

# Package ‘AnVIL’

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**Title** Bioconductor on the AnVIL compute environment

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**Description** The AnVIL is a cloud computing resource developed in part by the National Human Genome Research Institute. The AnVIL package provides programatic access to the Dockstore, Leonardo, Rawls, TDR, and Terra RESTful programming interfaces. For platform-specific user-level functionality, see either the AnVILGCP or AnVILAz package.

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|               |                                                             |
|---------------|-------------------------------------------------------------|
| AnVIL-package | <i>AnVIL: Bioconductor on the AnVIL compute environment</i> |
|---------------|-------------------------------------------------------------|

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## Description

The AnVIL is a cloud computing resource developed in part by the National Human Genome Research Institute. The AnVIL package provides end-user and developer functionality. For the end-user, AnVIL provides fast binary package installation, utilities for working with Terra / AnVIL table and data resources, and convenient functions for file movement to and from Google cloud storage. For developers, AnVIL provides programatic access to the Terra, Leonardo, Rawls, and Dockstore RESTful programming interface, including helper functions to transform JSON responses to formats more amenable to manipulation in R.

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## Description

Functions documented on this page are primarily intended for package developers wishing to implement gadgets (graphical interfaces) to navigating AnVIL-generated tables.

`.gadget_run()` presents the user with a tibble-navigating gadget, returning the value of `DONE_FUN` if a row of the tibble is selected, or `NULL`.

## Usage

```
.gadget_run(title, tibble, DONE_FUN)
```

## Arguments

|                       |                                                                                                                                                                                                                                                                                                            |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>title</code>    | character(1) (required) title to appear at the base of the gadget, e.g., "AnVIL Workspaces".                                                                                                                                                                                                               |
| <code>tibble</code>   | a tibble or <code>data.frame</code> to be displayed in the gadget.                                                                                                                                                                                                                                         |
| <code>DONE_FUN</code> | a function of two arguments, <code>tibble</code> and <code>row_selected</code> . The tibble is the tibble provided as an argument to <code>.gadget_run()</code> . <code>row_selected</code> is the row selected in the gadget by the user. The function is only invoked when the user selects a valid row. |

## Value

`.gadget_run()` returns the result of `DONE_FUN()` if a row has been selected by the user, or `NULL` if no row is selected (the user presses Cancel, or Done prior to selecting any row).

## Examples

```
## Not run:
tibble <- avworkspaces()
DONE_FUN <- function(tibble, row_selected) {
  selected <- slice(tibble, row_selected)
  with(selected, paste0(namespace, "/", name))
}
.gadget_run("AnVIL Example", tibble, DONE_FUN)

## End(Not run)
```

---

|                    |                                                              |
|--------------------|--------------------------------------------------------------|
| avworkspace_gadget | <i>Graphical user interfaces for common AnVIL operations</i> |
|--------------------|--------------------------------------------------------------|

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## Description

`workspace()` allows choice of workspace for subsequent use. It is the equivalent of displaying workspaces with `avworkspaces()`, and setting the selected workspace with `avworkspace()`.

`browse_workspace()` uses `browseURL()` to open a browser window pointing to the Terra workspace.

`table()` allows choice of table in the current workspace (selected by `avworkspace()` or `workspace()`) to be returned as a tibble. It is equivalent to invoking `avtables()` to show available tables, and `avtable()` to retrieve the selected table.

`workflow()` allows choice of workflow for retrieval. It is the equivalent of `avworkflows()` for listing available workflows, and `avworkflow_configuration_get()` for retrieving the workflow.

## Usage

```
avworkspace_gadget()

browse_workspace(use_avworkspace = TRUE)

avtable_gadget()

avworkflow_gadget()
```

## Arguments

`use_avworkspace`  
logical(1) when TRUE (default), use the selected workspace (via `workspace()` or `avworkspace()` if available. If FALSE or no workspace is currently selected, use `workspace()` to allow the user to select the workspace.

## Value

`workspace()` returns the selected workspace as a character(1) using the format namespace/name, or character(0) if no workspace is selected.

`browse_workspace()` returns the status of a `system()` call to launch the browser, invisibly.

`table()` returns a tibble representing the selected AnVIL table.

`workflow()` returns an `avworkflow_configuration` object representing the inputs and outputs of the selected workflow. This can be edited and updated as described in the "Running an AnVIL workflow within R" vignette.

## Examples

```
## Not run:
workspace()
browse_workspace(use_avworkspace = FALSE)
tbl <- table()
wkflw <- avworkflow_gadget()

## End(Not run)
```

---

|         |                                    |
|---------|------------------------------------|
| Service | <i>RESTful service constructor</i> |
|---------|------------------------------------|

---

## Description

RESTful service constructor

## Usage

```
Service(
  service,
  host,
  config = httr::config(),
  authenticate = TRUE,
  api_url = character(),
  package = "AnVIL",
  schemes = "https",
  api_reference_url = api_url,
  api_reference_md5sum = character(),
  api_reference_version = character(),
  api_reference_headers = NULL,
  ...
)
```

