Package: ResultModelManager (via r-universe)

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Title Result Model Manager

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Description Database data model management utilities for R packages in the Observational Health Data Sciences and Informatics programme. 'ResultModelManager' provides utility functions to allow package maintainers to migrate existing SQL database models, export and import results in consistent patterns.

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`ConnectionHandler` *ConnectionHandler*

Description

Class for handling DatabaseConnector:connection objects with consistent R6 interfaces for pooled and non-pooled connections. Allows a connection to cleanly be opened and closed and stored within class/object variables

Value

DatabaseConnector Connection instance close Connection

boolean TRUE if connection is valid close Connection

boolean TRUE if connection is valid executeSql

Public fields

`connectionDetails` DatabaseConnector connectionDetails object

`con` DatabaseConnector connection object

`isActive` Is connection active or not#'

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default)

Methods

Public methods:

- ConnectionHandler$new()
- ConnectionHandler$dbms()
- ConnectionHandler$tbl()
- ConnectionHandler$renderTranslateSql()
- ConnectionHandler$initConnection()
- ConnectionHandler$getConnection()
- ConnectionHandler$closeConnection()
- ConnectionHandler$dbIsValid()
- ConnectionHandler$finalize()
- ConnectionHandler$queryDb()
- ConnectionHandler$executeSql()
- ConnectionHandler$queryFunction()
- ConnectionHandler$executeFunction()
- ConnectionHandler$clone()

Method `new()`**:**

Usage:

```
ConnectionHandler$new(
  connectionDetails,
  loadConnection = TRUE,
  snakeCaseToCamelCase = TRUE
)
```

Arguments:

`connectionDetails` DatabaseConnector::connectionDetails class

`loadConnection` Boolean option to load connection right away

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default) get dbms

Method `dbms()`**:** Get the dbms type of the connection get table

Usage:

```
ConnectionHandler$dbms()
```

Method `tbl()`**:** get a dplyr table object (i.e. lazy loaded)

Usage:

```
ConnectionHandler$tbl(table, databaseSchema = NULL)
```

Arguments:

`table` table name

`databaseSchema` databaseSchema to which table belongs Render Translate Sql.

Method `renderTranslateSql()`**:** Masked call to SqlRender

Usage:

```
ConnectionHandler$renderTranslateSql(sql, ...)
```

Arguments:

`sql` Sql query string

`...` Elipsis initConnection

Method `initConnection()`**:** Load connection Get Connection

Usage:

```
ConnectionHandler$initConnection()
```

Method `getConnection()`**:** Returns connection for use with standard DatabaseConnector calls. Connects automatically if it isn't yet loaded

Usage:

```
ConnectionHandler$getConnection()
```

Method `closeConnection()`**:** Closes connection (if active) db Is Valid

Usage:

```
ConnectionHandler$closeConnection()
```

Method `dbIsValid()`**:** Masks call to DBI::dbIsValid. Returns False if connection is NULL

Usage:

```
ConnectionHandler$dbIsValid()
```

Method `finalize()`**:** Closes connection (if active) queryDb

Usage:

```
ConnectionHandler$finalize()
```

Method `queryDb()`**:** query database and return the resulting data.frame

If environment variable LIMIT_ROW_COUNT is set Returned rows are limited to this value (no default) Limit row count is intended for web applications that may cause a denial of service if they consume too many resources.

Usage:

```
ConnectionHandler$queryDb(
  sql,
  snakeCaseToCamelCase = self$snakeCaseToCamelCase,
  overrideRowLimit = FALSE,
  ...
)
```

Arguments:

`sql` sql query string

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default)

`overrideRowLimit` (Optional) Boolean. In some cases, where row limit is enforced on the system You may wish to ignore it.

`...` Additional query parameters

Method `executeSql()`**:** execute set of database queries

Usage:

```
ConnectionHandler$executeSql(sql, ...)
```

Arguments:

`sql` sql query string

`...` Additional query parameters query Function

Method `queryFunction()`**:** queryFunction that can be overriden with subclasses (e.g. use different base function or intercept query) Does not translate or render sql.

Usage:

```
ConnectionHandler$queryFunction(
  sql,
  snakeCaseToCamelCase = self$snakeCaseToCamelCase,
  connection = self$getConnection()
)
```

Arguments:

`sql` sql query string

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default)

`connection` (Optional) connection object execute Function

Method `executeFunction()`**:** exec query Function that can be overriden with subclasses (e.g. use different base function or intercept query) Does not translate or render sql.

