Package 'googlesheets4'

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Title Access Google Sheets using the Sheets API V4

Version 1.1.1

Description Interact with Google Sheets through the Sheets API v4 <https://developers.google.com/sheets/api>. ``API'' is an acronym for ``application programming interface''; the Sheets API allows users to interact with Google Sheets programmatically, instead of via a web browser. The ``v4'' refers to the fact that the Sheets API is currently at version 4. This package can read and write both the metadata and the cell data in a Sheet.

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BugReports https://github.com/tidyverse/googlesheets4/issues

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R topics documented:

cell-specification . . . 3
googlesheets4-configuration . . . 3
gs4_auth . . . 5
gs4_auth_configure . . . 8
gs4_browse . . . 9
gs4_create . . . 10
gs4_deauth . . . 11
gs4_endpoints . . . 12
gs4_examples . . . 13
gs4_find . . . 13
gs4_fodder . . . 14
gs4_formula . . . 15
gs4_get . . . 16
gs4_has_token . . . 17
gs4_random . . . 18
gs4_scopes . . . 18
gs4_token . . . 19
gs4_user . . . 20
range_autofit . . . 20
range_delete . . . 22
range_flood . . . 24
range_read . . . 26
range_read_cells . . . 29
range_speedread . . . 30
range_write . . . 32
request_generate . . . 35
request_make . . . 36
sheets_id . . . 37
sheet_add . . . 39
sheet_append . . . 40
sheet_copy . . . 42
sheet_delete . . . 44
sheet_properties . . . 45
sheet_relocate . . . 46
sheet_rename . . . 48
sheet_resize . . . 49
sheet_write . . . 51
spread_sheet . . . 53

Index **55**

cell-specification *Specify cells*

Description

Many functions in googlesheets4 use a `range` argument to target specific cells. The Sheets v4 API expects user-specified ranges to be expressed via its A1 notation, but googlesheets4 accepts and converts a few alternative specifications provided by the functions in the cellranger package. Of course, you can always provide A1-style ranges directly to functions like `read_sheet()` or `range_read_cells()`. Why would you use the cellranger helpers? Some ranges are practically impossible to express in A1 notation, specifically when you want to describe rectangles with some bounds that are specified and others determined by the data.

Examples

```
ss <- gs4_example("mini-gap")

# Specify only the rows or only the columns
read_sheet(ss, range = cell_rows(1:3))
read_sheet(ss, range = cell_cols("C:D"))
read_sheet(ss, range = cell_cols(1))

# Specify upper or lower bound on row or column
read_sheet(ss, range = cell_rows(c(NA, 4)))
read_sheet(ss, range = cell_cols(c(NA, "D")))
read_sheet(ss, range = cell_rows(c(3, NA)))
read_sheet(ss, range = cell_cols(c(2, NA)))
read_sheet(ss, range = cell_cols(c("C", NA)))

# Specify a partially open rectangle
read_sheet(ss, range = cell_limits(c(2, 3), c(NA, NA)), col_names = FALSE)
read_sheet(ss, range = cell_limits(c(1, 2), c(NA, 4)))
```

googlesheets4-configuration *googlesheets4 configuration*

Description

Some aspects of googlesheets4 behaviour can be controlled via an option.

Usage

```
local_gs4_quiet(env = parent.frame())

with_gs4_quiet(code)
```

Arguments

env	The environment to use for scoping
code	Code to execute quietly

Messages

The `googlesheets4_quiet` option can be used to suppress messages from googlesheets4. By default, googlesheets4 always messages, i.e. it is *not* quiet.

Set `googlesheets4_quiet` to `TRUE` to suppress messages, by one of these means, in order of decreasing scope:

- Put `options(googlesheets4_quiet = TRUE)` in a start-up file, such as `.Rprofile`, or in your R script
- Use `local_gs4_quiet()` to silence googlesheets4 in a specific scope
- Use `with_gs4_quiet()` to run a small bit of code silently

`local_gs4_quiet()` and `with_gs4_quiet()` follow the conventions of the the withr package (https://withr.r-lib.org).

Auth

Read about googlesheets4's main auth function, `gs4_auth()`. It is powered by the gargle package, which consults several options:

- Default Google user or, more precisely, `email`: see `gargle::gargle_oauth_email()`
- Whether or where to cache OAuth tokens: see `gargle::gargle_oauth_cache()`
- Whether to prefer "out-of-band" auth: see `gargle::gargle_oob_default()`
- Application Default Credentials: see `gargle::credentials_app_default()`

Examples

```
# message: "Creating new Sheet ..."
(ss <- gs4_create("gs4-quiet-demo", sheets = "alpha"))

# message: "Editing ..., Writing ..."
range_write(ss, data = data.frame(x = 1, y = "a"))

# suppress messages for a small amount of code
with_gs4_quiet(
  ss %>% sheet_append(data.frame(x = 2, y = "b"))
)

# message: "Writing ..., Appending ..."
ss %>% sheet_append(data.frame(x = 3, y = "c"))

# suppress messages until end of current scope
local_gs4_quiet()
ss %>% sheet_append(data.frame(x = 4, y = "d"))
```

```
# see that all the data was, in fact, written
read_sheet(ss)

# clean up
gs4_find("gs4-quiet-demo") %>%
  googledrive::drive_trash()
```

---

gs4_auth *Authorize googlesheets4*

Description

Authorize googlesheets4 to view and manage your Google Sheets. This function is a wrapper around `gargle::token_fetch()`.

By default, you are directed to a web browser, asked to sign in to your Google account, and to grant googlesheets4 permission to operate on your behalf with Google Sheets. By default, with your permission, these user credentials are cached in a folder below your home directory, from where they can be automatically refreshed, as necessary. Storage at the user level means the same token can be used across multiple projects and tokens are less likely to be synced to the cloud by accident.

Usage

```
gs4_auth(
  email = gargle::gargle_oauth_email(),
  path = NULL,
  subject = NULL,
  scopes = "spreadsheets",
  cache = gargle::gargle_oauth_cache(),
  use_oob = gargle::gargle_oob_default(),
  token = NULL
)
```

Arguments

`email` Optional. If specified, `email` can take several different forms:

- `"jane@gmail.com"`, i.e. an actual email address. This allows the user to target a specific Google identity. If specified, this is used for token lookup, i.e. to determine if a suitable token is already available in the cache. If no such token is found, `email` is used to pre-select the targeted Google identity in the OAuth chooser. (Note, however, that the email associated with a token when it's cached is always determined from the token itself, never from this argument).
- `"*@example.com"`, i.e. a domain-only glob pattern. This can be helpful if you need code that "just works" for both `alice@example.com` and `bob@example.com`.

- TRUE means that you are approving email auto-discovery. If exactly one matching token is found in the cache, it will be used.
- FALSE or NA mean that you want to ignore the token cache and force a new OAuth dance in the browser.

Defaults to the option named "gargle_oauth_email", retrieved by gargle_oauth_email() (unless a wrapper package implements different default behavior).

path — JSON identifying the service account, in one of the forms supported for the txt argument of jsonlite::fromJSON() (typically, a file path or JSON string).

subject — An optional subject claim. Specify this if you wish to use the service account represented by path to impersonate the subject, who is a normal user. Before this can work, an administrator must grant the service account domain-wide authority. Identify the user to impersonate via their email, e.g. subject = "user@example.com". Note that gargle automatically adds the non-sensitive "https://www.googleapis.com/auth/userinfo.email" scope, so this scope must be enabled for the service account, along with any other scopes being requested.

scopes — One or more API scopes. Each scope can be specified in full or, for Sheets API-specific scopes, in an abbreviated form that is recognized by gs4_scopes():

- "spreadsheets" = "https://www.googleapis.com/auth/spreadsheets" (the default)
- "spreadsheets.readonly" = "https://www.googleapis.com/auth/spreadsheets.readonly"
- "drive" = "https://www.googleapis.com/auth/drive"
- "drive.readonly" = "https://www.googleapis.com/auth/drive.readonly"
- "drive.file" = "https://www.googleapis.com/auth/drive.file"

See https://developers.google.com/identity/protocols/oauth2/scopes#sheets for details on the permissions for each scope.

cache — Specifies the OAuth token cache. Defaults to the option named "gargle_oauth_cache", retrieved via gargle_oauth_cache().

use_oob — Whether to use out-of-band authentication (or, perhaps, a variant implemented by gargle and known as "pseudo-OOB") when first acquiring the token. Defaults to the value returned by gargle_oob_default(). Note that (pseudo-)OOB auth only affects the initial OAuth dance. If we retrieve (and possibly refresh) a cached token, use_oob has no effect.

If the OAuth client is provided implicitly by a wrapper package, its type probably defaults to the value returned by gargle_oauth_client_type(). You can take control of the client type by setting options(gargle_oauth_client_type = "web") or options(gargle_oauth_client_type = "installed").

token — A token with class Token2.0 or an object of httr's class request, i.e. a token that has been prepared with httr::config() and has a Token2.0 in the auth_token component.

Details

Most users, most of the time, do not need to call gs4_auth() explicitly – it is triggered by the first action that requires authorization. Even when called, the default arguments often suffice.

However, when necessary, gs4_auth() allows the user to explicitly:

- Declare which Google identity to use, via an `email` specification.
- Use a service account token or workload identity federation via `path`.
- Bring your own `token`.
- Customize `scopes`.
- Use a non-default `cache` folder or turn caching off.
- Explicitly request out-of-bound (OOB) auth via `use_oob`.

If you are interacting with R within a browser (applies to RStudio Server, Posit Workbench, Posit Cloud, and Google Colaboratory), you need OOB auth or the pseudo-OOB variant. If this does not happen automatically, you can request it explicitly with `use_oob = TRUE` or, more persistently, by setting an option via `options(gargle_oob_default = TRUE)`.

