

# Package ‘hubUtils’

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**Version** 1.2.0

**Title** Core 'hubverse' Utilities

**Description** Core set of low-level utilities common across the 'hubverse'. Used to interact with 'hubverse' schema, Hub configuration files and model outputs and designed to be primarily used internally by other 'hubverse' packages. See Reich et al. (2022) <[doi:10.2105/AJPH.2022.306831](https://doi.org/10.2105/AJPH.2022.306831)> for an overview of Collaborative Hubs.

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**URL** <https://github.com/hubverse-org/hubUtils>,  
<https://hubverse-org.github.io/hubUtils/>

**BugReports** <https://github.com/hubverse-org/hubUtils/issues>

**Depends** R (>= 4.1.0)

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magrittr, memoise, purrr, rlang, stats, stringr, tibble, utils

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---

as_config	<i>Coerce a config list to a config class object</i>
-----------	--

---

**Description**

Coerce a config list to a config class object

**Usage**

```
as_config(x)
```

**Arguments**

x a list representation of the contents a tasks.json config file.

**Value**

a config list object with subclass <config>.

**Examples**

```
config_tasks <- read_config(  
  hub_path = system.file("testhubs/simple", package = "hubUtils")  
)  
# Remove all attributes except names to demonstrate functionality  
attributes(config_tasks) <- attributes(config_tasks)[  
  names(attributes(config_tasks)) == "names"  
]  
# Convert to config object  
as_config(config_tasks)
```

---

as_model_out_tbl	<i>Convert model output to a model_out_tbl class object.</i>
------------------	--

---

**Description**

Convert model output to a model\_out\_tbl class object.

**Usage**

```
as_model_out_tbl(  
  tbl,  
  model_id_col = NULL,  
  output_type_col = NULL,  
  output_type_id_col = NULL,  
  value_col = NULL,
```

```

  sep = "-",
  trim_to_task_ids = FALSE,
  hub_con = NULL,
  task_id_cols = NULL,
  remove_empty = FALSE
)

```

## Arguments

tbl	a data.frame or tibble of model output data returned from a query to a <hub_connection> object.
model_id_col	character string. If a model_id column does not already exist in tbl, the tbl column name containing model_id data. Alternatively, if both a team_abbr and a model_abbr column exist, these will be merged automatically to create a single model_id column.
output_type_col	character string. If an output_type column does not already exist in tbl, the tbl column name containing output_type data.
output_type_id_col	character string. If an output_type_id column does not already exist in tbl, the tbl column name containing output_type_id data.
value_col	character string. If a value column does not already exist in tbl, the tbl column name containing value data.
sep	character string. Character used as separator when concatenating team_abbr and model_abbr column values into a single model_id string. Only applicable if model_id column not present and team_abbr and model_abbr columns are.
trim_to_task_ids	logical. Whether to trim tbl to task ID columns only. Task ID columns can be specified by providing a <hub_connection> class object to hub_con or manually through task_id_cols.
hub_con	a <hub_connection> class object. Only used if trim_to_task_ids = TRUE and tasks IDs should be determined from the hub config.
task_id_cols	a character vector of column names. Only used if trim_to_task_ids = TRUE to manually specify task ID columns to retain. Overrides hub_con argument if provided.
remove_empty	Logical. Whether to remove columns containing only NA.

## Value

A model\_out\_tbl class object.

## Examples

```
as_model_out_tbl(hub_con_output)
```

---

 check\_deprecated\_schema

*Check whether a config file is using a deprecated schema*


---

### Description

Function compares the current schema version in a config file to a valid version, If config file version deprecated compared to valid version, the function issues a lifecycle warning to prompt user to upgrade.

### Usage

```
check_deprecated_schema(
  config_version,
  config,
  valid_version = "v2.0.0",
  hubutils_version = "0.0.0.9010"
)
```

### Arguments

`config_version` Character string of the schema version.

`config` List representation of config file.

`valid_version` Character string of minimum valid schema version.

`hubutils_version` The version of the hubUtils package in which deprecation of the schema version below `valid_version` is introduced.

### Value

Invisibly, TRUE if the schema version is deprecated, FALSE otherwise. Primarily used for the side effect of issuing a lifecycle warning.

---

 convert\_output\_type *Transform between output types*


---

### Description

Transform between output types for each unique combination of task IDs for each model. Conversion must be from a single initial output type to one or more to output types, and the resulting output will only contain the to output types. See details for supported conversions.

