```

```
handlers(handler_pbcol(adjust = 0.5))
y <- slow_sum(1:25)
```

```
handlers(handler_pbcol(
  adjust = 1,
  complete = function(s) cli::bg_red(cli::col_black(s)),
  incomplete = function(s) cli::bg_cyan(cli::col_black(s))
))
y <- slow_sum(1:25)
```

Examples

```
handlers(handler_pbcol)
with_progress({ y <- slow_sum(1:10) })
print(y)
```

| | |
|-------------------|--|
| handler_pbmcapply | <i>Progression Handler: Progress Reported via 'pbmcapply' Progress Bars (Text) in the Terminal</i> |
|-------------------|--|

Description

A progression handler for `pbmcapply::progressBar()`.

Usage

```
handler_pbmcapply(
  char = "=",
  substyle = 3L,
  style = "ETA",
  file = stderr(),
  intrusiveness = getOption("progressr.intrusiveness.terminal", 1),
  target = "terminal",
  ...
)
```

Arguments

| | |
|---------------|---|
| char | (character) The symbols to form the progress bar for <code>utils::txtProgressBar()</code> . |
| substyle | (integer) The progress-bar substyle according to <code>pbmapply::progressBar()</code> . |
| style | (character) The progress-bar style according to |
| file | (connection) A <code>base::connection</code> to where output should be sent. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| ... | Additional arguments passed to <code>pbmapply::progressBar()</code> and <code>make_progression_handler()</code> . |

Requirements

This progression handler requires the **pbmapply** package.

Appearance

Below are a few examples on how to use and customize this progress handler. In all cases, we use `handlers(global = TRUE)`. Since `style = "txt"` corresponds to using `handler_txtprogressbar()` with `style = substyle`, the main usage of this handler is with `style = "ETA"` (default) for which `substyle` is ignored.

```
handlers("pbmapply")
y <- slow_sum(1:25)
```

Examples

```
if (requireNamespace("pbmapply", quietly = TRUE)) {
  handlers("pbmapply")
  with_progress({ y <- slow_sum(1:10) })
  print(y)
}
```

| | |
|------------------|---|
| handler_progress | <i>Progression Handler: Progress Reported via 'progress' Progress Bars (Text) in the Terminal</i> |
|------------------|---|

Description

A progression handler for `progress::progress_bar()`.

Usage

```

handler_progress(
  format = ":spin [:bar] :percent :message",
  show_after = 0,
  intrusiveness = getOption("progressr.intrusiveness.terminal", 1),
  target = "terminal",
  ...
)

```

Arguments

| | |
|---------------|--|
| format | (character string) The format of the progress bar. |
| show_after | (numeric) Number of seconds to wait before displaying the progress bar. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| ... | Additional arguments passed to <code>progress::progress_bar()</code> and <code>make_progression_handler()</code> . |

Requirements

This progression handler requires the **progress** package.

Appearance

Below are a few examples on how to use and customize this progress handler. In all cases, we use `handlers(global = TRUE)`.

```

handlers("progress")
y <- slow_sum(1:25)

```

```

handlers(handler_progress(complete = "#"))
y <- slow_sum(1:25)

```

```

handlers(handler_progress(format = ":spin [:bar] :percent :message"))
y <- slow_sum(1:25)

```

```

handlers(handler_progress(format = ":percent [:bar] :eta :message"))
y <- slow_sum(1:25)

```

Examples

```

if (requireNamespace("progress", quietly = TRUE)) {
  handlers(handler_progress(format = ":spin [:bar] :percent :message"))
  with_progress({ y <- slow_sum(1:10) })
  print(y)
}

```

handler_rpushbullet *Progression Handler: Progress Reported via the Pushbullet Messaging Service*

Description

A progression handler for `RPushbullet::pbPost()` of the **RPushbullet** package.

Usage