The choice between conventional OOB or pseudo-OOB auth is determined by the type of OAuth client. If the client is of the "installed" type, `use_oob = TRUE` results in conventional OOB auth. If the client is of the "web" type, `use_oob = TRUE` results in pseudo-OOB auth. Packages that provide a built-in OAuth client can usually detect which type of client to use. But if you need to set this explicitly, use the `"gargle_oauth_client_type"` option:

```
options(gargle_oauth_client_type = "web")       # pseudo-OOB
# or, alternatively
options(gargle_oauth_client_type = "installed") # conventional OOB
```

For details on the many ways to find a token, see `gargle::token_fetch()`. For deeper control over auth, use `gs4_auth_configure()` to bring your own OAuth client or API key. To learn more about gargle options, see gargle::gargle_options.

See Also

Other auth functions: `gs4_auth_configure()`, `gs4_deauth()`, `gs4_scopes()`

Examples

```
# load/refresh existing credentials, if available
# otherwise, go to browser for authentication and authorization
gs4_auth()

# indicate the specific identity you want to auth as
gs4_auth(email = "jenny@example.com")

# force a new browser dance, i.e. don't even try to use existing user
# credentials
gs4_auth(email = NA)

# use a 'read only' scope, so it's impossible to edit or delete Sheets
gs4_auth(scopes = "spreadsheets.readonly")

# use a service account token
gs4_auth(path = "foofy-83ee9e7c9c48.json")
```

`gs4_auth_configure` *Edit and view auth configuration*

Description

These functions give more control over and visibility into the auth configuration than `gs4_auth()` does. `gs4_auth_configure()` lets the user specify their own:

- OAuth client, which is used when obtaining a user token.
- API key. If googlesheets4 is de-authorized via `gs4_deauth()`, all requests are sent with an API key in lieu of a token.

See the `vignette("get-api-credentials", package = "gargle")` for more. If the user does not configure these settings, internal defaults are used.

`gs4_oauth_client()` and `gs4_api_key()` retrieve the currently configured OAuth client and API key, respectively.

Usage

```
gs4_auth_configure(client, path, api_key, app = deprecated())

gs4_api_key()

gs4_oauth_client()
```

Arguments

`client`	A Google OAuth client, presumably constructed via `gargle::gargle_oauth_client_from_json()`. Note, however, that it is preferred to specify the client with JSON, using the `path` argument.
`path`	JSON downloaded from Google Cloud Console, containing a client id and secret, in one of the forms supported for the `txt` argument of `jsonlite::fromJSON()` (typically, a file path or JSON string).
`api_key`	API key.
`app`	**[Deprecated]** Replaced by the `client` argument.

Value

- `gs4_auth_configure()`: An object of R6 class gargle::AuthState, invisibly.
- `gs4_oauth_client()`: the current user-configured OAuth client.
- `gs4_api_key()`: the current user-configured API key.

See Also

Other auth functions: `gs4_auth()`, `gs4_deauth()`, `gs4_scopes()`

Examples

```
# see and store the current user-configured OAuth client (probably `NULL`)
(original_client <- gs4_oauth_client())

# see and store the current user-configured API key (probably `NULL`)
(original_api_key <- gs4_api_key())

# the preferred way to configure your own client is via a JSON file
# downloaded from Google Developers Console
# this example JSON is indicative, but fake
path_to_json <- system.file(
  "extdata", "client_secret_installed.googleusercontent.com.json",
  package = "gargle"
)
gs4_auth_configure(path = path_to_json)

# this is also obviously a fake API key
gs4_auth_configure(api_key = "the_key_I_got_for_a_google_API")

# confirm the changes
gs4_oauth_client()
gs4_api_key()

# restore original auth config
gs4_auth_configure(client = original_client, api_key = original_api_key)
```

---

gs4_browse *Visit a Sheet in a web browser*

Description

Visits a Google Sheet in your default browser, if session is interactive.

Usage

```
gs4_browse(ss)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().

Value

The Sheet's browser URL, invisibly.

Examples

```
gs4_example("mini-gap") %>% gs4_browse()
```

`gs4_create` *Create a new Sheet*

Description

Creates an entirely new (spread)Sheet (or, in Excel-speak, workbook). Optionally, you can also provide names and/or data for the initial set of (work)sheets. Any initial data provided via `sheets` is styled as a table, as described in `sheet_write()`.

Usage

```
gs4_create(name = gs4_random(), ..., sheets = NULL)
```

Arguments

`name`	The name of the new spreadsheet.
`...`	Optional spreadsheet properties that can be set through this API endpoint, such as locale and time zone.
`sheets`	Optional input for initializing (work)sheets. If unspecified, the Sheets API automatically creates an empty "Sheet1". You can provide a vector of sheet names, a data frame, or a (possibly named) list of data frames. See the examples.

Value

The input `ss`, as an instance of `sheets_id`

See Also

Wraps the `spreadsheets.create` endpoint:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/create

There is an article on writing Sheets:

- https://googlesheets4.tidyverse.org/articles/articles/write-sheets.html

Other write functions: `gs4_formula()`, `range_delete()`, `range_flood()`, `range_write()`, `sheet_append()`, `sheet_write()`

Examples

```
gs4_create("gs4-create-demo-1")

gs4_create("gs4-create-demo-2", locale = "en_CA")

gs4_create(
  "gs4-create-demo-3",
  locale = "fr_FR",
  timeZone = "Europe/Paris"
)

gs4_create(
  "gs4-create-demo-4",
  sheets = c("alpha", "beta")
)

my_data <- data.frame(x = 1)
gs4_create(
  "gs4-create-demo-5",
  sheets = my_data
)

gs4_create(
  "gs4-create-demo-6",
  sheets = list(chickwts = head(chickwts), mtcars = head(mtcars))
)

# Clean up
gs4_find("gs4-create-demo") %>%
  googledrive::drive_trash()
```

---

gs4_deauth *Suspend authorization*

Description

Put googlesheets4 into a de-authorized state. Instead of sending a token, googlesheets4 will send an API key. This can be used to access public resources for which no Google sign-in is required. This is handy for using googlesheets4 in a non-interactive setting to make requests that do not require a token. It will prevent the attempt to obtain a token interactively in the browser. The user can configure their own API key via `gs4_auth_configure()` and retrieve that key via `gs4_api_key()`. In the absence of a user-configured key, a built-in default key is used.

Usage

```
gs4_deauth()
```

See Also

Other auth functions: gs4_auth_configure(), gs4_auth(), gs4_scopes()

Examples

```
gs4_deauth()
gs4_user()

# get metadata on the public 'deaths' spreadsheet
gs4_example("deaths") %>%
  gs4_get()
```

---

gs4_endpoints *List Sheets endpoints*

Description

Returns a list of selected Sheets API v4 endpoints, as stored inside the googlesheets4 package. The names of this list (or the id sub-elements) are the nicknames that can be used to specify an endpoint in request_generate(). For each endpoint, we store its nickname or id, the associated HTTP method, the path, and details about the parameters. This list is derived programmatically from the Sheets API v4 Discovery Document (https://www.googleapis.com/discovery/v1/apis/sheets/v4/rest).

Usage

```
gs4_endpoints(i = NULL)
```

Arguments

i	The name(s) or integer index(ices) of the endpoints to return. Optional. By default, the entire list is returned.

Value

A list containing some or all of the subset of the Sheets API v4 endpoints that are used internally by googlesheets4.

Examples

```
str(gs4_endpoints(), max.level = 2)
gs4_endpoints("sheets.spreadsheets.values.get")
gs4_endpoints(4)
```

gs4_examples *Example Sheets*

Description

googlesheets4 makes a variety of world-readable example Sheets available for use in documentation and reprexes. These functions help you access the example Sheets. See `vignette("example-sheets", package = "googlesheets4")` for more.

Usage

```
gs4_examples(matches)

gs4_example(matches)
```

Arguments

`matches`	A regular expression that matches the name of the desired example Sheet(s). `matches` is optional for the plural `gs4_examples()` and, if provided, it can match multiple Sheets. The singular `gs4_example()` requires `matches` and it must match exactly one Sheet.

Value

- `gs4_example()`: a sheets_id
- `gs4_examples()`: a named vector of all built-in examples, with class `drive_id`

Examples

```
gs4_examples()
gs4_examples("gap")

gs4_example("gapminder")
gs4_example("deaths")
```

gs4_find *Find Google Sheets*

Description

Finds your Google Sheets. This is a very thin wrapper around `googledrive::drive_find()`, that specifies you want to list Drive files where `type = "spreadsheet"`. Therefore, note that this will require auth for googledrive! See the article Using googlesheets4 with googledrive if you want to coordinate auth between googlesheets4 and googledrive. This function will emit an informational message if you are currently logged in with both googlesheets4 and googledrive, but as different users.

Usage

```
gs4_find(...)
```

Arguments

...	Arguments (other than type, which is hard-wired as type = "spreadsheet") that are passed along to googledrive::drive_find().

Value

An object of class dribble, a tibble with one row per file.

Examples

```
# see all your Sheets
gs4_find()

# see 5 Sheets, prioritized by creation time
x <- gs4_find(order_by = "createdTime desc", n_max = 5)
x

# hoist the creation date, using other packages in the tidyverse
# x %>%
#   tidyr::hoist(drive_resource, created_on = "createdTime") %>%
#   dplyr::mutate(created_on = as.Date(created_on))
```

---

gs4_fodder *Create useful spreadsheet filler*

Description

Creates a data frame that is useful for filling a spreadsheet, when you just need a sheet to experiment with. The data frame has n rows and m columns with these properties:

- Column names match what Sheets displays: "A", "B", "C", and so on.
- Inner cell values reflect the coordinates where each value will land in the sheet, in A1-notation. So the first row is "B2", "C2", and so on. Note that this n-row data frame will occupy n + 1 rows in the sheet, because the column names occupy the first row.

Usage