### Usage

```
convert_output_type(model_out_tbl, to)
```

**Arguments**

- `model_out_tbl` an object of class `model_out_tbl` containing predictions with a single, unique value in the `output_type` column.
- `to` a named list indicating the desired output types and associated output type IDs. List item name and value pairs may be as follows:
- `mean`: NA (no associated output type ID)
  - `median`: NA (no associated output type ID)
  - `quantile`: a numeric vector of probability levels OR a dataframe of probability levels and the task ID variables they depend upon. (See examples section for an example of each.) Note that any task ID variable value must appear in the associated `model_out_tbl` task ID column

**Details**

Currently, only "sample" can be converted to "mean", "median", or "quantile"

**Value**

object of class `model_out_tbl` containing (only) predictions of the `to` `output_type(s)` for each unique combination of task IDs for each model

**Examples**

```
# We illustrate the conversion between output types using normal distributions
ex_quantiles <- c(0.25, 0.5, 0.75)
model_out_tbl <- expand.grid(
  stringsAsFactors = FALSE,
  group1 = c(1, 2),
  model_id = "A",
  output_type = "sample",
  output_type_id = 1:100
) |>
  dplyr::mutate(value = rnorm(200, mean = group1))

# Output type conversions with vector `to` elements
convert_output_type(model_out_tbl,
  to = list("quantile" = ex_quantiles, "median" = NA)
)

# Output type conversion with dataframe `to` element
# Output type ID values (quantile levels) are determined by group1 value
quantile_levels <- rbind(
  data.frame(group1 = 1, output_type_id = 0.5),
  data.frame(group1 = 2, output_type_id = c(0.25, 0.5, 0.75))
)
convert_output_type(model_out_tbl,
  to = list("quantile" = quantile_levels)
)
```

---

create_s3_url	<i>Create a URL to a file in an S3 bucket</i>
---------------	---

---

## Description

Create a URL to a file in an S3 bucket

## Usage

```
create_s3_url(base_fs, base_path)
```

## Arguments

**base\_fs** character string. Path of the base s3 file system (bucket) in the cloud. Can be extracted from the object of class `<SubTreeFileSystem>` using the `$base_fs` field, followed by the `$base_path`.

**base\_path** character string. Path to the file in relation to `base_fs`. Can be extracted from the object of class `<SubTreeFileSystem>` using the `$base_path`.

## Value

A character string of the URL to the file in s3.

## Examples

```
create_s3_url(  
  base_fs = "hubverse/hubutils/testhubs/simple/",  
  base_path = "hub-config/admin.json"  
)  
  
# Create a URL from an object of class `<SubTreeFileSystem>` of an s3 hub  
hub_path <- arrow::s3_bucket("hubverse/hubutils/testhubs/simple/")  
create_s3_url(hub_path$base_path, "hub-config/admin.json")  
config_path <- hub_path$path("hub-config/admin.json")  
# Create a URL from an object of class `<SubTreeFileSystem>` of the path to  
# a config file in an s3 hub  
create_s3_url(config_path$base_fs$base_path, config_path$base_path)
```

---

```
extract_schema_version
```

*Extract the schema version from a schema id or config schema\_version property character string*

---

### Description

Extract the schema version from a schema id or config schema\_version property character string

### Usage

```
extract_schema_version(id)
```

### Arguments

`id` A schema id or config schema\_version property character string.

### Value

The schema version number as a character string.

### Examples

```
extract_schema_version("schema_version: v3.0.0")
extract_schema_version("refs/heads/main/v3.0.0")
```

---

```
get_config_tid
```

*Get the name of the output type id column based on the schema version*

---

### Description

Version can be provided either directly through the config\_version argument or extracted from a config\_tasks object.

### Usage

```
get_config_tid(config_version, config_tasks)
```

### Arguments

`config_version` Character string of the schema version.

`config_tasks` a list version of the content's of a hub's tasks.json config file, accessed through the "config\_tasks" attribute of a <hub\_connection> object or function [read\\_config\(\)](#).

### Value

character string of the name of the output type id column



**Examples**

```

get_config_tid("v3.0.0")
get_config_tid("v2.0.0")

# this will produce a warning because support for schema version 1.0.0
# has been dropped.
get_config_tid("v1.0.0")

```

---

get_hub_timezone	<i>Get hub configuration fields</i>
------------------	-------------------------------------

---

**Description**

Get hub configuration fields

**Usage**

```

get_hub_timezone(hub_path)

get_hub_model_output_dir(hub_path)

get_hub_file_formats(hub_path, round_id = NULL)

get_hub_derived_task_ids(hub_path, round_id = NULL)

```

**Arguments**

hub_path	Either a character string path to a local Modeling Hub directory, a character string of a URL to a GitHub repository or an object of class <code>&lt;SubTreeFileSystem&gt;</code> created using functions <code>arrow::s3_bucket()</code> or <code>arrow::gs_bucket()</code> by providing a string S3 or GCS bucket name or path to a Modeling Hub directory stored in the cloud. For more details consult the <a href="#">Using cloud storage (S3, GCS)</a> in the arrow package.
round_id	Character string. Round identifier. If the round is set to <code>round_id_from_variable: true</code> , IDs are values of the task ID defined in the round's <code>round_id</code> property of <code>config_tasks</code> . Otherwise should match round's <code>round_id</code> value in config. Ignored if hub contains only a single round.

**Value**

- `get_hub_timezone`: The timezone of the hub
- `get_hub_model_output_dir`: The model output directory name
- `get_hub_file_formats`: character vector accepted hub or round level file formats. If `round_id` is NULL or the round does not have a round level `file_format` setting, returns the hub level `file_format` setting.

- `get_hub_derived_task_ids`: character vector of hub or round level derived task ID names. If `round_id` is NULL or the round does not have a `round_level_derived_tasks_ids` setting, returns the hub level `derived_tasks_ids` setting.

