

Package: transltr (via r-universe)

February 16, 2025

Title Support Many Languages in R

Version 0.1.0

Description An object model for source text and translations. Find and extract translatable strings. Provide translations and seamlessly retrieve them at runtime.

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URL <https://transltr.ununoctium.dev>

BugReports <https://github.com/jeanmathieupotvin/transltr/issues>

Encoding UTF-8

Language en

Roxygen list(markdown = TRUE, r6 = TRUE)

RoxygenNote 7.3.2

Config/testthat/edition 3

Depends R (>= 4.3)

Imports digest, R6, stringi, utils, yaml

Suggests covr, devtools, lifecycle, microbenchmark, pkgdown, testthat (>= 3.0.0), usethis, withr

Collate 'aaa.R' 'assert.R' 'class-location.R' 'class-text.R' 'class-translator.R' 'find-source-in-exprs.R' 'find-source.R' 'flat.R' 'hash.R' 'language.R' 'normalize.R' 'serialize.R' 'text-io.R' 'translator-io.R' 'transltr-package.R' 'utils-format-vector.R' 'utils-map.R' 'utils-nullish-op.R' 'utils-stop.R' 'utils-strings.R' 'uuid.R' 'zzz.R'

Config/pak/sysreqs libicu-dev

Repository <https://jeanmathieupotvin.r-universe.dev>

RemoteUrl <https://github.com/jeanmathieupotvin/transltr>

RemoteRef HEAD

RemoteSha 2a220b4f0c3bc9bbb5fb56a03c3e919d000f35a7

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find_source	<i>Find Source Text</i>
-------------	-------------------------

Description

Find and extract source text that must be translated.

Usage

```
find_source(
  path = ".",
  encoding = "UTF-8",
  verbose = getOption("transltr.verbose", TRUE),
  tr = translator(),
  interface = NULL
)
```

```
find_source_in_files(
  paths = character(),
  encoding = "UTF-8",
  verbose = getOption("transltr.verbose", TRUE),
  algorithm = algorithms(),
  interface = NULL
)
```

Arguments

path	A non-empty and non-NA character string. A path to a directory containing R source scripts. All subdirectories are searched. Files that do not have a .R, or .Rprofile extension are skipped.
encoding	A non-empty and non-NA character string. The source character encoding. In almost all cases, this should be UTF-8. Other encodings are internally re-encoded to UTF-8 for portability.
verbose	A non-NA logical value. Should progress information be reported?
tr	A Translator object.
interface	A name , a call object, or a NULL. A reference to an alternative (custom) function used to translate text. If a call object is passed to interface, it must be of operator <code>::</code> . Calls to method Translator\$translate() are ignored and calls to interface are extracted instead. See Details below.

paths	A character vector of non-empty and non-NA values. A set of paths to R source scripts that must be searched.
algorithm	A non-empty and non-NA character string equal to "sha1", or "utf8". The algorithm to use when hashing source information for identification purposes.

Details

`find_source()` and `find_source_in_files()` look for calls to method `Translator$translate()` in R scripts and convert them to `Text` objects. The former further sets these resulting objects into a `Translator` object. See argument `tr`.

`find_source()` and `find_source_in_files()` work on a purely lexical basis. The source code is parsed but never evaluated (aside from extracted literal character vectors).

- The underlying `Translator` object is never evaluated and does not need to exist (placeholders may be used in the source code).
- Only **literal** character vectors can be passed to arguments of method `Translator$translate()`.

Interfaces:

In some cases, it may not be desirable to call method `Translator$translate()` directly. A custom function wrapping (*interfacing*) this method may always be used as long as it has the same **signature** as method `Translator$translate()`. In other words, it must minimally have two formal arguments: `...` and `source_lang`.

Custom interfaces must be passed to `find_source()` and `find_source_in_files()` for extraction purposes. Since these functions work on a lexical basis, interfaces can be placeholders in the source code (non-existent bindings) at the time these functions are called. However, they must be bound to a function (ultimately) calling `Translator$translate()` at runtime.

Custom interfaces are passed to `find_source()` and `find_source_in_files()` as `name` or `call` objects in a variety of ways. The most straightforward way is to use `base::quote()`. See Examples below.

Methodology:

`find_source()` and `find_source_in_files()` go through these steps to extract source text from a single R script.