## Arguments

|                       |                                                                                                                                                                                                                            |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| service               | character(1) The Service class name, e.g., "terra".                                                                                                                                                                        |
| host                  | character(1) host name that provides the API resource, e.g., "leonardo.dsde-prod.broadinstitute.org".                                                                                                                      |
| config                | httr::config() curl options                                                                                                                                                                                                |
| authenticate          | logical(1) use credentials from authentication service file 'auth.json' in the specified package?                                                                                                                          |
| api_url               | optional character(1) url location of OpenAPI .json or .yaml service definition.                                                                                                                                           |
| package               | character(1) (default AnVIL) The package where 'api.json' yaml and (optionally) 'auth.json' files are located.                                                                                                             |
| schemes               | character(1) (default 'https') Specifies the transfer protocol supported by the API service.                                                                                                                               |
| api_reference_url     | character(1) path to reference API. See Details.                                                                                                                                                                           |
| api_reference_md5sum  | character(1) the result of tools::md5sum() applied to the reference API.                                                                                                                                                   |
| api_reference_version | character(1) the version of the reference API. This is used to check that the version of the service matches the version of the reference API. It is usually set by the service generation function, e.g., AnVIL::Rawls(). |
| api_reference_headers | character() header(s) to be used (e.g., c(Authorization = paste("Bearer", token))) when retrieving the API reference for validation.                                                                                       |
| ...                   | additional arguments passed to rapiclient::get_api()                                                                                                                                                                       |

## Details

This function creates a RESTful interface to a service provided by a host, e.g., "leonardo.dsde-prod.broadinstitute.org". The function requires an OpenAPI .json or .yaml specification as well as an (optional) .json authentication token. These files are located in the source directory of a package, at <package>/inst/service/<service>/api.json and <package>/inst/service/<service>/auth.json or at api\_url.

When provided, the api\_reference\_md5sum is used to check that the file described at api\_reference\_url has the same checksum as an author-validated version.

The service is usually a singleton, created at the package level during .onLoad().

## Value

An object of class Service.

## Examples

```
.MyService <- setClass("MyService", contains = "Service")

MyService <- function() {
  .MyService(Service("my_service", host="my.api.org"))
}
```

---

Services

*RESTful services useful for AnVIL developers*

---

## Description

RESTful services useful for AnVIL developers

## Usage

```
empty_object

operations(x, ..., .deprecated = FALSE)

## S4 method for signature 'Service'
operations(x, ..., auto_unbox = FALSE, .deprecated = FALSE)

schemas(x)

tags(x, .tags, .deprecated = FALSE)

## S4 method for signature 'Service'
x$name

Leonardo()

Terra()

Rawls()
```

Dockstore()

TDR()

### Arguments

|             |                                                                                                                       |
|-------------|-----------------------------------------------------------------------------------------------------------------------|
| x           | A Service instance, usually a singleton provided by the package and documented on this page, e.g., leonardo or terra. |
| ...         | additional arguments passed to methods or, for operations, Service-method, to the internal get_operation() function.  |
| .deprecated | optional logical(1) include deprecated operations?                                                                    |
| auto_unbox  | logical(1) If FALSE (default) do not automatically 'unbox' R scalar values from JSON arrays to JSON scalars.          |
| .tags       | optional character() of tags to use to filter operations.                                                             |
| name        | A symbol representing a defined operation, e.g., leonardo\$listRuntimes().                                            |

### Details

Note the services Terra(), Rawls(), and Leonardo() require the GCPtools package for authentication to the Google Cloud Platform. See ?GCPtools::gcloud\_access\_token() for details.

When using \$ to select a service, some arguments appear in 'body' of the REST request. Specify these using the `.__body__=` argument, as illustrated for createBillingProjectFull(), below.

### Value

empty\_object returns a representation to be used as arguments in function calls expecting the empty json object {}.

Leonardo() creates the API of the Leonardo container deployment service at <https://leonardo.dsde-prod.broadinstitute.org/api-docs.yaml>.

Terra() creates the API of the Terra cloud computational environemnt at <https://api.firecloud.org/>.

Rawls() creates the API of the Rawls cloud computational environemnt at <https://rawls.dsde-prod.broadinstitute.org>.

Dockstore() represents the API of the Dockstore platform to share Docker-based tools in CWL or WDL or Nextflow at <https://dockstore.org>

TDR() creates the API of the Terra Data Repository to work with snapshot data in the Terra Data Repository at <https://data.terra.bio>.

### Examples

```
empty_object

library(GCPtools)
if (gcloud_exists()) {
  ## Arguments to be used as the 'body' (`.__body__=`) of a REST query
  Terra()$createBillingProjectFull      # 6 arguments...
  args(Terra()$createBillingProjectFull) # ... passed as `.__body__ = list(...)`
}
library(GCPtools)
if (gcloud_exists())
```

```
Leonardo()

library(GCPtools)
if (gcloud_exists()) {
  tags(Terra())
  tags(Terra(), "Billing")
}

library(GCPtools)
if (gcloud_exists()) {
  tags(Rawls())
  tags(Rawls(), "billing")
}

Dockstore()

library(GCPtools)
if (gcloud_exists())
  TDR()
```

---

utilities

*Utilities for managing library paths*

---

## Description

`add_libpaths()`: Add local library paths to `.libPaths()`.

## Usage

```
add_libpaths(paths)
```

## Arguments

|                    |                                                                                                                                |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <code>paths</code> | <code>character()</code> : vector of directories to add to <code>.libPaths()</code> . Paths that do not exist will be created. |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------|

## Value

`add_libpaths()`: updated `.libPaths()`, invisibly.

## Examples

```
## Not run: add_libpaths("/tmp/host-site-library")
```



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