```
handler_rpushbullet(
  intrusiveness = getOption("progressr.intrusiveness.rpushbullet", 5),
  target = "gui",
  ...,
  title = "Progress update from R",
  recipients = NULL,
  email = NULL,
  channel = NULL,
  apikey = NULL,
  devices = NULL
)
```

Arguments

| | |
|---------------|--|
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| title | The title of the note being posted. |
| recipients | A character or numeric vector indicating the devices this post should go to. If missing, the default device is looked up from an optional setting, and if none has been set the push is sent to all devices. |
| email | An alternative way to specify a recipient is to specify an email address. If both recipients and email are present, recipients is used. |
| channel | A channel tag used to specify the name of the channel as the recipient. If either recipients or email are present, they will take precedence over channel. |
| apikey | The API key used to access the service. It can be supplied as an argument here, via the global option <code>rpushbullet.key</code> , or via the file <code>~/rpushbullet.json</code> which is read at package initialization (and, if found, also sets the global option). |
| devices | The device to which this post is pushed. It can be supplied as an argument here, or via the file <code>~/rpushbullet.json</code> which is read at package initialization. |
| ... | Additional arguments passed to <code>make_progression_handler()</code> . |

Requirements

This progression handler requires the **RPushbullet** package, a Pushbullet account, and configuration according to the instructions of the **RPushbullet** package. It also requires internet access from the computer where this progress handler is registered.

Examples

```
pkg <- "RPushbullet"
if (requireNamespace(pkg, quietly = TRUE)) {

  handlers("rpushbullet")
  with_progress({ y <- slow_sum(1:10) })
  print(y)

}
```

handler_rstudio

Progression Handler: Progress Reported in the RStudio Console

Description

Progression Handler: Progress Reported in the RStudio Console

Usage

```
handler_rstudio(
  intrusiveness = getOption("progressr.intrusiveness.gui", 1),
  target = "gui",
  title = function() format(Sys.time(), "Console %X"),
  ...
)
```

Arguments

| | |
|---------------|--|
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| title | (character or a function) The "name" of the progressor, which is displayed in front of the progress bar. If a function, then the name is created dynamically by calling the function when the progressor is created. |
| ... | Additional arguments passed to make_progression_handler() . |

Requirements

This progression handler works only in the RStudio Console.

Use this progression handler by default

To use this handler by default whenever using the RStudio Console, add the following to your `~/Rprofile` startup file:

```
if (requireNamespace("progressr", quietly = TRUE)) {
  if (Sys.getenv("RSTUDIO") == "1" && !nzchar(Sys.getenv("RSTUDIO_TERM"))) {
    options(progressr.handlers = progressr::handler_rstudio)
  }
}
```

Examples

```
if (requireNamespace("rstudioapi", quietly = TRUE) && rstudioapi::isAvailable()) {

  handlers("rstudio")
  with_progress({ y <- slow_sum(1:10) })
  print(y)

}
```

 handler_slowdown

Progression Handler: Slow Down Progress Reporting

Description

Progression Handler: Slow Down Progress Reporting

Usage

```
handler_slowdown(
  duration = 10,
  intrusiveness = 0,
  target = "void",
  enable = getOption("progressr.enable", TRUE),
  ...
)
```

Arguments

| | |
|---------------|--|
| duration | (numeric) Added slowdown (in seconds) across all progress steps, e.g. if duration = 10.0 and steps = 100L, then each step unit is delayed 0.1 seconds, totaling a ten-second slowdown. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| enable | (logical) If FALSE, then progress is not reported. |
| ... | Additional arguments passed to make_progression_handler() . |

Details

This progression handler delays each progress step a certain number of seconds. It does not render any output.

Examples

```
## Not run:
handlers(handler_slowdown(duration = 30.0)) ## 30-second total slowdown
with_progress(y <- slow_sum(1:100))
print(y)

## End(Not run)
```

handler_tkprogressbar *Progression Handler: Progress Reported as a Tcl/Tk Progress Bars in the GUI*

Description

A progression handler for `tcltk::tkProgressBar()`.

Usage

```
handler_tkprogressbar(
  intrusiveness = getOption("progressr.intrusiveness.gui", 1),
  target = "terminal",
  inputs = list(title = NULL, label = "message"),
  ...
)
```

Arguments

| | |
|---------------|--|
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| inputs | (named list) Specifies from what sources the MS Windows progress elements 'title' and 'label' should be updated. Valid sources are "message", "sticky_message" and "non_sticky_message", where "message" is short for <code>c("non_sticky_message", "sticky_message")</code> . For example, <code>inputs = list(title = "sticky_message", label = "message")</code> will update the 'title' component from sticky messages only, whereas the 'label' component is updated using any message. |
| ... | Additional arguments passed to <code>tcltk::tkProgressBar()</code> and <code>make_progression_handler()</code> . |

Requirements

This progression handler requires the **tcltk** package and that the current R session supports Tcl/Tk (`capabilities("tcltk")`).

Examples