```
gs4_fodder(n = 10, m = n)
```

Arguments

n	Number of rows.
m	Number of columns.

Value

A data frame of character vectors.

Examples

```
gs4_fodder()
gs4_fodder(5, 3)
```

---

gs4_formula *Class for Google Sheets formulas*

Description

In order to write a formula into Google Sheets, you need to store it as an object of class `googlesheets4_formula`. This is how we distinguish a "regular" character string from a string that should be interpreted as a formula. `googlesheets4_formula` is an S3 class implemented using the vctrs package.

Usage

```
gs4_formula(x = character())
```

Arguments

x	Character.

Value

An S3 vector of class `googlesheets4_formula`.

See Also

Other write functions: `gs4_create()`, `range_delete()`, `range_flood()`, `range_write()`, `sheet_append()`, `sheet_write()`

Examples

```
dat <- data.frame(x = c(1, 5, 3, 2, 4, 6))

ss <- gs4_create("gs4-formula-demo", sheets = dat)
ss

summaries <- tibble::tribble(
  ~desc, ~summaries,
  "max", "=max(A:A)",
  "sum", "=sum(A:A)",
  "min", "=min(A:A)",
  "sparkline", "=SPARKLINE(A:A, {\"color\", \"blue\"})"
)
```

```
# explicitly declare a column as `googlesheets4_formula`
summaries$summaries <- gs4_formula(summaries$summaries)
summaries

range_write(ss, data = summaries, range = "C1", reformat = FALSE)

miscellany <- tibble::tribble(
  ~desc, ~example,
  "hyperlink", "=HYPERLINK(\"http://www.google.com/\",\"Google\")",
  "image", "=IMAGE(\"https://www.google.com/images/srpr/logo3w.png\")"
)
miscellany$example <- gs4_formula(miscellany$example)
miscellany

sheet_write(miscellany, ss = ss)

# clean up
gs4_find("gs4-formula-demo") %>%
  googledrive::drive_trash()
```

`gs4_get` *Get Sheet metadata*

Description

Retrieve spreadsheet-specific metadata, such as details on the individual (work)sheets or named ranges.

- `gs4_get()` complements `googledrive::drive_get()`, which returns metadata that exists for any file on Drive.

Usage

```
gs4_get(ss)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.

Value

A list with S3 class googlesheets4_spreadsheet, for printing purposes.

See Also

Wraps the spreadsheets.get endpoint:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/get

Examples

```
gs4_get(gs4_example("mini-gap"))
```

---

gs4_has_token *Is there a token on hand?*

Description

Reports whether googlesheets4 has stored a token, ready for use in downstream requests.

Usage

```
gs4_has_token()
```

Value

Logical.

See Also

Other low-level API functions: gs4_token(), request_generate(), request_make()

Examples

```
gs4_has_token()
```

gs4_random *Generate a random Sheet name*

Description

Generates a random name, suitable for a newly created Sheet, using `ids::adjective_animal()`.

Usage

```
gs4_random(n = 1)
```

Arguments

n	Number of names to generate.

Value

A character vector.

Examples

```
gs4_random()
```

gs4_scopes *Produce scopes specific to the Sheets API*

Description

When called with no arguments, `gs4_scopes()` returns a named character vector of scopes associated with the Sheets API. If `gs4_scopes(scopes =)` is given, an abbreviated entry such as `"sheets.readonly"` is expanded to a full scope (`"https://www.googleapis.com/auth/sheets.readonly"` in this case). Unrecognized scopes are passed through unchanged.

Usage

```
gs4_scopes(scopes = NULL)
```

Arguments

scopes	One or more API scopes. Each scope can be specified in full or, for Sheets API-specific scopes, in an abbreviated form that is recognized by `gs4_scopes()`: • "spreadsheets" = "https://www.googleapis.com/auth/spreadsheets" (the default) • "spreadsheets.readonly" = "https://www.googleapis.com/auth/spreadsheets.readonly" • "drive" = "https://www.googleapis.com/auth/drive"

- "drive.readonly" = "https://www.googleapis.com/auth/drive.readonly"
- "drive.file" = "https://www.googleapis.com/auth/drive.file"

See https://developers.google.com/identity/protocols/oauth2/scopes#sheets for details on the permissions for each scope.

Value

A character vector of scopes.

See Also

https://developers.google.com/identity/protocols/oauth2/scopes#sheets for details on the permissions for each scope.

Other auth functions: gs4_auth_configure(), gs4_auth(), gs4_deauth()

Examples

```
gs4_scopes("spreadsheets")
gs4_scopes("spreadsheets.readonly")
gs4_scopes("drive")
gs4_scopes()
```

---

gs4_token *Produce configured token*

Description

For internal use or for those programming around the Sheets API. Returns a token pre-processed with httr::config(). Most users do not need to handle tokens "by hand" or, even if they need some control, gs4_auth() is what they need. If there is no current token, gs4_auth() is called to either load from cache or initiate OAuth2.0 flow. If auth has been deactivated via gs4_deauth(), gs4_token() returns NULL.

Usage

```
gs4_token()
```

Value

A request object (an S3 class provided by httr).

See Also

Other low-level API functions: gs4_has_token(), request_generate(), request_make()

Examples

```
req <- request_generate(
  "sheets.spreadsheets.get",
  list(spreadsheetId = "abc"),
  token = gs4_token()
)
req
```

`gs4_user` *Get info on current user*

Description

Reveals the email address of the user associated with the current token. If no token has been loaded yet, this function does not initiate auth.

Usage

```
gs4_user()
```

Value

An email address or, if no token has been loaded, `NULL`.

See Also

`gargle::token_userinfo()`, `gargle::token_email()`, `gargle::token_tokeninfo()`

Examples

```
gs4_user()
```

`range_autofit` *Auto-fit columns or rows to the data*

Description

Applies automatic resizing to either columns or rows of a (work)sheet. The width or height of targeted columns or rows, respectively, is determined from the current cell contents. This only affects the appearance of a sheet in the browser and doesn't affect its values or dimensions in any way.

Usage

```
range_autofit(ss, sheet = NULL, range = NULL, dimension = c("columns", "rows"))
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().
sheet	Sheet to modify, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Ignored if the sheet is specified via range. If neither argument specifies the sheet, defaults to the first visible sheet.
range	Which columns or rows to resize. Optional. If you want to resize all columns or all rows, use dimension instead. All the usual range specifications are accepted, but the targeted range must specify only columns (e.g. "B:F") or only rows (e.g. "2:7").
dimension	Ignored if range is given. If consulted, dimension must be either "columns" (the default) or "rows". This is the simplest way to request auto-resize for all columns or all rows.

Value

The input ss, as an instance of sheets_id

See Also

Makes an AutoResizeDimensionsRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#autoresizedimensionsrequest

Examples

```
dat <- tibble::tibble(
  fruit = c("date", "lime", "pear", "plum")
)

ss <- gs4_create("range-autofit-demo", sheets = dat)
ss

# open in the browser
gs4_browse(ss)

# shrink column A to fit the short fruit names
range_autofit(ss)
# in the browser, notice how the column width shrank
```

```
# send some longer fruit names
dat2 <- tibble::tibble(
  fruit = c("cucumber", "honeydew")
)
ss %>% sheet_append(dat2)
# in the browser, see that column A is now too narrow to show the data

range_autofit(ss)
# in the browser, see the column A reveals all the data now

# clean up
gs4_find("range-autofit-demo") %>%
  googledrive::drive_trash()
```

`range_delete` *Delete cells*

Description

Deletes a range of cells and shifts other cells into the deleted area. There are several related tasks that are implemented by other functions:

- To clear cells of their value and/or format, use `range_clear()`.
- To delete an entire (work)sheet, use `sheet_delete()`.
- To change the dimensions of a (work)sheet, use `sheet_resize()`.

Usage

```
range_delete(ss, sheet = NULL, range, shift = NULL)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`sheet`	Sheet to delete, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Ignored if the sheet is specified via `range`. If neither argument specifies the sheet, defaults to the first visible sheet.
`range`	Cells to delete. There are a couple differences between `range` here and how it works in other functions (e.g. `range_read()`):

- range must be specified.
- range must not be a named range.
- range must not be the name of a (work) sheet. Instead, use sheet_delete() to delete an entire sheet. Row-only and column-only ranges are especially relevant, such as "2:6" or "D". Remember you can also use the helpers in cell-specification, such as cell_cols(4:6), or cell_rows(5).

shift — Must be one of "up" or "left", if specified. Required if range is NOT a rows-only or column-only range (in which case, we can figure it out for you). Determines whether the deleted area is filled by shifting surrounding cells up or to the left.

Value

The input ss, as an instance of sheets_id

See Also

Makes a DeleteRangeRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#DeleteRangeRequest

Other write functions: gs4_create(), gs4_formula(), range_flood(), range_write(), sheet_append(), sheet_write()

Examples

```
# create a data frame to use as initial data
df <- gs4_fodder(10)

# create Sheet
ss <- gs4_create("range-delete-example", sheets = list(df))

# delete some rows
range_delete(ss, range = "2:4")

# delete a column
range_delete(ss, range = "C")

# delete a rectangle and specify how to shift remaining cells
range_delete(ss, range = "B3:F4", shift = "left")

# clean up
gs4_find("range-delete-example") %>%
  googledrive::drive_trash()
```

range_flood *Flood or clear a range of cells*

Description

range_flood() "floods" a range of cells with the same content. range_clear() is a wrapper that handles the common special case of clearing the cell value. Both functions, by default, also clear the format, but this can be specified via reformat.