Usage:

```
ConnectionHandler$executeFunction(sql, connection = self$getConnection())
```

Arguments:

`sql` sql query string

`connection` connection object

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
ConnectionHandler$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

`createQueryNamespace` *Create query namespace*

Description

Create a QueryNamespace instance from either a connection handler or a connectionDetails object Allows construction with various options not handled by QueryNamespace$new

Note - currently not supported is having multiple table prefixes for multiple table namespaces

Usage

```
createQueryNamespace(
  connectionDetails = NULL,
  connectionHandler = NULL,
  usePooledConnection = FALSE,
  tableSpecification = NULL,
  resultModelSpecificationPath = NULL,
  tablePrefix = "",
  snakeCaseToCamelCase = TRUE,
  ...
)
```

Arguments

`connectionDetails`	An object of type `connectionDetails` as created using the `createConnectionDetails` function in the DatabaseConnector package.
`connectionHandler`	ResultModelManager ConnectionHandler or PooledConnectionHandler instance
`usePooledConnection`	Use Pooled database connection instead of standard DatabaseConnector single connection.
`tableSpecification`	Table specfication data.frame
`resultModelSpecificationPath`	(optional) csv file or files for tableSpecifications - must conform to table spec format.
`tablePrefix`	String to prefix table names with - default is empty string
`snakeCaseToCamelCase`	convert snakecase results to camelCase field names (TRUE by default)
`...`	Elipsis - use for any additional string keys to replace

`createResultExportManager` *Create Result Export Manager*

Description

For a give table specification file, create an export manager instance for creating results data sets that conform to the data model.

This checks that, at export time, internal validity is assured for the data (e.g. primary keys are valid, data types are compatible

In addition this utility will create a manifest object that can be used to maintain the validity of data.

If an instance of a DataMigrationManager is present and available a packageVersion reference (where applicable) and migration set will be referenced. Allowing data to be imported into a database schema at a specific version.

Usage

```
createResultExportManager(
  tableSpecification,
  exportDir,
  minCellCount = getOption("ohdsi.minCellCount", default = 5),
  databaseId = NULL
)
```

Arguments

tableSpecification	Table specification data.frame
exportDir	Directory files are being exported to
minCellCount	Minimum cell count - reccomended that you set with options("ohdsi.minCellCount" = count) in all R projects. Default is 5
databaseId	database identifier - required when exporting according to many specs

---

DataMigrationManager *DataMigrationManager (DMM)*

Description

R6 class for management of database migration

Value

data frame all migrations, including file name, order and execution status Get connection handler

Public fields

`migrationPath` Path migrations exist in

`databaseSchema` Path migrations exist in

`packageName` packageName, can be null

`tablePrefix` tablePrefix, can be empty character vector

`packageTablePrefix` packageTablePrefix, can be empty character vector

Methods

Public methods:

- `DataMigrationManager$new()`
- `DataMigrationManager$migrationTableExists()`
- `DataMigrationManager$getMigrationsPath()`
- `DataMigrationManager$getStatus()`
- `DataMigrationManager$getConnectionHandler()`

- DataMigrationManager$check()
- DataMigrationManager$executeMigrations()
- DataMigrationManager$closeConnection()
- DataMigrationManager$isPackage()
- DataMigrationManager$finalize()
- DataMigrationManager$clone()

Method `new()`**:**

Usage:

```
DataMigrationManager$new(
  connectionDetails,
  databaseSchema,
  tablePrefix = "",
  packageTablePrefix = "",
  migrationPath,
  packageName = NULL,
  migrationRegexp = .defaultMigrationRegexp
)
```

Arguments:

`connectionDetails` DatabaseConnector connection details object

`databaseSchema` Database Schema to execute on

`tablePrefix` Optional table prefix for all tables (e.g. plp, cm, cd etc)

`packageTablePrefix` A table prefix when used in conjunction with other package results schema, e.g. "cd_", "sccs_", "plp_", "cm_"

`migrationPath` Path to location of migration sql files. If in package mode, this should just be a folder (e.g. "migrations") that lives in the location "sql/sql_server" (and) other database platforms. If in folder model, the folder must include "sql_server" in the relative path, (e.g if migrationPath = 'migrations' then the folder 'migrations/sql_server' should exists)

`packageName` If in package mode, the name of the R package

`migrationRegexp` (Optional) regular expression pattern default is `(Migration_([0-9]+))-(.+).sql` Migration table exists

Method `migrationTableExists()`**:** Check if migration table is present in schema

Usage:

```
DataMigrationManager$migrationTableExists()
```

Returns: boolean Get path of migrations

Method `getMigrationsPath()`**:** Get path to sql migration files

Usage:

```
DataMigrationManager$getMigrationsPath(dbms = "sql server")
```

Arguments:

`dbms` Optionally specify the dbms that the migration fits under Get status of result model

Method `getStatus()`**:** Get status of all migrations (executed or not)

Usage:

```
DataMigrationManager$getStatus()
```

Method `getConnectionHandler()`**:** Return connection handler instance

Usage:

```
DataMigrationManager$getConnectionHandler()
```

Returns: ConnectionHandler instance Check migrations in folder

Method `check()`**:** Check if file names are valid for migrations Execute Migrations

Usage:

```
DataMigrationManager$check()
```

Method `executeMigrations()`**:** Execute any unexecuted migrations

Usage:

```
DataMigrationManager$executeMigrations(stopMigrationVersion = NULL)
```

Arguments:

`stopMigrationVersion` (Optional) Migrate to a specific migration number closeConnection

Method `closeConnection()`**:** close connection, if active isPackage

Usage:

```
DataMigrationManager$closeConnection()
```

Method `isPackage()`**:** is a package folder structure or not finalize

Usage:

```
DataMigrationManager$isPackage()
```

Method `finalize()`**:** Deprecated call, will be removed in a future version

Usage:

```
DataMigrationManager$finalize()
```

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
DataMigrationManager$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

See Also

ConnectionHandler for information on returned class

`deleteAllRowsForDatabaseId` *Delete all rows for database id*

Description

Delete all rows for database id

Usage

```
deleteAllRowsForDatabaseId(
  connection,
  schema,
  tableName,
  databaseId,
  idIsInt = TRUE
)
```

Arguments

`connection`	DatabaseConnector connection instance
`schema`	The schema on the postgres server where the results table exists
`tableName`	Database table name
`databaseId`	Results source database identifier
`idIsInt`	Identified is a numeric type? If not character is used

Details

Only PostgreSQL servers are supported.

`deleteAllRowsForPrimaryKey` *Delete results rows for primary key values from database server tables*

Description

Delete results rows for primary key values from database server tables

Usage

```
deleteAllRowsForPrimaryKey(connection, schema, tableName, keyValues)
```

Arguments

connection	DatabaseConnector connection instance
schema	The schema on the postgres server where the results table exists
tableName	Database table name
keyValues	Key values of results rows to be deleted

Details

Only PostgreSQL servers are supported.

---

disablePythonUploads *Disable python uploads*

Description

This will stop the use of python in uploaResults - not that this will only work for this R session. If you have set RMM_USE_PYTHON_UPLOADS in your .Renviron this will reset the next time you start your R session.

Usage

```
disablePythonUploads()
```

---

enablePythonUploads *Enable Python Postgres Uploads*

Description

Step by step install to enable python uploads

Usage

```
enablePythonUploads(...)
```

Arguments

...	parameters to pass to py_install

`generateSqlSchema` *Schema generator*

Description

Take a csv schema definition and create a basic sql script with it. returns string containing the sql for the table

Usage

```
generateSqlSchema(
  csvFilepath = NULL,
  schemaDefinition = NULL,
  sqlOutputPath = NULL,
  overwrite = FALSE
)
```

Arguments

`csvFilepath`	Path to schema file. Csv file must have the columns: "table_name", "column_name", "data_type", "primary_key"
`schemaDefinition`	A schemaDefintiion data.frame‘ with the columns: tableName, columnName, dataType, isRequired, primaryKey
`sqlOutputPath`	File to write sql to.
`overwrite`	Boolean - overwrite existing file?

`grantTablePermissions` *Grant Table Permissions*

Description

Grant a given permission for all tables on a given tableSpecification

Very useful if you’re hosting studies on data.ohdsi.org or other postgresql instances

NOTE: only tested on postgresql, users’ of other platforms may have Sql translation issues

Usage

```
grantTablePermissions(
  connectionDetails = NULL,
  connection = NULL,
  tableSpecification,
  databaseSchema,
  tablePrefix = "",
```

```
  permissions = "SELECT",
  user
)
```

Arguments

connectionDetails	An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package.
connection	DatabaseConnector connection instance
tableSpecification	data.frame conforming to table spec (must contain tableName field)
databaseSchema	database schema to run this on
tablePrefix	String to prefix table names with - default is empty string
permissions	permissions to generate must be one of SELECT, INSERT, DELETE or UPDATE
user	database user to grant permissions to

---

install_psycopg2 *install psycopg2*

Description

Install psycopg2-binary python package into the specified python virtualenv

Usage

```
install_psycopg2(
  envname = Sys.getenv("RMM_PYTHON_ENV", unset = "rmm-uploads"),
  method = "auto",
  ...
)
```