```

if (capabilities("tcltk") && requireNamespace("tcltk", quietly = TRUE)) {

  handlers("tkprogressbar")
  with_progress({ y <- slow_sum(1:10) })
  print(y)

}

```

handler_txtprogressbar

Progression Handler: Progress Reported as Plain Progress Bars (Text) in the Terminal

Description

A progression handler for `utils::txtProgressBar()`.

Usage

```

handler_txtprogressbar(
  char = "=",
  style = 3L,
  file = stderr(),
  intrusiveness = getOption("progressr.intrusiveness.terminal", 1),
  target = "terminal",
  ...
)

```

Arguments

| | |
|---------------|--|
| char | (character) The symbols to form the progress bar for <code>utils::txtProgressBar()</code> . Contrary to <code>txtProgressBar()</code> , this handler supports also ANSI-colored symbols. |
| style | (integer) The progress-bar style according to <code>utils::txtProgressBar()</code> . |
| file | (connection) A <code>base::connection</code> to where output should be sent. |
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| ... | Additional arguments passed to <code>utils::txtProgressBar()</code> and <code>make_progression_handler()</code> . |

Appearance

Below are a few examples on how to use and customize this progress handler. In all cases, we use `handlers(global = TRUE)`.

```
handlers("txtprogressbar")
y <- slow_sum(1:25)
```

```
handlers(handler_txtprogressbar(style = 1L))
y <- slow_sum(1:25)
```

```
handlers(handler_txtprogressbar(style = 3L))
y <- slow_sum(1:25)
```

```
handlers(handler_txtprogressbar(char = "#"))
y <- slow_sum(1:25)
```

```
handlers(handler_txtprogressbar(char = "<>"))
y <- slow_sum(1:25)
```

```
handlers(handler_txtprogressbar(char = cli::col_red(cli::symbol$heart)))
y <- slow_sum(1:25)
```

Examples

```
handlers("txtprogressbar")

with_progress({ y <- slow_sum(1:10) })
print(y)
```

| | |
|--------------|--|
| handler_void | <i>Progression Handler: No Progress Report</i> |
|--------------|--|

Description

Progression Handler: No Progress Report

Usage

```
handler_void(intrusiveness = 0, target = "void", enable = FALSE, ...)
```

Arguments

| | |
|---------------|---|
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| enable | (logical) If FALSE, then progress is not reported. |
| ... | Additional arguments passed to <code>make_progression_handler()</code> . |

Details

This progression handler gives not output - it is invisible and silent.

Examples

```
## Not run:
handlers(handler_void())
with_progress(y <- slow_sum(1:100))
print(y)

## End(Not run)
```

handler_winprogressbar

Progression Handler: Progress Reported as a MS Windows Progress Bars in the GUI

Description

A progression handler for winProgressBar() in the **utils** package.

Usage

```
handler_winprogressbar(
  intrusiveness = getOption("progressr.intrusiveness.gui", 1),
  target = "gui",
  inputs = list(title = NULL, label = "message"),
  ...
)
```

Arguments

| | |
|---------------|---|
| intrusiveness | (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. |
| target | (character vector) Specifies where progression updates are rendered. |
| inputs | (named list) Specifies from what sources the MS Windows progress elements 'title' and 'label' should be updated. Valid sources are "message", "sticky_message" and "non_sticky_message", where "message" is short for c("non_sticky_message", "sticky_message"). For example, inputs = list(title = "sticky_message", label = "message") will update the 'title' component from sticky messages only, whereas the 'label' component is updated using any message. |
| ... | Additional arguments passed to tcltk::winProgressBar() and make_progression_handler(). |

Requirements

This progression handler requires MS Windows.

Examples

```
## Not run:
handlers(handler_winprogressbar())
with_progress(y <- slow_sum(1:100))

## End(Not run)
```

progressor

Create a Progressor Function that Signals Progress Updates

Description

Create a Progressor Function that Signals Progress Updates

Usage