1. It is read with `text_read()` and re-encoded to UTF-8 if necessary.
2. It is parsed with `parse()` and underlying tokens are extracted from parsed expressions with `utils::getParseData()`.
3. Each expression (`expr`) token is converted to language objects with `str2lang()`. Parsing errors and invalid expressions are silently skipped.
4. Valid `call` objects stemming from step 3 are filtered with `is_source()`.
5. Calls to method `Translator$translate()` or to interface stemming from step 4 are coerced to `Text` objects with `as_text()`.

These steps are repeated for each R script. `find_source()` further merges all resulting `Text` objects into a coherent set with `merge_texts()` (identical source code is merged into single `Text` entities).

Extracted character vectors are always normalized for consistency (at step 5). See `normalize()` for more information.

Limitations:

The current version of `transltr` can only handle **literal** character vectors. This means it cannot resolve non-trivial expressions that depends on a *state*. All values passed to argument `...` of method `Translator$translate()` must yield character vectors (trivially).

Value

`find_source()` returns an R6 object of class `Translator`. If an existing `Translator` object is passed to `tr`, it is modified in place and returned.

`find_source_in_files()` returns a list of `Text` objects. It may contain duplicated elements, depending on the extracted contents.

See Also

`Translator`, `Text`, `normalize()`, `translator_read()`, `translator_write()`, `base::quote()`, `base::call()`, `base::as.name()`

Examples

```
# Create a directory containing dummy R scripts for illustration purposes.
temp_dir <- file.path(tempdir(TRUE), "find-source")
temp_files <- file.path(temp_dir, c("ex-script-1.R", "ex-script-2.R"))
dir.create(temp_dir, showWarnings = FALSE, recursive = TRUE)

cat(
  "tr$translate('Hello, world!')",
  "tr$translate('Farewell, world!')",
  sep = "\n",
  file = temp_files[[1L]])
cat(
  "tr$translate('Hello, world!')",
  "tr$translate('Farewell, world!')",
  sep = "\n",
  file = temp_files[[2L]])

# Extract calls to method Translator$translate().
find_source(temp_dir)
find_source_in_files(temp_files)

# Use custom functions.
# For illustrations purposes, assume the package
# exports an hypothetical translate() function.
cat(
  "translate('Hello, world!')",
  "transtlr::translate('Farewell, world!')",
  sep = "\n",
  file = temp_files[[1L]])
cat(
  "translate('Hello, world!')",
  "transltr::translate('Farewell, world!')",
  sep = "\n",
```

```

file = temp_files[[2L]])

# Extract calls to translate() and transltr::translate().
# Since find_source() and find_source_in_files() work on
# a lexical basis, these are always considered to be two
# distinct functions. They also don't need to exist in the
# R session calling find_source() and find_source_in_files().
find_source(temp_dir, interface = quote(translate))
find_source_in_files(temp_files, interface = quote(transltr::translate))

```

language_set

Get or Set Language

Description

Get or set the current, and source languages.

They are registered as environment variables named `TRANSLTR_LANGUAGE`, and `TRANSLTR_SOURCE_LANGUAGE`.

Usage

```
language_set(lang = "en")
```

```
language_get()
```

```
language_source_set(lang = "en")
```

```
language_source_get()
```

Arguments

lang	A non-empty and non-NA character string. The underlying language. A language is usually a code (of two or three letters) for a native language name. While users retain full control over codes, it is best to use language codes stemming from well-known schemes such as IETF BCP 47 , or ISO 639-1 to maximize portability and cross-compatibility.
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Details

The language and the source language can always be temporarily changed. See argument `lang` of method `Translator$translate()` for more information.

The underlying locale is left as is. To change an R session's locale, use `Sys.setlocale()` or `Sys.setLanguage()` instead. See below for more information.

Value

`language_set()`, and `language_source_set()` return `NULL`, invisibly. They are used for their side-effect of setting environment variables `TRANSLTR_LANGUAGE` and `TRANSLTR_SOURCE_LANGUAGE`, respectively.

`language_get()` returns a character string. It is the current value of environment variable `TRANSLTR_LANGUAGE`. It is empty if the latter is unset.

`language_source_get()` returns a character string. It is the current value of environment variable `TRANSLTR_SOURCE_LANGUAGE`. It returns `"en"` if the latter is unset.

Locales versus languages

A **locale** is a set of multiple low-level settings that relate to the user's language and region. The *language* itself is just one parameter among many others.

Modifying a locale on-the-fly *can* be considered risky in some situations. It may not be the optimal solution for merely changing textual representations of a program or an application at runtime, as it may introduce unintended changes and induce subtle bugs that are harder to fix.