Usage

```
range_flood(ss, sheet = NULL, range = NULL, cell = NULL, reformat = TRUE)

range_clear(ss, sheet = NULL, range = NULL, reformat = TRUE)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().
sheet	Sheet to write into, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number.
range	A cell range to read from. If NULL, all non-empty cells are read. Otherwise specify range as described in Sheets A1 notation or using the helpers documented in cell-specification. Sheets uses fairly standard spreadsheet range notation, although a bit different from Excel. Examples of valid ranges: "Sheet1!A1:B2", "Sheet1!A:A", "Sheet1!1:2", "Sheet1!A5:A", "A1:B2", "Sheet1". Interpreted strictly, even if the range forces the inclusion of leading, trailing, or embedded empty rows or columns. Takes precedence over skip, n_max and sheet. Note range can be a named range, like "sales_data", without any cell reference.
cell	The value to fill the cells in the range with. If unspecified, the default of NULL results in clearing the existing value.
reformat	Logical, indicates whether to reformat the affected cells. Currently googlesheets4 provides no real support for formatting, so reformat = TRUE effectively means that edited cells become unformatted.

Value

The input ss, as an instance of sheets_id

See Also

Makes a RepeatCellRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#repeatcellrequest

Other write functions: gs4_create(), gs4_formula(), range_delete(), range_write(), sheet_append(), sheet_write()

Examples

```
# create a data frame to use as initial data
df <- gs4_fodder(10)

# create Sheet
ss <- gs4_create("range-flood-demo", sheets = list(df))

# default behavior (`cell = NULL`): clear value and format
range_flood(ss, range = "A1:B3")

# clear value but preserve format
range_flood(ss, range = "C1:D3", reformat = FALSE)

# send new value
range_flood(ss, range = "4:5", cell = ";-)")

# send formatting
# WARNING: use these unexported, internal functions at your own risk!
# This not (yet) officially supported, but it's possible.
blue_background <- googlesheets4:::CellData(
  userEnteredFormat = googlesheets4:::new(
    "CellFormat",
    backgroundColor = googlesheets4:::new(
      "Color",
      red = 159 / 255, green = 183 / 255, blue = 196 / 255
    )
  )
)
range_flood(ss, range = "I:J", cell = blue_background)

# range_clear() is a shortcut where `cell = NULL` always
range_clear(ss, range = "9:9")
range_clear(ss, range = "10:10", reformat = FALSE)

# clean up
gs4_find("range-flood-demo") %>%
  googledrive::drive_trash()
```

range_read *Read a Sheet into a data frame*

Description

This is the main "read" function of the googlesheets4 package. It goes by two names, because we want it to make sense in two contexts:

- `read_sheet()` evokes other table-reading functions, like `readr::read_csv()` and `readxl::read_excel()`. The `sheet` in this case refers to a Google (spread)Sheet.
- `range_read()` is the right name according to the naming convention used throughout the googlesheets4 package.

`read_sheet()` and `range_read()` are synonyms and you can use either one.

Usage

```
range_read(
  ss,
  sheet = NULL,
  range = NULL,
  col_names = TRUE,
  col_types = NULL,
  na = "",
  trim_ws = TRUE,
  skip = 0,
  n_max = Inf,
  guess_max = min(1000, n_max),
  .name_repair = "unique"
)

read_sheet(
  ss,
  sheet = NULL,
  range = NULL,
  col_names = TRUE,
  col_types = NULL,
  na = "",
  trim_ws = TRUE,
  skip = 0,
  n_max = Inf,
  guess_max = min(1000, n_max),
  .name_repair = "unique"
)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().
sheet	Sheet to read, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Ignored if the sheet is specified via range. If neither argument specifies the sheet, defaults to the first visible sheet.
range	A cell range to read from. If NULL, all non-empty cells are read. Otherwise specify range as described in Sheets A1 notation or using the helpers documented in cell-specification. Sheets uses fairly standard spreadsheet range notation, although a bit different from Excel. Examples of valid ranges: "Sheet1!A1:B2", "Sheet1!A:A", "Sheet1!1:2", "Sheet1!A5:A", "A1:B2", "Sheet1". Interpreted strictly, even if the range forces the inclusion of leading, trailing, or embedded empty rows or columns. Takes precedence over skip, n_max and sheet. Note range can be a named range, like "sales_data", without any cell reference.
col_names	TRUE to use the first row as column names, FALSE to get default names, or a character vector to provide column names directly. If user provides col_types, col_names can have one entry per column or one entry per unskipped column.
col_types	Column types. Either NULL to guess all from the spreadsheet or a string of readr-style shortcodes, with one character or code per column. If exactly one col_type is specified, it is recycled. See Column Specification for more.
na	Character vector of strings to interpret as missing values. By default, blank cells are treated as missing data.
trim_ws	Logical. Should leading and trailing whitespace be trimmed from cell contents?
skip	Minimum number of rows to skip before reading anything, be it column names or data. Leading empty rows are automatically skipped, so this is a lower bound. Ignored if range is given.
n_max	Maximum number of data rows to parse into the returned tibble. Trailing empty rows are automatically skipped, so this is an upper bound on the number of rows in the result. Ignored if range is given. n_max is imposed locally, after reading all non-empty cells, so, if speed is an issue, it is better to use range.
guess_max	Maximum number of data rows to use for guessing column types.
.name_repair	Handling of column names. By default, googlesheets4 ensures column names are not empty and are unique. There is full support for .name_repair as documented in tibble::tibble().

Value

A tibble

Column Specification

Column types must be specified in a single string of readr-style short codes, e.g. "cci?l" means "character, character, integer, guess, logical". This is not where googlesheets4's col spec will end up, but it gets the ball rolling in a way that is consistent with readr and doesn't reinvent any wheels.

Shortcodes for column types:

- `_` or `-`: Skip. Data in a skipped column is still requested from the API (the high-level functions in this package are rectangle-oriented), but is not parsed into the data frame output.
- `?`: Guess. A type is guessed for each cell and then a consensus type is selected for the column. If no atomic type is suitable for all cells, a list-column is created, in which each cell is converted to an R object of "best" type. If no column types are specified, i.e. `col_types = NULL`, all types are guessed.
- `l`: Logical.
- `i`: Integer. This type is never guessed from the data, because Sheets have no formal cell type for integers.
- `d` or `n`: Numeric, in the sense of "double".
- `D`: Date. This type is never guessed from the data, because date cells are just serial datetimes that bear a "date" format.
- `t`: Time of day. This type is never guessed from the data, because time cells are just serial datetimes that bear a "time" format. *Not implemented yet; returns POSIXct.*
- `T`: Datetime, specifically POSIXct.
- `c`: Character.
- `C`: Cell. This type is unique to googlesheets4. This returns raw cell data, as an R list, which consists of everything sent by the Sheets API for that cell. Has S3 type of `"CELL_SOMETHING"` and `"SHEETS_CELL"`. Mostly useful internally, but exposed for those who want direct access to, e.g., formulas and formats.
- `L`: List, as in "list-column". Each cell is a length-1 atomic vector of its discovered type.
- *Still to come*: duration (code will be `:`) and factor (code will be `f`).

Examples

```
ss <- gs4_example("deaths")
read_sheet(ss, range = "A5:F15")
read_sheet(ss, range = "other!A5:F15", col_types = "ccilDD")
read_sheet(ss, range = "arts_data", col_types = "ccilDD")

read_sheet(gs4_example("mini-gap"))
read_sheet(
  gs4_example("mini-gap"),
  sheet = "Europe",
  range = "A:D",
  col_types = "ccid"
)
```

range_read_cells *Read cells from a Sheet*

Description

This low-level function returns cell data in a tibble with one row per cell. This tibble has integer variables `row` and `col` (referring to location with the Google Sheet), an A1-style reference `loc`, and a `cell` list-column. The flagship function `read_sheet()`, a.k.a. `range_read()`, is what most users are looking for, rather than `range_read_cells()`. `read_sheet()` is basically `range_read_cells()` (this function), followed by `spread_sheet()`, which looks after reshaping and column typing. But if you really want raw cell data from the API, `range_read_cells()` is for you!

Usage

```
range_read_cells(
  ss,
  sheet = NULL,
  range = NULL,
  skip = 0,
  n_max = Inf,
  cell_data = c("default", "full"),
  discard_empty = TRUE
)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`sheet`	Sheet to read, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Ignored if the sheet is specified via `range`. If neither argument specifies the sheet, defaults to the first visible sheet.
`range`	A cell range to read from. If `NULL`, all non-empty cells are read. Otherwise specify `range` as described in Sheets A1 notation or using the helpers documented in cell-specification. Sheets uses fairly standard spreadsheet range notation, although a bit different from Excel. Examples of valid ranges: `"Sheet1!A1:B2"`, `"Sheet1!A:A"`, `"Sheet1!1:2"`, `"Sheet1!A5:A"`, `"A1:B2"`, `"Sheet1"`. Interpreted strictly, even if the range forces the inclusion of leading, trailing, or embedded empty rows or columns. Takes precedence over `skip`, `n_max` and `sheet`.

Note range can be a named range, like "sales_data", without any cell reference.

skip — Minimum number of rows to skip before reading anything, be it column names or data. Leading empty rows are automatically skipped, so this is a lower bound. Ignored if range is given.

n_max — Maximum number of data rows to parse into the returned tibble. Trailing empty rows are automatically skipped, so this is an upper bound on the number of rows in the result. Ignored if range is given. n_max is imposed locally, after reading all non-empty cells, so, if speed is an issue, it is better to use range.

cell_data — How much detail to get for each cell. "default" retrieves the fields actually used when googlesheets4 guesses or imposes cell and column types. "full" retrieves all fields in the CellData schema. The main differences relate to cell formatting.

discard_empty — Whether to discard cells that have no data. Literally, we check for an effectiveValue, which is one of the fields in the CellData schema.

Value

A tibble with one row per cell in the range.

See Also

Wraps the spreadsheets.get endpoint:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/get

Examples