```
progressor(
  steps = length(along),
  along = NULL,
  offset = 0L,
  scale = 1L,
  transform = function(steps) scale * steps + offset,
  message = character(0L),
  label = NA_character_,
  trace = FALSE,
  initiate = TRUE,
  finalize = FALSE,
  auto_finish = TRUE,
  on_exit = !identical(envir, globalenv()),
  enable = getOption("progressr.enable", TRUE),
  envir = parent.frame()
)
```

Arguments

| | |
|---------------|--|
| steps | (integer) Number of progressing steps. |
| along | (vector; alternative) Alternative that sets steps = length(along). |
| offset, scale | (integer; optional) scale and offset applying the transform steps <- scale * steps + offset. |
| transform | (function; optional) A function that takes the effective number of steps as input and returns another finite and non-negative number of steps. |
| message | (character vector or a function) If a character vector, then it is pasted together into a single string using an empty separator. If a function, then the message is constructed by conditionMessage(p) calling this function with the progression condition p itself as the first argument. |

| | |
|----------------|---|
| label | (character) A label. |
| trace | (logical) If TRUE, then the call stack is recorded, otherwise not. |
| initiate | (logical) If TRUE, the progressor will signal a progression 'initiate' condition when created. |
| finalize | (logical) If TRUE, the progressor signals a progression 'shutdown' condition when finalized by the garbage collector. |
| auto_finish | (logical) If TRUE, then the progressor will signal a progression 'finish' condition as soon as the last step has been reached. |
| on_exit, envir | (logical) If TRUE, then the created progressor will signal a progression 'finish' condition when the calling frame exits. This is ignored if the calling frame (envir) is the global environment. |
| enable | (logical) If TRUE, progression conditions are signaled when calling the progressor function created by this function. If FALSE, no progression conditions is signaled because the progressor function is an empty function that does nothing. |

Details

A progressor function can only be created inside a local environment, e.g. inside a function, within a `local()` call, or within a `with_progress()` call. Notably, it *cannot* be created at the top level, e.g. immediately at the R prompt or outside a local environment in an R script. If attempted, an informative error message is produced, e.g.

```
> p <- progressr::progressor(100)
Error in progressr::progressor(100) :
  A progressor must not be created in the global environment unless
  wrapped in a with_progress() or without_progress() call. Alternatively,
  create it inside a function or in a local() environment to make sure
  there is a finite life span of the progressor
```

Value

A function of class `progressor`.

progressr

progressr: A Unifying API for Progress Updates

Description

The **progressr** package provides a minimal, unifying API for scripts and packages to report progress updates from anywhere including when using parallel processing.

Details

The package is designed such that *the developer* can focus on *what* progress should be reported on without having to worry about *how* to present it.

The *end user* has full control of *how*, *where*, and *when* to render these progress updates. For instance, they can choose to report progress in the terminal using `utils::txtProgressBar()` (default) or `cli::cli_progress_bar()`, via the R graphical user interface (GUI) using `utils::winProgressBar()` or `tcltk::tkProgressBar()`, or via the RStudio GUI using `rstudioapi::jobSetProgress()`. An alternative to above visual rendering, is to report progress as audio using `beepr::beep()` or `BRRR::skrrrahh()`. It is also possible to use a combination of above progression handlers, e.g. a progress bar in the terminal together with audio updates. Besides the existing handlers, it is possible to develop custom progression handlers.

The **progressr** package is compatible with **shiny** applications and **knitr** rendering.

The **progressr** package uses R's condition framework for signaling progress updated. Because of this, progress can be reported from almost anywhere in R, e.g. from classical for and while loops, from map-reduce APIs like the `lapply()` family of functions, **purrr**, **plyr**, and **foreach**. The **progressr** package will also work with parallel processing via the **future** framework, e.g. `future.apply::future_lapply()`, `furrr::future_map()`, and `foreach::foreach()` with **doFuture**.

Progression Handlers

In the terminal:

- `handler_txtprogressbar` (built-in; default)
- `handler_pbcoll` (built-in)
- `handler_ascii_alert` (built-in)
- `handler_pbmapply` (requires the **pbmapply** package)
- `handler_progress` (requires the **progress** package)

In a graphical user interface (GUI):

- `handler_rstudio` (only in the RStudio Console)
- `handler_tkprogressbar` (built-in)
- `handler_winprogressbar` (built-in)

As sound:

- `handler_ascii_alert` (built-in)
- `handler_beepr` (requires the **beep** package)
- `handler_brrr` (requires the **BRRR** package)

Via the file system:

- `handler_filesize` (built-in)

In Shiny:

- `withProgressShiny` (requires the **shiny** package)

Via notification systems:

- [handler_ntfy](#) (requires the **ntfy** package)
- [handler_notifier](#) (requires the non-CRAN **notifier** package)
- [handler_rpushbullet](#) (requires the **RPushBullet** package)

Miscellaneous:

- [handler_debug](#) (built-in)
- [handler_newline](#) (built-in)
- [handler_slowdown](#) (built-in)
- [handler_void](#) (built-in)

Author(s)

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See Also

Useful links:

- <https://progressr.futureverse.org>
- <https://github.com/futureverse/progressr>
- Report bugs at <https://github.com/futureverse/progressr/issues>

Examples