## Functions

- `get_hub_timezone()`: Get the hub timezone
- `get_hub_model_output_dir()`: Get the model output directory name
- `get_hub_file_formats()`: Get the hub or round level file formats
- `get_hub_derived_task_ids()`: Get the hub or round level `derived_tasks_ids`

## Examples

```
hub_path <- system.file("testhubs", "flusight", package = "hubUtils")
get_hub_timezone(hub_path)
get_hub_model_output_dir(hub_path)
get_hub_file_formats(hub_path)
get_hub_file_formats(hub_path, "2022-12-12")
```

---

get\_round\_idx

*Utilities for accessing round ID metadata*

---

## Description

Utilities for accessing round ID metadata

## Usage

```
get_round_idx(config_tasks, round_id)

get_round_ids(
  config_tasks,
  flatten = c("all", "model_task", "task_id", "none")
)
```

## Arguments

- |                           |  |
|---------------------------|--|
| <code>config_tasks</code> | a list version of the content's of a hub's tasks. json config file, accessed through the "config_tasks" attribute of a <hub_connection> object or function <a href="#">read_config()</a> .   |
| <code>round_id</code>     | Character string. Round identifier. If the round is set to <code>round_id_from_variable</code> : true, IDs are values of the task ID defined in the round's <code>round_id</code> property of <code>config_tasks</code> . Otherwise should match round's <code>round_id</code> value in config. Ignored if hub contains only a single round. |
| <code>flatten</code>      | Character. Whether and how much to flatten output. <ul style="list-style-type: none"> <li>• "all": Complete flattening. Returns a character vector of unique round IDs across all rounds.</li> </ul>   |

- "model\_task": Flatten model tasks. Returns a list with an element for each round. Each round element contains a character vector of unique round IDs across all round model tasks. Only applicable if round\_id\_from\_variable is TRUE.
- "task\_id": Flatten task ID. Returns a nested list with an element for each round. Each round element contains a list with an element for each model task. Each model task element contains a character vector of unique round IDs, across required and optional properties. Only applicable if round\_id\_from\_variable is TRUE
- "none": No flattening. If round\_id\_from\_variable is TRUE, returns a nested list with an element for each round. Each round element contains a nested element for each model task. Each model task element contains a nested list of required and optional character vectors of round IDs. If round\_id\_from\_variable is FALSE, a list with a round ID for each round is returned.

### Value

the integer index of the element in config\_tasks\$rounds that a character round identifier maps to a list or character vector of hub round IDs

- A character vector is returned only if flatten = "all"
- A list is returned otherwise (see flatten for more details)

### Functions

- get\_round\_idx(): Get an integer index of the element in config\_tasks\$rounds that a character round identifier maps to.
- get\_round\_ids(): Get a list or character vector of hub round IDs. For each round, if round\_id\_from\_variable is TRUE, round IDs returned are the values of the task ID defined in the round\_id property. Otherwise, if round\_id\_from\_variable is FALSE, the value of the round\_id property is returned.

### Examples

```
config_tasks <- read_config(
  hub_path = system.file("testhubs/simple", package = "hubUtils")
)
# Get round IDs
get_round_ids(config_tasks)
get_round_ids(config_tasks, flatten = "model_task")
get_round_ids(config_tasks, flatten = "task_id")
get_round_ids(config_tasks, flatten = "none")
# Get round integer index using a round_id
get_round_idx(config_tasks, "2022-10-01")
get_round_idx(config_tasks, "2022-10-29")
```

---

get\_round\_model\_tasks *Get the model tasks for a given round*

---

### Description

Get the model tasks for a given round

### Usage

```
get_round_model_tasks(config_tasks, round_id)
```

### Arguments

`config_tasks` a list version of the content's of a hub's tasks.json config file, accessed through the "config\_tasks" attribute of a <hub\_connection> object or function [read\\_config\(\)](#).

`round_id` Character string. Round identifier. If the round is set to `round_id_from_variable`: true, IDs are values of the task ID defined in the round's `round_id` property of `config_tasks`. Otherwise should match round's `round_id` value in config. Ignored if hub contains only a single round.

### Value

a list representation of model tasks for a given round.

### Examples

```
hub_path <- system.file("testhubs/simple", package = "hubUtils")
config_tasks <- read_config(hub_path, "tasks")
get_round_model_tasks(config_tasks, round_id = "2022-10-08")
get_round_model_tasks(config_tasks, round_id = "2022-10-15")
```

---

get\_round\_task\_id\_names  
*Get task ID names for a given round*

---

### Description

Get task ID names for a given round

### Usage

```
get_round_task_id_names(config_tasks, round_id)
```

**Arguments**

- `config_tasks` a list version of the content's of a hub's tasks.json config file, accessed through the "config\_tasks" attribute of a <hub\_connection> object or function [read\\_config\(\)](#).
- `round_id` Character string. Round identifier. If the round is set to `round_id_from_variable`: true, IDs are values of the task ID defined in the round's `round_id` property of `config_tasks`. Otherwise should match round's `round_id` value in config. Ignored if hub contains only a single round.