```
range_read_cells(gs4_example("deaths"), range = "arts_data")

# if you want detailed and exhaustive cell data, do this
range_read_cells(
  gs4_example("formulas-and-formats"),
  cell_data = "full",
  discard_empty = FALSE
)
```

---

range_speedread *Read Sheet as CSV*

Description

This function uses a quick-and-dirty method to read a Sheet that bypasses the Sheets API and, instead, parses a CSV representation of the data. This can be much faster than `range_read()` – noticeably so for "large" spreadsheets. There are real downsides, though, so we recommend this approach only when the speed difference justifies it. Here are the limitations we must accept to get faster reading:

- Only formatted cell values are available, not underlying values or details on the formats.
- We can't target a named range as the `range`.
- We have no access to the data type of a cell, i.e. we don't know that it's logical, numeric, or datetime. That must be re-discovered based on the CSV data (or specified by the user).
- Auth and error handling have to be handled a bit differently internally, which may lead to behaviour that differs from other functions in googlesheets4.

Note that the Sheets API is still used to retrieve metadata on the target Sheet, in order to support range specification. `range_speedread()` also sends an auth token with the request, unless a previous call to `gs4_deauth()` has put googlesheets4 into a de-authorized state.

Usage

```
range_speedread(ss, sheet = NULL, range = NULL, skip = 0, ...)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`sheet`	Sheet to read, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Ignored if the sheet is specified via `range`. If neither argument specifies the sheet, defaults to the first visible sheet.
`range`	A cell range to read from. If `NULL`, all non-empty cells are read. Otherwise specify `range` as described in Sheets A1 notation or using the helpers documented in cell-specification. Sheets uses fairly standard spreadsheet range notation, although a bit different from Excel. Examples of valid ranges: `"Sheet1!A1:B2"`, `"Sheet1!A:A"`, `"Sheet1!1:2"`, `"Sheet1!A5:A"`, `"A1:B2"`, `"Sheet1"`. Interpreted strictly, even if the range forces the inclusion of leading, trailing, or embedded empty rows or columns. Takes precedence over `skip`, `n_max` and `sheet`. Note `range` can be a named range, like `"sales_data"`, without any cell reference.
`skip`	Minimum number of rows to skip before reading anything, be it column names or data. Leading empty rows are automatically skipped, so this is a lower bound. Ignored if `range` is given.
`...`	Passed along to the CSV parsing function (currently `readr::read_csv()`).

Value

A tibble

Examples

```
if (require("readr")) {
  # since cell type is not available, use readr's col type specification
  range_speedread(
    gs4_example("deaths"),
    sheet = "other",
    range = "A5:F15",
    col_types = cols(
      Age = col_integer(),
      `Date of birth` = col_date("%m/%d/%Y"),
      `Date of death` = col_date("%m/%d/%Y")
    )
  )
}

# write a Sheet that, by default, is NOT world-readable
(ss <- sheet_write(chickwts))

# demo that range_speedread() sends a token, which is why we can read this
range_speedread(ss)

# clean up
googledrive::drive_trash(ss)
```

---

range_write *(Over)write new data into a range*

Description

Writes a data frame into a range of cells. Main differences from `sheet_write()` (a.k.a. `write_sheet()`):

- Narrower scope. `range_write()` literally targets some cells, not a whole (work)sheet.
- The edited rectangle is not explicitly styled as a table. Nothing special is done re: formatting a header row or freezing rows.
- Column names can be suppressed. This means that, although `data` must be a data frame (at least for now), `range_write()` can actually be used to write arbitrary data.
- The target (spread)Sheet and (work)sheet must already exist. There is no ability to create a Sheet or add a worksheet.
- The target sheet dimensions are not "trimmed" to shrink-wrap the `data`. However, the sheet might gain rows and/or columns, in order to write `data` to the user-specified `range`.

If you just want to add rows to an existing table, the function you probably want is `sheet_append()`.

Usage

```
range_write(
  ss,
  data,
  sheet = NULL,
  range = NULL,
  col_names = TRUE,
  reformat = TRUE
)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().
data	A data frame.
sheet	Sheet to write into, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Ignored if the sheet is specified via range. If neither argument specifies the sheet, defaults to the first visible sheet.
range	Where to write. This range argument has important similarities and differences to range elsewhere (e.g. range_read()): • Similarities: Can be a cell range, using A1 notation ("A1:D3") or using the helpers in cell-specification. Can combine sheet name and cell range ("Sheet1!A5:A") or refer to a sheet by name (range = "Sheet1", although sheet = "Sheet1" is preferred for clarity). • Difference: Can NOT be a named range. • Difference: range can be interpreted as the *start* of the target rectangle (the upper left corner) or, more literally, as the actual target rectangle. See the "Range specification" section for details.
col_names	Logical, indicates whether to send the column names of data.
reformat	Logical, indicates whether to reformat the affected cells. Currently googlesheets4 provides no real support for formatting, so reformat = TRUE effectively means that edited cells become unformatted.

Value

The input ss, as an instance of sheets_id

Range specification

The range argument of range_write() is special, because the Sheets API can implement it in 2 different ways:

- If range represents exactly 1 cell, like "B3", it is taken as the *start* (or upper left corner) of the targeted cell rectangle. The edited cells are determined implicitly by the extent of the data we are writing. This frees you from doing fiddly range computations based on the dimensions of the data.
- If range describes a rectangle with multiple cells, it is interpreted as the *actual* rectangle to edit. It is possible to describe a rectangle that is unbounded on the right (e.g. "B2:4"), on the bottom (e.g. "A4:C"), or on both the right and the bottom (e.g. cell_limits(c(2, 3), c(NA, NA)). Note that **all cells** inside the rectangle receive updated data and format. Important implication: if the data object isn't big enough to fill the target rectangle, the cells that don't receive new data are effectively cleared, i.e. the existing value and format are deleted.

See Also

If sheet size needs to change, makes an UpdateSheetPropertiesRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#UpdateSheetPropertiesRequest

The main data write is done via an UpdateCellsRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#updatecellsrequest

Other write functions: gs4_create(), gs4_formula(), range_delete(), range_flood(), sheet_append(), sheet_write()

Examples

```
# create a Sheet with some initial, empty (work)sheets
(ss <- gs4_create("range-write-demo", sheets = c("alpha", "beta")))

df <- data.frame(
  x = 1:3,
  y = letters[1:3]
)

#  write df somewhere other than the "upper left corner"
range_write(ss, data = df, range = "D6")

# view your magnificent creation in the browser
gs4_browse(ss)

# send data of disparate types to a 1-row rectangle
dat <- tibble::tibble(
  string = "string",
  logical = TRUE,
  datetime = Sys.time()
```

```
)
range_write(ss, data = dat, sheet = "beta", col_names = FALSE)

# send data of disparate types to a 1-column rectangle
dat <- tibble::tibble(
  x = list(Sys.time(), FALSE, "string")
)
range_write(ss, data = dat, range = "beta!C5", col_names = FALSE)

# clean up
gs4_find("range-write-demo") %>%
  googledrive::drive_trash()
```

`request_generate` *Generate a Google Sheets API request*

Description

Generate a request, using knowledge of the Sheets API from its Discovery Document (`https://www.googleapis.com/disc`
Use `request_make()` to execute the request. Most users should, instead, use higher-level wrappers that facilitate common tasks, such as reading or writing worksheets or cell ranges. The functions here are intended for internal use and for programming around the Sheets API.

`request_generate()` lets you provide the bare minimum of input. It takes a nickname for an endpoint and:

- Uses the API spec to look up the `method`, `path`, and `base_url`.
- Checks `params` for validity and completeness with respect to the endpoint. Uses `params` for URL endpoint substitution and separates remaining parameters into those destined for the body versus the query.
- Adds an API key to the query if and only if `token = NULL`.

Usage

```
request_generate(
  endpoint = character(),
  params = list(),
  key = NULL,
  token = gs4_token()
)
```

Arguments

`endpoint`	Character. Nickname for one of the selected Sheets API v4 endpoints built into googlesheets4. Learn more in `gs4_endpoints()`.
`params`	Named list. Parameters destined for endpoint URL substitution, the query, or the body.

key — API key. Needed for requests that don't contain a token. The need for an API key in the absence of a token is explained in Google's document "Credentials, access, security, and identity" (https://support.google.com/googleapi/answer/6158857?hl=en&ref
In order of precedence, these sources are consulted: the formal key argument, a key parameter in params, a user-configured API key set up with gs4_auth_configure() and retrieved with gs4_api_key().

token — Set this to NULL to suppress the inclusion of a token. Note that, if auth has been de-activated via gs4_deauth(), gs4_token() will actually return NULL.

Value

list()
Components are method, url, body, and token, suitable as input for request_make().

See Also

gargle::request_develop(), gargle::request_build(), gargle::request_make()

Other low-level API functions: gs4_has_token(), gs4_token(), request_make()

Examples

```
req <- request_generate(
  "sheets.spreadsheets.get",
  list(spreadsheetId = gs4_example("deaths")),
  key = "PRETEND_I_AM_AN_API_KEY",
  token = NULL
)
req
```

---

request_make *Make a Google Sheets API request*

Description

Low-level function to execute a Sheets API request. Most users should, instead, use higher-level wrappers that facilitate common tasks, such as reading or writing worksheets or cell ranges. The functions here are intended for internal use and for programming around the Sheets API.

Usage