```
library(progressr)

xs <- 1:5

with_progress({
  p <- progressor(along = xs)
  y <- lapply(xs, function(x) {
    Sys.sleep(0.1)
    p(sprintf("x=%g", x))
    sqrt(x)
  })
})
```

progressr.options *Options and environment variables used by the 'progressr' packages*

Description

Below are environment variables and R options that are used by the **progressr** package. Below are all R options that are currently used by the **progressr** package.

WARNING: Note that the names and the default values of these options may change in future versions of the package. Please use with care until further notice.

Options for controlling progression reporting

`'progressr.handlers'`: (function or list of functions) Zero or more progression handlers that will report on any progression updates. If empty list, progress updates are ignored. If NULL, the default (`handler_txtprogressbar`) progression handlers is used. The recommended way to set this option is via `handlers()`. (Default: NULL)

Options for controlling progression handlers

`'progressr.clear'`: (logical) If TRUE, any output, typically visual, produced by a reporter will be cleared/removed upon completion, if possible. (Default: TRUE)

`'progressr.enable'`: (logical) If FALSE, then progress is not reported. (Default: TRUE in interactive mode, otherwise FALSE)

`'progressr.enable_after'`: (numeric) Delay (in seconds) before progression updates are reported. (Default: 0.0)

`'progressr.times'`: (numeric) The maximum number of times a handler should report progression updates. If zero, then progress is not reported. (Default: +Inf)

`'progressr.interval'`: (numeric) The minimum time (in seconds) between successive progression updates from this handler. (Default: 0.0)

`'progressr.intrusiveness'`: (numeric) A non-negative scalar on how intrusive (disruptive) the reporter to the user. This multiplicative scalar applies to the *interval* and *times* parameters. (Default: 1.0)

`'progressr.intrusiveness.audio'`: (numeric) intrusiveness for auditory progress handlers (Default: 5.0)

`'progressr.intrusiveness.file'`: (numeric) intrusiveness for file-based progress handlers (Default: 5.0)

`'progressr.intrusiveness.gui'`: (numeric) intrusiveness for graphical-user-interface progress handlers (Default: 1.0)

`'progressr.intrusiveness.notifier'`: (numeric) intrusiveness for progress handlers that creates notifications (Default: 10.0)

`'progressr.intrusiveness.terminal'`: (numeric) intrusiveness for progress handlers that outputs to the terminal (Default: 1.0)

`'progressr.intrusiveness.debug'`: (numeric) intrusiveness for "debug" progress handlers (Default: 0.0)

Options for controlling how standard output and conditions are relayed

`'progressr.delay_conditions'`: (character vector) condition classes to be captured and relayed at the end after any captured standard output is relayed. (Default: `c("condition")`)

`'progressr.delay_stdout'`: (logical) If TRUE, standard output is captured and relayed at the end just before any captured conditions are relayed. (Default: TRUE)

Options for controlling interrupts

`'progressr.interrupts'`: (logical) Controls whether interrupts should be detected or not. If FALSE, then interrupts are not detected and progress information is generated. (Default: TRUE)

`'progressr.delay_stdout'`: (logical) If TRUE, standard output is captured and relayed at the end just before any captured conditions are relayed. (Default: TRUE)

Options for debugging progression updates

`'progressr.debug'`: (logical) If TRUE, extensive debug messages are generated. (Default: FALSE)

Options for progressr examples and demos

`'progressr.demo.delay'`: (numeric) Delay (in seconds) between each iteration of `slow_sum()`. (Default: `1.0`)

Environment variables that set R options

Some of the above R `'progressr.*'` options can be set by corresponding environment variable `R_PROGRESSR_*` when the **progressr** package is loaded. For example, if `R_PROGRESSR_ENABLE = "true"`, then option `'progressr.enable'` is set to TRUE (logical). For example, if `R_PROGRESSR_ENABLE_AFTER = "2.0"`, then option `'progressr.enable_after'` is set to `2.0` (numeric).

See Also

To set R options when R starts (even before the **progressr** package is loaded), see the [Startup](#) help page. The **startup** package provides a friendly mechanism for configuring R at startup.

progress_progressr *Use Progressr with Plyr Map-Reduce Functions*

Description

A "progress bar" for **plyr**'s `.progress` argument.

Usage