**Value**

a character vector of task ID names

**Examples**

```
hub_path <- system.file("testhubs/simple", package = "hubUtils")
config_tasks <- read_config(hub_path, "tasks")
get_round_task_id_names(config_tasks, round_id = "2022-10-08")
get_round_task_id_names(config_tasks, round_id = "2022-10-15")
```

---

get\_schema

*Download a schema*

---

**Description**

Download a schema

**Usage**

```
get_schema(schema_url)
```

**Arguments**

- `schema_url` The download URL for a given config schema version.

**Value**

Contents of the JSON schema as a character string.

**See Also**

Other functions supporting config file validation: [get\\_schema\\_url\(\)](#), [get\\_schema\\_valid\\_versions\(\)](#)

**Examples**

```
schema_url <- get_schema_url(config = "tasks", version = "v0.0.0.9")
get_schema(schema_url)
```

---

get_schema_url	<i>Get the JSON schema download URL for a given config file version</i>
----------------	---

---

**Description**

Get the JSON schema download URL for a given config file version

**Usage**

```
get_schema_url(
  config = c("tasks", "admin", "model", "target-data"),
  version,
  branch = "main"
)
```

**Arguments**

config	Name of config file to validate. One of "tasks", "admin", "model" or "target-data".
version	A valid version of hubverse <b>schema</b> (e.g. "v0.0.1").
branch	The branch of the hubverse <b>schemas repository</b> from which to fetch schema. Defaults to "main".

**Value**

The JSON schema download URL for a given config file version.

**See Also**

Other functions supporting config file validation: [get\\_schema\(\)](#), [get\\_schema\\_valid\\_versions\(\)](#)

**Examples**

```
get_schema_url(config = "tasks", version = "v0.0.0.9")
```

---

get_schema_valid_versions	<i>Get a vector of valid schema version</i>
---------------------------	---

---

**Description**

Get a vector of valid schema version

**Usage**

```
get_schema_valid_versions(branch = "main")
```

### Arguments

`branch` The branch of the hubverse **schemas repository** from which to fetch schema. Defaults to "main".

### Value

a character vector of valid versions of hubverse **schema**.

### See Also

Other functions supporting config file validation: [get\\_schema\(\)](#), [get\\_schema\\_url\(\)](#)

### Examples

```
get_schema_valid_versions()
```

---

```
get_schema_version_latest
```

*Get the latest schema version*

---

### Description

Get the latest schema version from the schema repository if "latest" requested (default) or ignore if specific version provided.

### Usage

```
get_schema_version_latest(schema_version = "latest", branch = "main")
```

### Arguments

`schema_version` A character vector. Either "latest" or a valid schema version.  
`branch` The branch of the hubverse **schemas repository** from which to fetch schema. Defaults to "main".

### Value

a schema version string. If `schema_version` is "latest", the latest schema version from the schema repository. If specific version provided to `schema_version`, the same version is returned.

### Examples

```
# Get the latest version of the schema

get_schema_version_latest()
get_schema_version_latest(schema_version = "v3.0.0")
```

---

get\_task\_id\_names      *Get hub task IDs*

---

**Description**

Get hub task IDs

**Usage**

```
get_task_id_names(config_tasks)
```

**Arguments**

config\_tasks      a list version of the content's of a hub's tasks.json config file, accessed through the "config\_tasks" attribute of a <hub\_connection> object or function [read\\_config\(\)](#).

**Value**

a character vector of all unique task ID names across all rounds.

**Examples**

```
hub_path <- system.file("testhubs/simple", package = "hubUtils")
config_tasks <- read_config(hub_path, "tasks")
get_task_id_names(config_tasks)
```

---

get\_version\_config      *Get hub config schema versions*

---

**Description**

Get hub config schema versions

**Usage**

```
get_version_config(config)

get_version_file(config_path)

get_version_hub(hub_path, config_type = c("tasks", "admin", "target-data"))
```



**Arguments**

config	A <config> class object. Usually the output of read_config or read_config_file.
config_path	Either a character string of a path to a local JSON config file, a character string of the URL to the <b>raw contents</b> of a JSON config file (e.g on GitHub) or an object of class <SubTreeFileSystem> created using functions <code>arrow::s3_bucket()</code> and associated methods for creating paths to JSON config files within the bucket.
hub_path	Either a character string path to a local Modeling Hub directory, a character string of a URL to a GitHub repository or an object of class <SubTreeFileSystem> created using functions <code>arrow::s3_bucket()</code> or <code>arrow::gs_bucket()</code> by providing a string S3 or GCS bucket name or path to a Modeling Hub directory stored in the cloud. For more details consult the <a href="#">Using cloud storage (S3, GCS)</a> in the arrow package.
config_type	Character vector specifying the type of config file to read. One of "tasks", "admin" or "target-data". Default is "tasks".

**Value**

The schema version number as a character string.

**Functions**

- `get_version_config()`: Get schema version from config list representation.
- `get_version_file()`: Get schema version from config file at specific path.
- `get_version_hub()`: Get schema version from config file at specific path.