Moreover, it makes sense for some applications and/or programs such as **Shiny applications** to decouple the front-end's current language (what *users* see) from the back-end's locale (what *developers* see). A UI may be displayed in a certain language while keeping logs and R internal messages, warnings, and errors as is.

Consequently, the language setting of `transltr` is purposely kept separate from the underlying locale and removes the complexity of having to support many of them. Users can always change both the locale and the language parameter of the package. See Examples.

Note

Environment variables are used because they can be shared among different processes. This matters when using parallel and/or concurrent R sessions. It can further be shared among direct and transitive dependencies (other packages that rely on `transltr`).

Examples

```
# Change the language parameters (globally).
language_source_set("en")
language_set("fr")

language_source_get() ## Outputs "en"
language_get()       ## Outputs "fr"

# Change both the language parameter and the locale.
# Note that while users control how languages are named
# for language_set(), they do not for Sys.setLanguage().
language_set("fr")
Sys.setLanguage("fr-CA")

# Reset settings.
language_source_set(NULL)
language_set(NULL)
```

```
# Source language has a default value.
language_source_get() ## Outputs "en"
```

translator	<i>Source Text and Translations</i>
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Description

Structure and manipulate the source text of a project and its translations.

Usage

```
translator(..., id = uuid(), algorithm = algorithms())

is_translator(x)

## S3 method for class 'Translator'
format(x, ...)

## S3 method for class 'Translator'
print(x, ...)
```

Arguments

...	Usage depends on the underlying function. <ul style="list-style-type: none"> Any number of Text objects and/or named character strings for translator() (in no preferred order). Further arguments passed to or from other methods for format(), and print().
id	A non-empty and non-NA character string. A globally unique identifier for the Translator object. Beware of collisions when using user-defined values.
algorithm	A non-empty and non-NA character string equal to "sha1", or "utf8". The algorithm to use when hashing source information for identification purposes.
x	Any R object.

Details

A [Translator](#) object encapsulates the source text of a project (or any other *context*) and all related translations. Under the hood, [Translator](#) objects are collections of [Text](#) objects. These do most of the work. They are treated as lower-level component and in typical situations, users rarely interact with them.

[Translator](#) objects can be saved and exported with [translator_write\(\)](#). They can be imported back into an R session with [translator_read\(\)](#).

Value

`translator()` returns an R6 object of class `Translator`.

`is_translator()` returns a logical value.

`format()` returns a character vector.

`print()` returns argument `x` invisibly.

Active bindings

`id` A non-empty and non-NA character string. A globally unique identifier for the underlying object. Beware of plausible collisions when using user-defined values.

`algorithm` A non-empty and non-NA character string equal to "sha1", or "utf8". The algorithm to use when hashing source information for identification purposes.

`hashes` A character vector of non-empty and non-NA values, or NULL. The set of all hash exposed by registered `Text` objects. If there is none, `hashes` is NULL. This is a **read-only** field updated whenever field `algorithm` is updated.

`source_texts` A character vector of non-empty and non-NA values, or NULL. The set of all registered source texts. If there is none, `source_texts` is NULL. This is a **read-only** field.

`source_langs` A character vector of non-empty and non-NA values, or NULL. The set of all registered source languages. This is a **read-only** field.

- If there is none, `source_langs` is NULL.
- If there is one unique value, `source_langs` is an unnamed character string.
- Otherwise, it is a named character vector.

`languages` A character vector of non-empty and non-NA values, or NULL. The set of all registered languages (codes). If there is none, `languages` is NULL. This is a **read-only** field.

`native_languages` A named character vector of non-empty and non-NA values, or NULL. A map (bijection) of languages (codes) to native language names. Names are codes and values are native languages. If there is none, `native_languages` is NULL.

While users retain full control over `native_languages`, it is best to use well-known schemes such as [IETF BCP 47](#), or [ISO 639-1](#). Doing so maximizes portability and cross-compatibility between packages.

Update this field with method `$set_native_languages()`. See below for more information.

Methods**Public methods:**

- `Translator$new()`
- `Translator$translate()`
- `Translator$get_translation()`
- `Translator$get_text()`
- `Translator$set_text()`
- `Translator$set_texts()`
- `Translator$rm_text()`
- `Translator$set_native_languages()`

- [Translator\\$set_default_value\(\)](#)

Method `new()`: Create a [Translator](#) object.