```
progress_progressr(...)
```

Arguments

... Not used.

Value

A named `base::list` that can be passed as argument `.progress` to any of **plyr** function accepting that argument.

Limitations

One can use `doFuture::registerDoFuture()` to run **plyr** functions in parallel, e.g. `plyr::l_ply(..., .parallel = TRUE)`. Unfortunately, using `.parallel = TRUE` disables progress updates because, internally, **plyr** forces `.progress = "none"` whenever `.parallel = TRUE`. Thus, despite the **future** ecosystem and **progressr** would support it, it is not possible to run **dplyr** in parallel *and* get progress updates at the same time.

Examples

```
if (requireNamespace("plyr", quietly=TRUE)) {
  with_progress({
    y <- plyr::llply(1:10, function(x) {
      Sys.sleep(0.1)
      sqrt(x)
    }, .progress = "progressr")
  })
}
```

| | |
|-------------------|---|
| withProgressShiny | <i>Use Progressr in Shiny Apps: Plug-in Backward-Compatible Replacement for shiny::withProgress()</i> |
|-------------------|---|

Description

A plug-in, backward-compatible replacement for `shiny::withProgress()`.

Usage

```
withProgressShiny(
  expr,
  ...,
  message = NULL,
  detail = NULL,
  inputs = list(message = NULL, detail = "message"),
  env = parent.frame(),
  quoted = FALSE,
```

```
handlers = c(shiny = handler_shiny, progressr::handlers(default = NULL))
)
```

Arguments

`expr, ..., env`, quoted
Arguments passed to `shiny::withProgress()` as is.

`message, detail` (character string) The message and the detail message to be passed to `shiny::withProgress()`.

`inputs` (named list) Specifies from what sources the Shiny progress elements 'message' and 'detail' should be updated. Valid sources are "message", "sticky_message" and "non_sticky_message", where "message" is short for `c("non_sticky_message", "sticky_message")`. For example, `inputs = list(message = "sticky_message", detail = "message")` will update the Shiny 'message' component from sticky messages only, whereas the 'detail' component is updated using any message.

`handlers` Zero or more progression handlers used to report on progress.

Value

The value of `shiny::withProgress`.

Requirements

This function requires the **shiny** package and will use the `handler_shiny()` **progressr** handler internally to report on updates.

Examples

```
library(shiny)
library(progressr)

app <- shinyApp(
  ui = fluidPage(
    plotOutput("plot")
  ),
  server = function(input, output) {
    output$plot <- renderPlot({
      X <- 1:15
      withProgressShiny(message = "Calculation in progress",
                        detail = "Starting ...",
                        value = 0, {
        p <- progressor(along = X)
        y <- lapply(X, FUN=function(x) {
          Sys.sleep(0.25)
          p(sprintf("x=%d", x))
        })
      })
    })
  }
)

plot(cars)

## Terminate the Shiny app
```

```

        Sys.sleep(1.0)
        stopApp(returnValue = invisible())
    })
}
)

local({
  oopts <- options(device.ask.default = FALSE)
  on.exit(options(oopts))
  if (interactive()) print(app)
})

```

with_progress

Report on Progress while Evaluating an R Expression

Description

Report on Progress while Evaluating an R Expression

Usage