```
request_make(x, ..., encode = "json")
```

Arguments

x	List. Holds the components for an HTTP request, presumably created with request_generate() or gargle::request_build(). Must contain a method and url. If present, body and token are used.
...	Optional arguments passed through to the HTTP method.
encode	If the body is a named list, how should it be encoded? This has the same meaning as encode in all the httr::VERB()s, such as httr::POST(). Note, however, that we default to encode = "json", which is what you want most of the time when calling the Sheets API. The httr default is "multipart". Other acceptable values are "form" and "raw".

Details

make_request() is a very thin wrapper around gargle::request_retry(), only adding the googlesheets4 user agent. Typically the input has been created with request_generate() or gargle::request_build() and the output is processed with process_response().

gargle::request_retry() retries requests that error with 429 RESOURCE_EXHAUSTED. Its basic scheme is exponential backoff, with one tweak that is very specific to the Sheets API, which has documented usage limits:

"a limit of 500 requests per 100 seconds per project and 100 requests per 100 seconds per user"

Note that the "project" here means everyone using googlesheets4 who hasn't configured their own OAuth client. This is potentially a lot of users, all acting independently.

If you hit the "100 requests per 100 seconds per **user**" limit (which really does mean YOU), the first wait time is a bit more than 100 seconds, then we revert to exponential backoff.

If you experience lots of retries, especially with 100 second delays, it means your use of googlesheets4 is more than casual and **it's time for you to get your own OAuth client or use a service account token**. This is explained in the gargle vignette vignette("get-api-credentials", package = "gargle").

Value

Object of class response from httr.

See Also

Other low-level API functions: gs4_has_token(), gs4_token(), request_generate()

---

sheets_id sheets_id *class*

Description

`sheets_id` is an S3 class that marks a string as a Google Sheet's id, which the Sheets API docs refer to as `spreadsheetId`.

Any object of class `sheets_id` also has the `drive_id` class, which is used by googledrive for the same purpose. This means you can provide a `sheets_id` to googledrive functions, in order to do anything with your Sheet that has nothing to do with it being a spreadsheet. Examples: change the Sheet's name, parent folder, or permissions. Read more about using googlesheets4 and googledrive together in `vignette("drive-and-sheets")`. Note that a `sheets_id` object is intended to hold **just one** id, while the parent class `drive_id` can be used for multiple ids.

`as_sheets_id()` is a generic function that converts various inputs into an instance of `sheets_id`. See more below.

When you print a `sheets_id`, we attempt to reveal the Sheet's current metadata, via `gs4_get()`. This can fail for a variety of reasons (e.g. if you're offline), but the input `sheets_id` is always revealed and returned, invisibly.

Usage

```
as_sheets_id(x, ...)
```

Arguments

`x`	Something that contains a Google Sheet id: an id string, a `drive_id`, a URL, a one-row `dribble`, or a `googlesheets4_spreadsheet`.
`...`	Other arguments passed down to methods. (Not used.)

`as_sheets_id()`

These inputs can be converted to a `sheets_id`:

- Spreadsheet id, "a string containing letters, numbers, and some special characters", typically 44 characters long, in our experience. Example: `1qpyC0XzvTcKT6EISywvqESX3A0MwQoFDE8p-Bll4hps`.
- A URL, from which we can excavate a spreadsheet or file id. Example: `"https://docs.google.com/spreadsheets/d`
- A one-row `dribble`, a "Drive tibble" used by the googledrive package. In general, a `dribble` can represent several files, one row per file. Since googlesheets4 is not vectorized over spreadsheets, we are only prepared to accept a one-row `dribble`.
  - `googledrive::drive_get("YOUR_SHEET_NAME")` is a great way to look up a Sheet via its name.
  - `gs4_find("YOUR_SHEET_NAME")` is another good way to get your hands on a Sheet.
- Spreadsheet meta data, as returned by, e.g., `gs4_get()`. Literally, this is an object of class `googlesheets4_spreadsheet`.

See Also

googledrive::as_id

Examples

```
mini_gap_id <- gs4_example("mini-gap")
class(mini_gap_id)
mini_gap_id

as_sheets_id("abc")
```

`sheet_add` *Add one or more (work)sheets*

Description

Adds one or more (work)sheets to an existing (spread)Sheet. Note that sheet names must be unique.

Usage

```
sheet_add(ss, sheet = NULL, ..., .before = NULL, .after = NULL)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`sheet`	One or more new sheet names. If unspecified, one new sheet is added and Sheets autogenerates a name of the form "SheetN".
`...`	Optional parameters to specify additional properties, common to all of the new sheet(s). Not relevant to most users. Specify fields of the `SheetProperties` schema in `name = value` form.
`.before, .after`	Optional specification of where to put the new sheet(s). Specify, at most, one of `.before` and `.after`. Refer to an existing sheet by name (via a string) or by position (via a number). If unspecified, Sheets puts the new sheet(s) at the end.

Value

The input `ss`, as an instance of `sheets_id`

See Also

Makes a batch of `AddSheetRequest`s (one per sheet):

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#addsheetrequest

Other worksheet functions: `sheet_append()`, `sheet_copy()`, `sheet_delete()`, `sheet_properties()`, `sheet_relocate()`, `sheet_rename()`, `sheet_resize()`, `sheet_write()`

Examples

```
ss <- gs4_create("add-sheets-to-me")

# the only required argument is the target spreadsheet
ss %>% sheet_add()

# but you CAN specify sheet name and/or position
ss %>% sheet_add("apple", .after = 1)
ss %>% sheet_add("banana", .after = "apple")

# add multiple sheets at once
ss %>% sheet_add(c("coconut", "dragonfruit"))

# keeners can even specify additional sheet properties
ss %>%
  sheet_add(
    sheet = "eggplant",
    .before = 1,
    gridProperties = list(
      rowCount = 3, columnCount = 6, frozenRowCount = 1
    )
  )

# get an overview of the sheets
sheet_properties(ss)

# clean up
gs4_find("add-sheets-to-me") %>%
  googledrive::drive_trash()
```

---

sheet_append *Append rows to a sheet*

Description

Adds one or more new rows after the last row with data in a (work)sheet, increasing the row dimension of the sheet if necessary.

Usage

```
sheet_append(ss, data, sheet = 1)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().
data	A data frame.
sheet	Sheet to append to, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number.

Value

The input ss, as an instance of sheets_id

See Also

Makes an AppendCellsRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#AppendCellsRequest

Other write functions: gs4_create(), gs4_formula(), range_delete(), range_flood(), range_write(), sheet_write()

Other worksheet functions: sheet_add(), sheet_copy(), sheet_delete(), sheet_properties(), sheet_relocate(), sheet_rename(), sheet_resize(), sheet_write()

Examples

```
# we will recreate the table of "other" deaths from this example Sheet
(deaths <- gs4_example("deaths") %>%
  range_read(range = "other_data", col_types = "????DD"))

# split the data into 3 pieces, which we will send separately
deaths_one <- deaths[1:5, ]
deaths_two <- deaths[6, ]
deaths_three <- deaths[7:10, ]

# create a Sheet and send the first chunk of data
ss <- gs4_create("sheet-append-demo", sheets = list(deaths = deaths_one))

# append a single row
ss %>% sheet_append(deaths_two)
```

```
# append remaining rows
ss %>% sheet_append(deaths_three)

# read and check against the original
deaths_replica <- range_read(ss, col_types = "????DD")
identical(deaths, deaths_replica)

# clean up
gs4_find("sheet-append-demo") %>%
  googledrive::drive_trash()
```

`sheet_copy` *Copy a (work)sheet*

Description

Copies a (work)sheet, within its current (spread)Sheet or to another Sheet.

Usage

```
sheet_copy(
  from_ss,
  from_sheet = NULL,
  to_ss = from_ss,
  to_sheet = NULL,
  .before = NULL,
  .after = NULL
)
```

Arguments

`from_ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`from_sheet`	Sheet to copy, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Defaults to the first visible sheet.
`to_ss`	The Sheet to copy *to*. Accepts all the same types of input as `from_ss`, which is also what this defaults to, if unspecified.

`to_sheet` Optional. Name of the new sheet, as a string. If you don't specify this, Google generates a name, along the lines of "Copy of blah". Note that sheet names must be unique within a Sheet, so if the automatic name would violate this, Google also de-duplicates it for you, meaning you could conceivably end up with "Copy of blah 2". If you have better ideas about sheet names, specify `to_sheet`.

`.before, .after` Optional specification of where to put the new sheet. Specify, at most, one of `.before` and `.after`. Refer to an existing sheet by name (via a string) or by position (via a number). If unspecified, Sheets puts the new sheet at the end.

Value

The receiving Sheet, `to_ ss`, as an instance of `sheets_id`.

See Also

If the copy happens within one Sheet, makes a `DuplicateSheetRequest`:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#duplicatesheetrequest

If the copy is from one Sheet to another, wraps the `spreadsheets.sheets/copyTo` endpoint:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets.sheets/copyTo

and possibly makes a subsequent `UpdateSheetPropertiesRequest`:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#UpdateSheetPropertiesRequest

Other worksheet functions: `sheet_add()`, `sheet_append()`, `sheet_delete()`, `sheet_properties()`, `sheet_relocate()`, `sheet_rename()`, `sheet_resize()`, `sheet_write()`

Examples

```
ss_aaa <- gs4_create(
  "sheet-copy-demo-aaa",
  sheets = list(mtcars = head(mtcars), chickwts = head(chickwts))
)

# copy 'mtcars' sheet within existing Sheet, accept autogenerated name
ss_aaa %>%
  sheet_copy()

# copy 'mtcars' sheet within existing Sheet
# specify new sheet's name and location
ss_aaa %>%
  sheet_copy(to_sheet = "mtcars-the-sequel", .after = 1)

# make a second Sheet
```

```
ss_bbb <- gs4_create("sheet-copy-demo-bbb")

# copy 'chickwts' sheet from first Sheet to second
# accept auto-generated name and default location
ss_aaa %>%
  sheet_copy("chickwts", to_ss = ss_bbb)

# copy 'chickwts' sheet from first Sheet to second,
# WITH a specific name and into a specific location
ss_aaa %>%
  sheet_copy(
    "chickwts",
    to_ss = ss_bbb, to_sheet = "chicks-two", .before = 1
  )

# clean up
gs4_find("sheet-copy-demo") %>%
  googledrive::drive_trash()
```

`sheet_delete` *Delete one or more (work)sheets*

Description

Deletes one or more (work)sheets from a (spread)Sheet.

Usage

```
sheet_delete(ss, sheet)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`sheet`	Sheet to delete, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. You can pass a vector to delete multiple sheets at once or even a list, if you need to mix names and positions.