**Examples**

```

config <- read_config_file(
  system.file("config", "tasks.json", package = "hubUtils")
)
get_version_config(config)
config_path <- system.file("config", "tasks.json", package = "hubUtils")
get_version_file(config_path)
# Get version from a URL of a hub config file
url <- paste0(
  "https://raw.githubusercontent.com/hubverse-org/",
  "example-simple-forecast-hub/refs/heads/main/hub-config/tasks.json"
)
get_version_file(url)

# Get version from an AWS S3 cloud hub config file
hub_path <- arrow::s3_bucket("hubverse/hubutils/testhubs/simple/")
config_path <- hub_path$path("hub-config/admin.json")
get_version_file(config_path)

hub_path <- system.file("testhubs/simple", package = "hubUtils")
get_version_hub(hub_path)
get_version_hub(hub_path, "admin")

```



**Value**

Logical. TRUE if the URL is a GitHub repository URL, FALSE otherwise.

**Examples**

```
is_github_repo_url("https://github.com/hubverse-org/example-simple-forecast-hub")
raw_url <- paste0(
  "https://raw.githubusercontent.com/hubverse-org/",
  "example-simple-forecast-hub/refs/heads/main/hub-config/tasks.json"
)
is_github_repo_url(raw_url)
url_to_blob <- "https://github.com/hubverse-org/example-simple-forecast-hub/blob/main/README.md"
is_github_repo_url(url_to_blob)
```

---

is_github_url	<i>Detect a URL on github.com</i>
---------------	-----------------------------------

---

**Description**

Detect a URL on github.com

**Usage**

```
is_github_url(url)
```

**Arguments**

url                    character string of the URL to check.

**Value**

Logical. TRUE if the URL on github.com, FALSE otherwise.

**Examples**

```
# Returns TRUE
is_github_url("https://github.com/hubverse-org/example-simple-forecast-hub")
is_github_url("https://github.com/hubverse-org/schemas/tree/main/v5.0.0")
# Returns FALSE
is_github_url("https://gitlab.com/hubverse-org/schemas/tree/main/v5.0.0")
raw_url <- paste0(
  "https://raw.githubusercontent.com/hubverse-org/",
  "example-simple-forecast-hub/refs/heads/main/hub-config/tasks.json"
)
is_github_url(raw_url)
```

---

is_s3_base_fs	<i>Detect whether An object of class &lt;SubTreeFileSystem&gt; represents the base path of an S3 file system (i.e. the root of a cloud hub)</i>
---------------	---

---

**Description**

Detect whether An object of class <SubTreeFileSystem> represents the base path of an S3 file system (i.e. the root of a cloud hub)

**Usage**

```
is_s3_base_fs(s3_fs)
```

**Arguments**

s3\_fs            An object of class <SubTreeFileSystem>.

**Value**

Logical. TRUE if the object represents the base path of an S3 file, FALSE otherwise.

**Examples**

```
hub_path <- arrow::s3_bucket("hubverse/hubutils/testhubs/simple/")
config_path <- hub_path$path("hub-config/admin.json")
is_s3_base_fs(hub_path)
is_s3_base_fs(config_path)
```

---

is_url	<i>Determine if a string is a URL</i>
--------	---------------------------------------

---

**Description**

Determine if a string is a URL

**Usage**

```
is_url(x)
```

**Arguments**

x                character string to check if it is a URL. Must contain a protocol to be considered a URL.

**Value**

Logical. TRUE if x is a URL, FALSE otherwise.

**Examples**

```
is_url("https://docs.hubverse.io")
is_url("www.hubverse.io")
```

---

is_v3_config	<i>Is config list representation using v3.0.0 schema?</i>
--------------	---

---

**Description**

Is config list representation using v3.0.0 schema?

**Usage**

```
is_v3_config(config)
```

**Arguments**

config            List representation of the JSON config file.

**Value**

Logical, whether the config list representation is using v3.0.0 schema or greater.

**Examples**

```
config <- read_config_file(
  system.file("config", "tasks.json", package = "hubUtils")
)
is_v3_config(config)
```

---

is_v3_config_file	<i>Is config file using v3.0.0 schema?</i>
-------------------	--

---

**Description**

Is config file using v3.0.0 schema?

**Usage**

```
is_v3_config_file(config_path)
```

**Arguments**

`config_path` Either a character string of a path to a local JSON config file, a character string of the URL to the **raw contents** of a JSON config file (e.g on GitHub) or an object of class `<SubTreeFileSystem>` created using functions `arrow::s3_bucket()` and associated methods for creating paths to JSON config files within the bucket.

**Value**

Logical, whether the config file is using v3.0.0 schema or greater.

**Examples**

```
config_path <- system.file("config", "tasks.json", package = "hubUtils")
is_v3_config_file(config_path)
```

---

<code>is_v3_hub</code>	<i>Is hub configured using v3.0.0 schema?</i>
------------------------	---

---

**Description**

Is hub configured using v3.0.0 schema?

**Usage**

```
is_v3_hub(hub_path, config = c("tasks", "admin", "target-data"))
```

**Arguments**

`hub_path` Either a character string path to a local Modeling Hub directory, a character string of a URL to a GitHub repository or an object of class `<SubTreeFileSystem>` created using functions `arrow::s3_bucket()` or `arrow::gs_bucket()` by providing a string S3 or GCS bucket name or path to a Modeling Hub directory stored in the cloud. For more details consult the [Using cloud storage \(S3, GCS\)](#) in the arrow package.