```

with_progress(
  expr,
  handlers = progressr::handlers(),
  cleanup = TRUE,
  delay_terminal = NULL,
  delay_stdout = NULL,
  delay_conditions = NULL,
  interrupts = getOption("progressr.interrupts", TRUE),
  interval = NULL,
  enable = NULL
)

without_progress(expr)

```

Arguments

| | |
|----------------|---|
| expr | An R expression to evaluate. |
| handlers | A progression handler or a list of them. If NULL or an empty list, progress updates are ignored. |
| cleanup | If TRUE, all progression handlers will be shutdown at the end regardless of whether the progression is complete or not. |
| delay_terminal | If TRUE, output and conditions that may end up in the terminal will be delayed. |
| delay_stdout | If TRUE, standard output is captured and relayed at the end just before any captured conditions are relayed. |

| | |
|------------------|--|
| delay_conditions | A character vector specifying <code>base::condition</code> classes to be captured and relayed at the end after any captured standard output is relayed. |
| interrupts | Controls whether interrupts should be detected or not. If TRUE and an interrupt is signaled, progress handlers are asked to report on the current amount of progress when the evaluation was terminated by the interrupt, e.g. when a user pressed Ctrl-C in an interactive session, or a batch process was interrupted because it ran out of time. Note that it's optional for a progress handler to support this and only some do. |
| interval | (numeric) The minimum time (in seconds) between successive progression updates from handlers. |
| enable | (logical) If FALSE, then progress is not reported. The default is to report progress in interactive mode but not batch mode. See below for more details. |

Details

If you are writing a Shiny app, use the `withProgressShiny()` function instead of this one.

If the global progression handler is enabled, it is temporarily disabled while evaluating the expression.

If a progression condition causes the progressor to be completed ("reaches 100%"), then `with_progress()` will muffle the progression condition preventing it from reaching, say, any global condition handlers.

IMPORTANT: This function is meant for end users only. It should not be used by R packages, whose only task is to *signal* progress updates, not to decide if, when, and how progress should be reported.

`without_progress()` evaluates an expression while ignoring all progress updates.

Value

Returns the value of the expression.

Progression handler functions

Formally, progression handlers are calling handlers that are called when a `progression` condition is signaled. These handlers are functions that take one argument which is the `progression` condition.

Progress updates in batch mode

When running R from the command line, R runs in a non-interactive mode (`interactive()` returns FALSE). The default behavior of `with_progress()` is to *not* report on progress in non-interactive mode. To have progress being reported also then, set R options 'progressr.enable' or environment variable `R_PROGRESSR_ENABLE` to TRUE. Alternatively, one can set argument `enable=TRUE` when calling `with_progress()`. For example,

```
$ Rscript -e "library(progressr)" -e "with_progress(slow_sum(1:5))"
```

will *not* report on progress, whereas:

```
$ export R_PROGRESSR_ENABLE=TRUE
$ Rscript -e "library(progressr)" -e "with_progress(slow_sum(1:5))"
```

will.

See Also

For Shiny apps, use `withProgressShiny()` instead of this function. Internally, this function is built around `base::withCallingHandlers()`.

Examples

```
## The slow_sum() example function
slow_sum <- progressr::slow_sum
print(slow_sum)

x <- 1:10

## Without progress updates
y <- slow_sum(x)

## Progress reported via txtProgressBar (default)
handlers("txtprogressbar") ## default
with_progress({
  y <- slow_sum(x)
})

## Progress reported via tcltk::tkProgressBar
if (capabilities("tcltk") && requireNamespace("tcltk", quietly = TRUE)) {
  handlers("tkprogressbar")
  with_progress({
    y <- slow_sum(x)
  })
}

## Progress reported via progress::progress_bar
if (requireNamespace("progress", quietly = TRUE)) {
  handlers("progress")
  with_progress({
    y <- slow_sum(x)
  })
}

## Progress reported via txtProgressBar and beep::beep
if (requireNamespace("beep", quietly = TRUE)) {
  handlers("beep", "txtprogressbar")
  with_progress({
    y <- slow_sum(x)
  })
}
```

```
## Progress reported via customized utils::txtProgressBar and beep::beep,  
## if available.  
handlers(handler_txtprogressbar(style = 3L))  
if (requireNamespace("beep", quietly = TRUE)) {  
  handlers("beep", append = TRUE)  
}  
  
with_progress({  
  y <- slow_sum(1:30)  
})
```

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