Value

The input `ss`, as an instance of `sheets_id`

See Also

Makes an `DeleteSheetsRequest`:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#DeleteSheetRequest

Other worksheet functions: `sheet_add()`, `sheet_append()`, `sheet_copy()`, `sheet_properties()`, `sheet_relocate()`, `sheet_rename()`, `sheet_resize()`, `sheet_write()`

Examples

```
ss <- gs4_create("delete-sheets-from-me")
sheet_add(ss, c("alpha", "beta", "gamma", "delta"))

# get an overview of the sheets
sheet_properties(ss)

# delete sheets
sheet_delete(ss, 1)
sheet_delete(ss, "gamma")
sheet_delete(ss, list("alpha", 2))

# get an overview of the sheets
sheet_properties(ss)

# clean up
gs4_find("delete-sheets-from-me") %>%
  googledrive::drive_trash()
```

`sheet_properties` *Get data about (work)sheets*

Description

Reveals full metadata or just the names for the (work)sheets inside a (spread)Sheet.

Usage

```
sheet_properties(ss)

sheet_names(ss)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id

- a one-row dribble, which is how googledrive represents Drive files
- an instance of googlesheets4_spreadsheet, which is what gs4_get() returns

Processed through as_sheets_id().

Value

- sheet_properties(): A tibble with one row per (work)sheet.
- sheet_names(): A character vector of (work)sheet names.

See Also

Other worksheet functions: sheet_add(), sheet_append(), sheet_copy(), sheet_delete(), sheet_relocate(), sheet_rename(), sheet_resize(), sheet_write()

Examples

```
ss <- gs4_example("gapminder")
sheet_properties(ss)
sheet_names(ss)
```

---

sheet_relocate *Relocate one or more (work)sheets*

Description

Move (work)sheets around within a (spread)Sheet. The outcome is most predictable for these common and simple use cases:

- Reorder and move one or more sheets to the front.
- Move a single sheet to a specific (but arbitrary) location.
- Move multiple sheets to the back with .after = 100 (.after can be any number greater than or equal to the number of sheets).

If your relocation task is more complicated and you are puzzled by the result, break it into a sequence of simpler calls to sheet_relocate().

Usage

```
sheet_relocate(ss, sheet, .before = if (is.null(.after)) 1, .after = NULL)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().
sheet	Sheet to relocate, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. You can pass a vector to move multiple sheets at once or even a list, if you need to mix names and positions.
.before, .after	Specification of where to locate the sheets(s) identified by sheet. Exactly one of .before and .after must be specified. Refer to an existing sheet by name (via a string) or by position (via a number).

Value

The input ss, as an instance of sheets_id

See Also

Constructs a batch of UpdateSheetPropertiesRequests (one per sheet):

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#UpdateSheetPropertiesRequest

Other worksheet functions: sheet_add(), sheet_append(), sheet_copy(), sheet_delete(), sheet_properties(), sheet_rename(), sheet_resize(), sheet_write()

Examples

```
sheet_names <- c("alfa", "bravo", "charlie", "delta", "echo", "foxtrot")
ss <- gs4_create("sheet-relocate-demo", sheets = sheet_names)
sheet_names(ss)

# move one sheet, forwards then backwards
ss %>%
  sheet_relocate("echo", .before = "bravo") %>%
  sheet_names()
ss %>%
  sheet_relocate("echo", .after = "delta") %>%
  sheet_names()

# reorder and move multiple sheets to the front
ss %>%
  sheet_relocate(list("foxtrot", 4)) %>%
```

```
  sheet_names()

# put the sheets back in the original order
ss %>%
  sheet_relocate(sheet_names) %>%
  sheet_names()

# reorder and move multiple sheets to the back
ss %>%
  sheet_relocate(c("bravo", "alfa", "echo"), .after = 10) %>%
  sheet_names()

# clean up
gs4_find("sheet-relocate-demo") %>%
  googledrive::drive_trash()
```

`sheet_rename` *Rename a (work)sheet*

Description

Changes the name of a (work)sheet.

Usage

```
sheet_rename(ss, sheet = NULL, new_name)
```

Arguments

`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files • an instance of `googlesheets4_spreadsheet`, which is what `gs4_get()` returns Processed through `as_sheets_id()`.
`sheet`	Sheet to rename, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number. Defaults to the first visible sheet.
`new_name`	New name of the sheet, as a string. This is required.

Value

The input `ss`, as an instance of `sheets_id`

See Also

Makes an UpdateSheetPropertiesRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#UpdateSheetPropertiesRequest

Other worksheet functions: sheet_add(), sheet_append(), sheet_copy(), sheet_delete(), sheet_properties(), sheet_relocate(), sheet_resize(), sheet_write()

Examples

```
ss <- gs4_create(
  "sheet-rename-demo",
  sheets = list(cars = head(cars), chickwts = head(chickwts))
)
sheet_names(ss)

ss %>%
  sheet_rename(1, new_name = "automobiles") %>%
  sheet_rename("chickwts", new_name = "poultry")

# clean up
gs4_find("sheet-rename-demo") %>%
  googledrive::drive_trash()
```

---

sheet_resize *Change the size of a (work)sheet*

Description

Changes the number of rows and/or columns in a (work)sheet.

Usage

```
sheet_resize(ss, sheet = NULL, nrow = NULL, ncol = NULL, exact = FALSE)
```

Arguments

ss	Something that identifies a Google Sheet: • its file id as a string or drive_id • a URL from which we can recover the id • a one-row dribble, which is how googledrive represents Drive files • an instance of googlesheets4_spreadsheet, which is what gs4_get() returns Processed through as_sheets_id().

sheet	Sheet to resize, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number.
nrow, ncol	Desired number of rows or columns, respectively. The default of NULL means to leave unchanged.
exact	Logical, indicating whether to impose nrow and ncol exactly or to treat them as lower bounds. If exact = FALSE, sheet_resize() can only add cells. If exact = TRUE, cells can be deleted and their contents are lost.

Value

The input ss, as an instance of sheets_id

See Also

Makes an UpdateSheetPropertiesRequest:

- https://developers.google.com/sheets/api/reference/rest/v4/spreadsheets/request#UpdateSheetPropertiesRequest

Other worksheet functions: sheet_add(), sheet_append(), sheet_copy(), sheet_delete(), sheet_properties(), sheet_relocate(), sheet_rename(), sheet_write()

Examples

```
# create a Sheet with the default initial worksheet
(ss <- gs4_create("sheet-resize-demo"))

# see (work)sheet dims
sheet_properties(ss)

# no resize occurs
sheet_resize(ss, nrow = 2, ncol = 6)

# reduce sheet size
sheet_resize(ss, nrow = 5, ncol = 7, exact = TRUE)

# add rows
sheet_resize(ss, nrow = 7)

# add columns
sheet_resize(ss, ncol = 10)

# add rows and columns
sheet_resize(ss, nrow = 9, ncol = 12)

# re-inspect (work)sheet dims
sheet_properties(ss)

# clean up
gs4_find("sheet-resize-demo") %>%
  googledrive::drive_trash()
```

`sheet_write` *(Over)write new data into a Sheet*

Description

This is one of the main ways to write data with googlesheets4. This function writes a data frame into a (work)sheet inside a (spread)Sheet. The target sheet is styled as a table:

- Special formatting is applied to the header row, which holds column names.
- The first row (header row) is frozen.
- The sheet's dimensions are set to "shrink wrap" the `data`.

If no existing Sheet is specified via `ss`, this function delegates to `gs4_create()` and the new Sheet's name is randomly generated. If that's undesirable, call `gs4_create()` directly to get more control.

If no `sheet` is specified or if `sheet` doesn't identify an existing sheet, a new sheet is added to receive the `data`. If `sheet` specifies an existing sheet, it is effectively overwritten! All pre-existing values, formats, and dimensions are cleared and the targeted sheet gets new values and dimensions from `data`.

This function goes by two names, because we want it to make sense in two contexts:

- `write_sheet()` evokes other table-writing functions, like `readr::write_csv()`. The `sheet` here technically refers to an individual (work)sheet (but also sort of refers to the associated Google (spread)Sheet).
- `sheet_write()` is the right name according to the naming convention used throughout the googlesheets4 package.

`write_sheet()` and `sheet_write()` are equivalent and you can use either one.

Usage

```
sheet_write(data, ss = NULL, sheet = NULL)

write_sheet(data, ss = NULL, sheet = NULL)
```

Arguments

`data`	A data frame. If it has zero rows, we send one empty pseudo-row of data, so that we can apply the usual table styling. This empty row goes away (gets filled, actually) the first time you send more data with `sheet_append()`.
`ss`	Something that identifies a Google Sheet: • its file id as a string or `drive_id` • a URL from which we can recover the id • a one-row `dribble`, which is how googledrive represents Drive files

- an instance of googlesheets4_spreadsheet, which is what gs4_get() returns

Processed through as_sheets_id().

sheet — Sheet to write into, in the sense of "worksheet" or "tab". You can identify a sheet by name, with a string, or by position, with a number.