Usage:

```
Translator$new(id = uuid(), algorithm = algorithms())
```

Arguments:

`id` A non-empty and non-NA character string. A globally unique identifier for the [Translator](#) object. Beware of collisions when using user-defined values.

`algorithm` A non-empty and non-NA character string equal to "sha1", or "utf8". The algorithm to use when hashing source information for identification purposes.

Returns: An R6 object of class [Translator](#).

Examples:

```
# Consider using translator() instead.
tr <- Translator$new()
```

Method `translate()`: Translate source text.

Usage:

```
Translator$translate(
  ...,
  lang = language_get(),
  source_lang = language_source_get()
)
```

Arguments:

... Any number of vectors containing [atomic](#) elements. Each vector is normalized as a paragraph.

- Elements are coerced to character values.
- NA values and empty strings are discarded.
- Multi-line strings are supported and encouraged. Blank lines are interpreted (two or more newline characters) as paragraph separators.

`lang` A non-empty and non-NA character string. The underlying language.

A language is usually a code (of two or three letters) for a native language name. While users retain full control over codes, it is best to use language codes stemming from well-known schemes such as [IETF BCP 47](#), or [ISO 639-1](#) to maximize portability and cross-compatibility.

`source_lang` A non-empty and non-NA character string. The language of the source text. See argument `lang` for more information.

Details: See [normalize\(\)](#) for further details on how ... is normalized.

Returns: A character string. If there is no corresponding translation, the value passed to method [\\$set_default_value\(\)](#) is returned. NULL is returned by default.

Examples:

```
tr <- Translator$new()
tr$set_text(en = "Hello, world!", fr = "Bonjour, monde!")
tr$translate("Hello, world!", lang = "en") ## Outputs "Hello, world!"
tr$translate("Hello, world!", lang = "fr") ## Outputs "Bonjour, monde!"
```

Method `get_translation()`: Extract a translation or a source text.

Usage:

```
Translator$get_translation(hash = "", lang = "")
```

Arguments:

`hash` A non-empty and non-NA character string. The unique identifier of the requested source text.

`lang` A non-empty and non-NA character string. The underlying language.

A language is usually a code (of two or three letters) for a native language name. While users retain full control over codes, it is best to use language codes stemming from well-known schemes such as [IETF BCP 47](#), or [ISO 639-1](#) to maximize portability and cross-compatibility.

Returns: A character string. If there is no corresponding translation, the value passed to method `$set_default_value()` is returned. NULL is returned by default.

Examples:

```
tr <- Translator$new()
tr$set_text(en = "Hello, world!")

# Consider using translate() instead.
tr$get_translation("256e0d7", "en") ## Outputs "Hello, world!"
```

Method `get_text()`: Extract a source text and its translations.

Usage:

```
Translator$get_text(hash = "")
```

Arguments:

`hash` A non-empty and non-NA character string. The unique identifier of the requested source text.

Returns: A [Text](#) object, or NULL.

Examples:

```
tr <- Translator$new()
tr$set_text(en = "Hello, world!")

tr$get_translation("256e0d7", "en") ## Outputs "Hello, world!"
```

Method `set_text()`: Register a source text.

Usage:

```
Translator$set_text(..., source_lang = language_source_get())
```

Arguments:

`...` Passed as is to `text()`.

`source_lang` Passed as is to `text()`.

Returns: A NULL, invisibly.

Examples:

```
tr <- Translator$new()

tr$set_text(en = "Hello, world!", location())
```

Method `set_texts()`: Register one or more source texts.

Usage:

```
Translator$set_texts(...)
```

Arguments:

... Any number of `Text` objects.

Details: This method calls `merge_texts()` to merge all values passed to ... together with previously registered `Text` objects. The underlying registered source texts, translations, and `Location` objects won't be duplicated.

Returns: A NULL, invisibly.

Examples:

```
# Set source language.
language_source_set("en")

tr <- Translator$new()

# Create Text objects.
txt1 <- text(
  location("a", 1L, 2L, 3L, 4L),
  en = "Hello, world!",
  fr = "Bonjour, monde!")

txt2 <- text(
  location("b", 5L, 6L, 7L, 8L),
  en = "Farewell, world!",
  fr = "Au revoir, monde!")

tr$set_texts(txt1, txt2)
```

Method `rm_text()`: Remove a registered source text.

Usage:

```
Translator$rm_text(hash = "")
```

Arguments:

hash A non-empty and non-NA character string identifying the source text to remove.

Returns: A NULL, invisibly.