`config` Type of config file to read. One of "tasks", "admin" or "model-metadata-schema". Default is "tasks".

**Value**

Logical, whether the hub is configured using v3.0.0 schema or greater.

**Examples**

```
is_v3_hub(hub_path = system.file("testhubs", "flusight", package = "hubUtils"))
```

---

is_valid_url	<i>Determine if a URL is valid and reachable</i>
--------------	--

---

**Description**

Determine if a URL is valid and reachable

**Usage**

```
is_valid_url(url)
```

**Arguments**

url                    character string of the URL to check.

**Value**

Logical. TRUE if the URL is valid and reachable, FALSE otherwise.

**Examples**

```
is_valid_url("https://docs.hubverse.io")
is_valid_url("https://docs.hubverse.io/invalid")
```

---

model_id_merge	<i>Merge/Split model output tbl model_id column</i>
----------------	---

---

**Description**

Merge/Split model output tbl model\_id column

**Usage**

```
model_id_merge(tbl, sep = "-")
```

```
model_id_split(tbl, sep = "-")
```

**Arguments**

tbl                    a data.frame or tibble of model output data returned from a query to a <hub\_connection> object.

sep                    character string. Character used as separator when concatenating team\_abbr and model\_abbr values into a single model\_id string or splitting model\_id into component team\_abbr and model\_abbr. When splitting, if multiple instances of the separator exist in a model\_id stringing, splitting occurs on the first instance.

**Value**

tbl with either team\_abbrev and model\_abbrev merged into a single model\_id column or model\_id split into columns team\_abbrev and model\_abbrev.

a [tibble](#) with model\_id column split into separate team\_abbrev and model\_abbrev columns

**Functions**

- model\_id\_merge(): merge team\_abbrev and model\_abbrev into a single model\_id column.
- model\_id\_split(): split model\_id column into separate team\_abbrev and model\_abbrev columns.

**Examples**

```
tbl_split <- model_id_split(hub_con_output)
tbl_split

# Merge model_id
tbl_merged <- model_id_merge(tbl_split)
tbl_merged

# Split / Merge using custom separator
tbl_sep <- hub_con_output
tbl_sep$model_id <- gsub("-", "_", tbl_sep$model_id)
tbl_sep <- model_id_split(tbl_sep, sep = "_")
tbl_sep
tbl_sep <- model_id_merge(tbl_sep, sep = "_")
tbl_sep
```

---

read\_config

*Read a hub config file into R*

---

**Description**

Read a hub config file into R

**Usage**

```
read_config(
  hub_path,
  config = c("tasks", "admin", "model-metadata-schema", "target-data"),
  silent = TRUE
)
```



**Arguments**

hub_path	Either a character string path to a local Modeling Hub directory, a character string of a URL to a GitHub repository or an object of class <code>&lt;SubTreeFileSystem&gt;</code> created using functions <code>arrow::s3_bucket()</code> or <code>arrow::gs_bucket()</code> by providing a string S3 or GCS bucket name or path to a Modeling Hub directory stored in the cloud. For more details consult the <a href="#">Using cloud storage (S3, GCS)</a> in the arrow package.
config	Type of config file to read. One of "tasks", "admin" or "model-metadata-schema". Default is "tasks".
silent	Logical. If TRUE, suppress warnings. Default is FALSE.

**Value**

The contents of the config file as an R list. If possible, the output is further converted to a `<config>` class object before returning. Note that "model-metadata-schema" files are never converted to a `<config>` object.

**Examples**

```
# Read config files from local hub
hub_path <- system.file("testhubs/simple", package = "hubUtils")
read_config(hub_path, "tasks")
read_config(hub_path, "admin")

# Read config file from a GitHub hub repository
github_url <- "https://github.com/hubverse-org/example-simple-forecast-hub"
read_config(github_url)
read_config(github_url, "admin")

# Read config file from AWS S3 bucket hub
hub_path <- arrow::s3_bucket("hubverse/hubutils/testhubs/simple/")
read_config(hub_path, "admin")
```

---

read_config_file	<i>Read a JSON config file from a path</i>
------------------	--

---

**Description**

Read a JSON config file from a path

**Usage**

```
read_config_file(config_path, silent = TRUE)
```

**Arguments**

config_path	Either a character string of a path to a local JSON config file, a character string of the URL to the <b>raw contents</b> of a JSON config file (e.g on GitHub) or an object of class <SubTreeFileSystem> created using functions <a href="#">arrow::s3_bucket()</a> and associated methods for creating paths to JSON config files within the bucket.
silent	Logical. If TRUE, suppress warnings. Default is FALSE.

**Value**

The contents of the config file as an R list. If possible, the output is further converted to a <config> class object before returning. Note that "model-metadata-schema" files are never converted to a <config> object.