Value

The input ss, as an instance of sheets_id

See Also

Other write functions: gs4_create(), gs4_formula(), range_delete(), range_flood(), range_write(), sheet_append()

Other worksheet functions: sheet_add(), sheet_append(), sheet_copy(), sheet_delete(), sheet_properties(), sheet_relocate(), sheet_rename(), sheet_resize()

Examples

```
df <- data.frame(
  x = 1:3,
  y = letters[1:3]
)

# specify only a data frame, get a new Sheet, with a random name
ss <- write_sheet(df)
read_sheet(ss)

# clean up
googledrive::drive_trash(ss)

# create a Sheet with some initial, placeholder data
ss <- gs4_create(
  "sheet-write-demo",
  sheets = list(alpha = data.frame(x = 1), omega = data.frame(x = 1))
)

# write df into its own, new sheet
sheet_write(df, ss = ss)

# write mtcars into the sheet named "omega"
sheet_write(mtcars, ss = ss, sheet = "omega")

# get an overview of the sheets
sheet_properties(ss)

# view your magnificent creation in the browser
gs4_browse(ss)

# clean up
```

```
gs4_find("sheet-write-demo") %>%
  googledrive::drive_trash()
```

---

spread_sheet *Spread a data frame of cells into spreadsheet shape*

Description

Reshapes a data frame of cells (presumably the output of range_read_cells()) into another data frame, i.e., puts it back into the shape of the source spreadsheet. This function exists primarily for internal use and for testing. The flagship function range_read(), a.k.a. read_sheet(), is what most users are looking for. It is basically range_read_cells() + spread_sheet().

Usage

```
spread_sheet(
  df,
  col_names = TRUE,
  col_types = NULL,
  na = "",
  trim_ws = TRUE,
  guess_max = min(1000, max(df$row)),
  .name_repair = "unique"
)
```

Arguments

df	A data frame with one row per (nonempty) cell, integer variables row and column (probably referring to location within the spreadsheet), and a list-column cell of SHEET_CELL objects.
col_names	TRUE to use the first row as column names, FALSE to get default names, or a character vector to provide column names directly. If user provides col_types, col_names can have one entry per column or one entry per unskipped column.
col_types	Column types. Either NULL to guess all from the spreadsheet or a string of readr-style shortcodes, with one character or code per column. If exactly one col_type is specified, it is recycled. See Column Specification for more.
na	Character vector of strings to interpret as missing values. By default, blank cells are treated as missing data.
trim_ws	Logical. Should leading and trailing whitespace be trimmed from cell contents?
guess_max	Maximum number of data rows to use for guessing column types.
.name_repair	Handling of column names. By default, googlesheets4 ensures column names are not empty and are unique. There is full support for .name_repair as documented in tibble::tibble().

Value

A tibble in the shape of the original spreadsheet, but enforcing user's wishes regarding column names, column types, NA strings, and whitespace trimming.

Examples

```
df <- gs4_example("mini-gap") %>%
  range_read_cells()
spread_sheet(df)

# ^^ gets same result as ...
read_sheet(gs4_example("mini-gap"))
```

Index

∗ **auth functions**
  gs4_auth, 5
  gs4_auth_configure, 8
  gs4_deauth, 11
  gs4_scopes, 18
∗ **formatting functions**
  range_autofit, 20
∗ **low-level API functions**
  gs4_has_token, 17
  gs4_token, 19
  request_generate, 35
  request_make, 36
∗ **worksheet functions**
  sheet_add, 39
  sheet_append, 40
  sheet_copy, 42
  sheet_delete, 44
  sheet_properties, 45
  sheet_relocate, 46
  sheet_rename, 48
  sheet_resize, 49
  sheet_write, 51
∗ **write functions**
  gs4_create, 10
  gs4_formula, 15
  range_delete, 22
  range_flood, 24
  range_write, 32
  sheet_append, 40
  sheet_write, 51

anchored *(*cell-specification*)*, 3
as_sheets_id *(*sheets_id*)*, 37
as_sheets_id(), *9*, *16*, *21*, *22*, *24*, *27*, *29*, *31*, *33*, *39*, *41*, *42*, *44*, *46–49*, *52*

cell-specification, 3, *24*, *27*, *29*, *31*
cell_cols *(*cell-specification*)*, 3
cell_limits *(*cell-specification*)*, 3
cell_rows *(*cell-specification*)*, 3
cellranger, *3*

dribble, *9*, *14*, *16*, *21*, *22*, *24*, *27*, *29*, *31*, *33*, *38*, *39*, *41*, *42*, *44*, *46–49*, *51*
drive_id, *9*, *13*, *16*, *21*, *22*, *24*, *27*, *29*, *31*, *33*, *38*, *39*, *41*, *42*, *44*, *45*, *47–49*, *51*

gargle::AuthState, *8*
gargle::credentials_app_default(), *4*
gargle::gargle_oauth_cache(), *4*
gargle::gargle_oauth_client_from_json(), *8*
gargle::gargle_oauth_email(), *4*
gargle::gargle_oob_default(), *4*
gargle::gargle_options, *7*
gargle::request_build(), *36*, *37*
gargle::request_develop(), *36*
gargle::request_make(), *36*
gargle::request_retry(), *37*
gargle::token_email(), *20*
gargle::token_fetch(), *5*, *7*
gargle::token_tokeninfo(), *20*
gargle::token_userinfo(), *20*
gargle_oauth_cache(), *6*
gargle_oauth_client_type(), *6*
gargle_oauth_email(), *6*
gargle_oob_default(), *6*
googledrive, *38*
googledrive::as_id, *38*
googledrive::drive_find(), *13*, *14*
googledrive::drive_get(), *16*
googledrive::drive_get(YOUR_SHEET_NAME), *38*
googlesheets4, *38*
googlesheets4-configuration, 3
gs4_api_key *(*gs4_auth_configure*)*, 8
gs4_api_key(), *11*, *36*
gs4_auth, 5, *8*, *12*, *19*
gs4_auth(), *4*, *8*, *19*
gs4_auth_configure, *7*, 8, *12*, *19*

gs4_auth_configure(), *7*, *11*, *36*
gs4_browse, 9
gs4_create, 10, *15*, *23*, *25*, *34*, *41*, *52*
gs4_create(), *51*
gs4_deauth, *7, 8*, 11, *19*
gs4_deauth(), *8*, *19*, *31*, *36*
gs4_endpoints, 12
gs4_endpoints(), *35*
gs4_example *(*gs4_examples*)*, 13
gs4_examples, 13
gs4_find, 13
gs4_find(YOUR_SHEET_NAME), *38*
gs4_fodder, 14
gs4_formula, *10*, 15, *23*, *25*, *34*, *41*, *52*
gs4_get, 16
gs4_get(), *9*, *16*, *21, 22*, *24*, *27*, *29*, *31*, *33*, *38, 39*, *41, 42*, *44*, *46–49*, *52*
gs4_has_token, 17, *19*, *36, 37*
gs4_oauth_client *(*gs4_auth_configure*)*, 8
gs4_random, 18
gs4_scopes, *7, 8*, *12*, 18
gs4_scopes(), *6*, *18*
gs4_token, *17*, 19, *36, 37*
gs4_user, 20

httr, *19*, *37*
httr::config(), *6*, *19*
httr::POST(), *37*
httr::VERB(), *37*

ids::adjective_animal(), *18*

jsonlite::fromJSON(), *6*, *8*

local_gs4_quiet *(*googlesheets4-configuration*)*, 3

range_autofit, 20
range_clear *(*range_flood*)*, 24
range_clear(), *22*
range_delete, *10*, *15*, 22, *25*, *34*, *41*, *52*
range_flood, *10*, *15*, *23*, 24, *34*, *41*, *52*
range_read, 26
range_read(), *22*, *29*, *31*, *33*, *53*
range_read_cells, 29
range_read_cells(), *3*, *53*
range_speedread, 30
range_write, *10*, *15*, *23*, *25*, 32, *41*, *52*
read_sheet *(*range_read*)*, 26
read_sheet(), *3*, *29*, *53*
request_generate, *17*, *19*, 35, *37*
request_generate(), *12*, *37*
request_make, *17*, *19*, *36*, 36
request_make(), *35, 36*

sheet_add, 39, *41*, *43*, *45–47*, *49, 50*, *52*
sheet_append, *10*, *15*, *23*, *25*, *34*, *40*, 40, *43*, *45–47*, *49, 50*, *52*
sheet_append(), *32*, *51*
sheet_copy, *40, 41*, 42, *45–47*, *49, 50*, *52*
sheet_delete, *40, 41*, *43*, 44, *46, 47*, *49, 50*, *52*
sheet_delete(), *22, 23*
sheet_names *(*sheet_properties*)*, 45
sheet_properties, *40, 41*, *43*, *45*, 45, *47*, *49, 50*, *52*
sheet_relocate, *40, 41*, *43*, *45, 46*, 46, *49, 50*, *52*
sheet_rename, *40, 41*, *43*, *45–47*, 48, *50*, *52*
sheet_resize, *40, 41*, *43*, *45–47*, *49*, 49, *52*
sheet_resize(), *22*
sheet_write, *10*, *15*, *23*, *25*, *34*, *40, 41*, *43*, *45–47*, *49, 50*, 51
sheet_write(), *10*, *32*
sheets_id, *10*, *13*, *21*, *23, 24*, *33*, 37, *39*, *41*, *43, 44*, *47, 48*, *50*, *52*
spread_sheet, 53
spread_sheet(), *29*

tibble, *27*, *32*
tibble::tibble(), *27*, *53*
Token2.0, *6*

with_gs4_quiet *(*googlesheets4-configuration*)*, 3
write_sheet *(*sheet_write*)*, 51
write_sheet(), *32*