Examples:

```
tr <- Translator$new()
tr$set_text(en = "Hello, world!")

tr$rm_text("256e0d7")
```

Method `set_native_languages()`: Map a language code to a native language name.

Usage:

```
Translator$set_native_languages(...)
```

Arguments:

... Any number of named, non-empty, and non-NA character strings. Names are codes and values are native languages. See field `native_languages` for more information.

Returns: A NULL, invisibly.

Examples:

```
tr <- Translator$new()

tr$set_native_languages(en = "English", fr = "Français")

# Remove existing entries.
tr$set_native_languages(fr = NULL)
```

Method `set_default_value()`: Register a default value to return when there is no corresponding translations for the requested language.

Usage:

```
Translator$set_default_value(value = NULL)
```

Arguments:

`value` A NULL or a non-NA character string. It can be empty. The former is returned by default.

Details: This modifies what methods `$translate()` and `$get_translation()` returns when there is no translation for `lang`.

Returns: A NULL, invisibly.

Examples:

```
tr <- Translator$new()
tr$set_default_value("<unavailable>")
```

See Also

[find_source\(\)](#), [translator_read\(\)](#), [translator_write\(\)](#)

Examples

```
# Set source language.
language_source_set("en")

# Create a Translator object.
# This would normally be done automatically
# by find_source(), or translator_read().
tr <- translator(
  id = "test-translator",
  en = "English",
  es = "Español",
  fr = "Français",
  text(
    location("a", 1L, 2L, 3L, 4L),
```

```

    en = "Hello, world!",
    fr = "Bonjour, monde!"),
text(
  location("b", 1L, 2L, 3L, 4L),
  en = "Farewell, world!",
  fr = "Au revoir, monde!"))

is_translator(tr)

# Translator objects has a specific format.
# print() calls format() internally, as expected.
print(tr)

## -----
## Method `Translator$new`
## -----

# Consider using translator() instead.
tr <- Translator$new()

## -----
## Method `Translator$translate`
## -----

tr <- Translator$new()
tr$set_text(en = "Hello, world!", fr = "Bonjour, monde!")
tr$translate("Hello, world!", lang = "en") ## Outputs "Hello, world!"
tr$translate("Hello, world!", lang = "fr") ## Outputs "Bonjour, monde!"

## -----
## Method `Translator$get_translation`
## -----

tr <- Translator$new()
tr$set_text(en = "Hello, world!")

# Consider using translate() instead.
tr$get_translation("256e0d7", "en") ## Outputs "Hello, world!"

## -----
## Method `Translator$get_text`
## -----

tr <- Translator$new()
tr$set_text(en = "Hello, world!")

tr$get_translation("256e0d7", "en") ## Outputs "Hello, world!"

## -----
## Method `Translator$set_text`
## -----

```

```

tr <- Translator$new()

tr$set_text(en = "Hello, world!", location())

## -----
## Method `Translator$set_texts`
## -----

# Set source language.
language_source_set("en")

tr <- Translator$new()

# Create Text objects.
txt1 <- text(
  location("a", 1L, 2L, 3L, 4L),
  en = "Hello, world!",
  fr = "Bonjour, monde!")

txt2 <- text(
  location("b", 5L, 6L, 7L, 8L),
  en = "Farewell, world!",
  fr = "Au revoir, monde!")

tr$set_texts(txt1, txt2)

## -----
## Method `Translator$rm_text`
## -----

tr <- Translator$new()
tr$set_text(en = "Hello, world!")

tr$rm_text("256e0d7")

## -----
## Method `Translator$set_native_languages`
## -----

tr <- Translator$new()

tr$set_native_languages(en = "English", fr = "Français")

# Remove existing entries.
tr$set_native_languages(fr = NULL)

## -----
## Method `Translator$set_default_value`
## -----

tr <- Translator$new()
tr$set_default_value("<unavailable>")

```

translator_read	<i>Read and Write Translations</i>
-----------------	------------------------------------

Description

Export `Translator` objects to text files and import such files back into R as `Translator` objects.