**Examples**

```
# Read local config file
read_config_file(system.file("config", "tasks.json", package = "hubUtils"))
# Read config file from URL
url <- paste0(
  "https://raw.githubusercontent.com/hubverse-org/",
  "example-simple-forecast-hub/refs/heads/main/hub-config/tasks.json"
)
read_config_file(url)

# Read config file from AWS S3 bucket hub
hub_path <- arrow::s3_bucket("hubverse/hubutils/testhubs/simple/")
config_path <- hub_path$path("hub-config/admin.json")
read_config_file(config_path)
```

---

std\_colnames

*Hubverse model output standard column names*


---

**Description**

A named character string of standard column names used in hubverse model output data files. The terms currently used for standard column names in the hubverse are English. In future, however, this could be expanded to provide the basis for hub terminology localisation.

**Usage**

```
std_colnames
```

**Format**

An object of class character of length 4.

---

subset\_task\_id\_cols    *Subset a model\_out\_tbl or submission tbl.*

---

### Description

Subset a model\_out\_tbl or submission tbl.

### Usage

```
subset_task_id_cols(model_out_tbl)
```

```
subset_std_cols(model_out_tbl)
```

### Arguments

model\_out\_tbl    A model\_out\_tbl or submission tbl object. Must inherit from class data.frame.

### Value

- subset\_task\_id\_cols: an object of the same class as model\_out\_tbl which contains only task ID columns.
- subset\_std\_cols: an object of the same class as model\_out\_tbl which contains only hubverse standard columns (i.e. columns that are not task\_id columns).

### Functions

- subset\_task\_id\_cols(): subset a model\_out\_tbl or submission tbl to only include task\_id columns
- subset\_std\_cols(): subset a model\_out\_tbl or submission tbl to only include hubverse standard columns (i.e. columns that are not task\_id columns)

### Examples

```
model_out_tbl_path <- system.file("testhubs", "v4", "simple",  
  "model-output", "hub-baseline", "2022-10-15-hub-baseline.parquet",  
  package = "hubUtils"  
)  
model_out_tbl <- arrow::read_parquet(model_out_tbl_path)  
subset_task_id_cols(model_out_tbl)  
subset_std_cols(model_out_tbl)
```

---

subset\_task\_id\_names    *Subset a vector of column names to only include task IDs*

---

**Description**

Subset a vector of column names to only include task IDs

**Usage**

```
subset_task_id_names(x)
```

**Arguments**

x                      character vector of column names

**Value**

a character vector of task ID names

**Examples**

```
x <- c(
  "origin_date", "horizon", "target_date",
  "location", "output_type", "output_type_id", "value"
)
subset_task_id_names(x)
```

---

target-data-utils    *Get target data configuration properties*

---

**Description**

Utility functions for extracting properties from target-data.json configuration files (v6.0.0 schema). These functions handle defaults and inheritance patterns for target data configuration.

**Usage**

```
get_date_col(config_target_data)

get_observable_unit(
  config_target_data,
  dataset = c("time-series", "oracle-output")
)

get_versioned(config_target_data, dataset = c("time-series", "oracle-output"))
```

```

get_has_output_type_ids(config_target_data)

get_non_task_id_schema(config_target_data)

has_target_data_config(hub_path)

## Default S3 method:
has_target_data_config(hub_path)

## S3 method for class 'SubTreeFileSystem'
has_target_data_config(hub_path)

```

### Arguments

config_target_data	A target-data config object created by <code>read_config(hub_path, "target-data")</code> .
dataset	Character string specifying the dataset type: either "time-series" or "oracle-output". Used for functions that extract dataset-specific properties.
hub_path	Path to a hub. Can be a local directory path or cloud URL (S3, GCS).

### Details

#### Inheritance and Defaults:

Some properties can be specified at both the global level and the dataset level:

- **observable\_unit**: Dataset-specific values override global when specified, otherwise the global value is used.
- **versioned**: Dataset-specific values override global when specified, otherwise inherits from global (default FALSE if not specified anywhere).

Other properties are dataset-specific only:

- **has\_output\_type\_ids**: Only for oracle-output dataset (default FALSE)
- **non\_task\_id\_schema**: Only for time-series dataset (default NULL)

### Value

`get_date_col()` returns a character string: the name of the date column that stores the date on which observed data actually occurred.

`get_observable_unit()` returns a character vector: column names whose unique value combinations define the minimum observable unit.

`get_versioned()` returns a logical value: whether the dataset is versioned using `as_of` dates.

`get_has_output_type_ids()` returns a logical value: whether oracle-output data has `output_type` and `output_type_id` columns (default FALSE if not specified).

`get_non_task_id_schema()` returns a named list: key-value pairs of non-task ID column names and their data types, or NULL if not specified.

`has_target_data_config()` returns a logical value: TRUE if the `target-data.json` file exists in the `hub-config` directory of the hub, FALSE otherwise.

## Functions

- `get_date_col()`: Get the name of the date column across hub data.
- `get_observable_unit()`: Get observable unit column names. Returns dataset-specific `observable_unit` if configured, otherwise falls back to global.
- `get_versioned()`: Get whether target data is versioned for the specified dataset. Returns dataset-specific setting if configured, otherwise inherits from global (default FALSE if not specified).
- `get_has_output_type_ids()`: Get whether oracle-output data has `output_type/output_type_id` columns.
- `get_non_task_id_schema()`: Get the schema for non-task ID columns in time-series data.
- `has_target_data_config()`: Check if target data config file exists in hub.

## Examples

```
hub_path <- system.file("testhubs/v6/target_dir", package = "hubUtils")
config <- read_config(hub_path, "target-data")

# Get the date column name
get_date_col(config)

# Get observable unit (uses dataset-specific or falls back to global)
get_observable_unit(config, dataset = "time-series")
get_observable_unit(config, dataset = "oracle-output")

# Get versioned setting (inherits from global if not specified)
get_versioned(config, dataset = "time-series")

# Get oracle-output specific property
get_has_output_type_ids(config)

# Get time-series specific property
get_non_task_id_schema(config)

# Check if target data config exists
has_target_data_config(hub_path)
no_config_hub <- system.file("testhubs/v5/target_file/", package = "hubUtils")
has_target_data_config(no_config_hub)
```

---

```
validate_model_out_tbl
```

*Validate a model\_out\_tbl object.*

---

## Description

Validate a `model_out_tbl` object.

**Usage**

```
validate_model_out_tbl(tbl)
```

**Arguments**

tbl                    a model\_out\_tbl S3 class object.

**Value**

If valid, returns a model\_out\_tbl class object. Otherwise, throws an error.

**Examples**

```
md_out <- as_model_out_tbl(hub_con_output)
validate_model_out_tbl(md_out)
```

---

version_equal	<i>Compare hub config schema_versions to specific version numbers from a variety of sources</i>
---------------	---

---

**Description**

Compare hub config schema\_versions to specific version numbers from a variety of sources

**Usage**

```
version_equal(
  version,
  config = NULL,
  config_path = NULL,
  hub_path = NULL,
  schema_version = NULL
)
```

```
version_gte(
  version,
  config = NULL,
  config_path = NULL,
  hub_path = NULL,
  schema_version = NULL
)
```

```
version_gt(
  version,
  config = NULL,
  config_path = NULL,
  hub_path = NULL,
```

```

    schema_version = NULL
  )

  version_lte(
    version,
    config = NULL,
    config_path = NULL,
    hub_path = NULL,
    schema_version = NULL
  )

  version_lt(
    version,
    config = NULL,
    config_path = NULL,
    hub_path = NULL,
    schema_version = NULL
  )

```

### Arguments

version	Character string. Version number to compare against, must be in the format "v#. #. #".
config	A <config> class object. Usually the output of read_config or read_config_file.
config_path	Either a character string of a path to a local JSON config file, a character string of the URL to the <b>raw contents</b> of a JSON config file (e.g on GitHub) or an object of class <SubTreeFileSystem> created using functions <a href="#">arrow::s3_bucket()</a> and associated methods for creating paths to JSON config files within the bucket.
hub_path	Either a character string path to a local Modeling Hub directory, a character string of a URL to a GitHub repository or an object of class <SubTreeFileSystem> created using functions <a href="#">arrow::s3_bucket()</a> or <a href="#">arrow::gs_bucket()</a> by providing a string S3 or GCS bucket name or path to a Modeling Hub directory stored in the cloud. For more details consult the <a href="#">Using cloud storage (S3, GCS)</a> in the arrow package.
schema_version	Character string. A config schema_version property to compare against.

### Value

TRUE or FALSE depending on how the schema version compares to the version number specified.

### Functions

- `version_equal()`: Check whether a schema version property is equal to a specific version number.
- `version_gte()`: Check whether a schema version property is equal to or greater than a specific version number.
- `version_gt()`: Check whether a schema version property is greater than a specific version number.



- `version_lte()`: Check whether a schema version property is equal to or less than a specific version number.
- `version_lt()`: Check whether a schema version property is less than a specific version number.

### Examples

```
# Actual version "v2.0.0"
hub_path <- system.file("testhubs/simple", package = "hubUtils")
# Actual version "v3.0.0"
config_path <- system.file("config", "tasks.json", package = "hubUtils")
config <- read_config_file(config_path)
schema_version <- config$schema_version
# Check whether schema_version equal to v3.0.0
version_equal("v3.0.0", config = config)
version_equal("v3.0.0", config_path = config_path)
version_equal("v3.0.0", hub_path = hub_path)
version_equal("v3.0.0", schema_version = schema_version)
# Check whether schema_version equal to or greater than v3.0.0
version_gte("v3.0.0", config = config)
version_gte("v3.0.0", config_path = config_path)
version_gte("v3.0.0", hub_path = hub_path)
version_gte("v3.0.0", schema_version = schema_version)
# Check whether schema_version greater than v3.0.0
version_gt("v3.0.0", config = config)
version_gt("v3.0.0", config_path = config_path)
version_gt("v3.0.0", hub_path = hub_path)
version_gt("v3.0.0", schema_version = schema_version)
# Check whether schema_version equal to or less than v3.0.0
version_lte("v3.0.0", config = config)
version_lte("v3.0.0", config_path = config_path)
version_lte("v3.0.0", hub_path = hub_path)
version_lte("v3.0.0", schema_version = schema_version)
# Check whether schema_version less than v3.0.0
version_lt("v3.0.0", config = config)
version_lt("v3.0.0", config_path = config_path)
version_lt("v3.0.0", hub_path = hub_path)
version_lt("v3.0.0", schema_version = schema_version)
```

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