Usage

```
translator_read(
  path = getOption("transltr.path"),
  encoding = "UTF-8",
  verbose = getOption("transltr.verbose", TRUE),
  translations = TRUE
)

translator_write(
  tr = translator(),
  path = getOption("transltr.path"),
  overwrite = FALSE,
  verbose = getOption("transltr.verbose", TRUE),
  translations = TRUE
)

translations_read(path = "", encoding = "UTF-8", tr = NULL)

translations_write(tr = translator(), path = "", lang = "")

translations_paths(
  tr = translator(),
  parent_dir = dirname(getOption("transltr.path"))
)
```

Arguments

path	A non-empty and non-NA character string. A path to a file to read from, or write to. <ul style="list-style-type: none"> This file must be a Translator file for <code>translator_read()</code>. This file must be a translations file for <code>translations_read()</code>. <p>See Details for more information. <code>translator_write()</code> automatically creates the parent directories of path (recursively) if they do not exist.</p>
encoding	A non-empty and non-NA character string. The source character encoding. In almost all cases, this should be UTF-8. Other encodings are internally re-encoded to UTF-8 for portability.
verbose	A non-NA logical value. Should progress information be reported?

translations	A non-NA logical value. Should translations files also be read, or written along with path (the Translator file)?
tr	A Translator object. This argument is NULL by default for translations_read() . If a Translator object is passed to this function, it will read translations and further register them (as long as they correspond to an existing source text).
overwrite	A non-NA logical value. Should existing files be overwritten? If such files are detected and <code>overwrite</code> is set equal to TRUE, an error is thrown.
lang	A non-empty and non-NA character string. The underlying language. A language is usually a code (of two or three letters) for a native language name. While users retain full control over codes, it is best to use language codes stemming from well-known schemes such as IETF BCP 47 , or ISO 639-1 to maximize portability and cross-compatibility.
parent_dir	A non-empty and non-NA character string. A path to a parent directory.

Details

The information contained within a [Translator](#) object is split: translations are reorganized by language and exported independently from other fields.

[translator_write\(\)](#) creates two types of file: a single *Translator file*, and zero, or more *translations files*. These are plain text files that can be inspected and modified using a wide variety of tools and systems. They target different audiences:

- the Translator file is useful to developers, and
- translations files are meant to be shared with non-technical collaborators such as translators.

[translator_read\(\)](#) first reads a Translator file and creates a [Translator](#) object from it. It then calls [translations_paths\(\)](#) to list expected translations files (that should normally be stored alongside the Translator file), attempts to read them, and registers successfully imported translations.

There are two requirements.

- All files must be stored in the same directory. By default, this is set equal to `inst/transltr/` (see `getOption("transltr.path")`).
- Filenames of translations files are standardized and must correspond to languages (language codes, see `lang`).

The inner workings of the serialization process are thoroughly described in [serialize\(\)](#).

Translator file:

A Translator file contains a [YAML](#) (1.1) representation of a [Translator](#) object stripped of all its translations except those that are registered as source text.

Translations files:

A translations file contains a [FLAT](#) representation of a set of translations sharing the same target language. This format attempts to be as simple as possible for non-technical collaborators.

Value

`translator_read()` returns an R6 object of class `Translator`.

`translator_write()` returns NULL, invisibly. It is used for its side-effects of

- creating a Translator file to the location given by path, and
- creating further translations file(s) in the same directory if `translations` is TRUE.

`translations_read()` returns an S3 object of class `ExportedTranslations`.

`translations_write()` returns NULL, invisibly.

`translations_paths()` returns a named character vector.

See Also

`Translator`, `serialize()`

Examples

```
# Set source language.
language_source_set("en")

# Create a path to a temporary Translator file.
temp_path <- tempfile(pattern = "translator_", fileext = ".yml")
temp_dir <- dirname(temp_path) ## tempdir() could also be used

# Create a Translator object.
# This would normally be done by find_source(), or translator_read().
tr <- translator(
  id = "test-translator",
  en = "English",
  es = "Español",
  fr = "Français",
  text(
    en = "Hello, world!",
    fr = "Bonjour, monde!"),
  text(
    en = "Farewell, world!",
    fr = "Au revoir, monde!"))

# Export it. This creates 3 files: 1 Translator file, and 2 translations
# files because two non-source languages are registered. The file for
# language "es" contains placeholders and must be completed.
translator_write(tr, temp_path)
translator_read(temp_path)

# Translations can be read individually.
translations_files <- translations_paths(tr, temp_dir)
translations_read(translations_files[["es"]])
translations_read(translations_files[["fr"]])

# This is rarely useful, but translations can also be exported individually.
# You may use this to add a new language, as long as it has an entry in the
```

```
# underlying Translator object (or file).
tr$set_native_languages(e1 = "Greek")

translations_files <- translations_paths(tr, temp_dir)

translations_write(tr, translations_files[["e1"]], "e1")
translations_read(file.path(temp_dir, "e1.txt"))
```

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