Arguments

envname	python virtual environment name. Can be set with system environment variable "RMM_PYTHON_ENV", default is rmm-uploads
method	method paramter for reticulate::py_install (defualt is auto)
...	Extra parameters for reticulate::py_install

loadResultsDataModelSpecifications

Get specifications from a given file path

Description

Get specifications from a given file path

Usage

```
loadResultsDataModelSpecifications(filePath)
```

Arguments

filePath	path to a valid csv file

Value

A tibble data frame object with specifications

PooledConnectionHandler

Pooled Connection Handler

Description

Transparently works the same way as a standard connection handler but stores pooled connections. Useful for long running applications that serve multiple concurrent requests. Note that a side effect of using this is that each call to this increments the .GlobalEnv attribute `RMMPooledHandlerCount`

Value

boolean TRUE if connection is valid executeSql

Super class

`ResultModelManager::ConnectionHandler` -> `PooledConnectionHandler`

Methods

Public methods:

- `PooledConnectionHandler$new()`
- `PooledConnectionHandler$initConnection()`
- `PooledConnectionHandler$getCheckedOutConnectionPath()`
- `PooledConnectionHandler$getConnection()`

- PooledConnectionHandler$dbms()
- PooledConnectionHandler$closeConnection()
- PooledConnectionHandler$queryDb()
- PooledConnectionHandler$executeSql()
- PooledConnectionHandler$queryFunction()
- PooledConnectionHandler$executeFunction()
- PooledConnectionHandler$clone()

Method `new()`**:**

Usage:

```
PooledConnectionHandler$new(
  connectionDetails = NULL,
  snakeCaseToCamelCase = TRUE,
  loadConnection = TRUE,
  dbConnectArgs = NULL,
  forceJdbcConnection = TRUE
)
```

Arguments:

`connectionDetails` DatabaseConnector::connectionDetails class

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default)

`loadConnection` Boolean option to load connection right away

`dbConnectArgs` Optional arguments to call pool::dbPool overrides default usage of connectionDetails

`forceJdbcConnection` Force JDBC connection (requires using DatabaseConnector ConnectionDetails) initialize pooled db connection

Method `initConnection()`**:** Overrides ConnectionHandler Call Used for getting a checked out connection from a given environment (if one exists)

Usage:

```
PooledConnectionHandler$initConnection()
```

Method `getCheckedOutConnectionPath()`**:**

Usage:

```
PooledConnectionHandler$getCheckedOutConnectionPath()
```

Arguments:

`.deferedFrame` defaults to the parent frame of the calling block. Get Connection

Method `getConnection()`**:** Returns a connection from the pool When the desired frame exits, the connection will be returned to the pool As a side effect, the connection is stored as an attribute within the calling frame (e.g. the same function) to prevent multiple connections being spawned, which limits performance.

If you call this somewhere you need to think about returning the object or you may create a connection that is never returned to the pool.

Usage:

```
PooledConnectionHandler$getConnection(.deferedFrame = parent.frame(n = 2))
```

Arguments:

`.deferedFrame` defaults to the parent frame of the calling block. get dbms

Method `dbms()`**:** Get the dbms type of the connection Close Connection

Usage:

```
PooledConnectionHandler$dbms()
```

Method `closeConnection()`**:** Overrides ConnectionHandler Call - closes all active connections called with getConnection queryDb

Usage:

```
PooledConnectionHandler$closeConnection()
```

Method `queryDb()`**:** query database and return the resulting data.frame
If environment variable LIMIT_ROW_COUNT is set Returned rows are limited to this value (no default) Limit row count is intended for web applications that may cause a denial of service if they consume too many resources.

Usage:

```
PooledConnectionHandler$queryDb(
  sql,
  snakeCaseToCamelCase = self$snakeCaseToCamelCase,
  overrideRowLimit = FALSE,
  ...
)
```

Arguments:

`sql` sql query string

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default)

`overrideRowLimit` (Optional) Boolean. In some cases, where row limit is enforced on the system You may wish to ignore it.

`...` Additional query parameters

Method `executeSql()`**:** execute set of database queries

Usage:

```
PooledConnectionHandler$executeSql(sql, ...)
```

Arguments:

`sql` sql query string

`...` Additional query parameters query Function

Method `queryFunction()`**:** Overrides ConnectionHandler Call. Does not translate or render sql.

Usage:

```
PooledConnectionHandler$queryFunction(
  sql,
  snakeCaseToCamelCase = self$snakeCaseToCamelCase,
  connection
)
```

Arguments:

`sql` sql query string

`snakeCaseToCamelCase` (Optional) Boolean. return the results columns in camel case (default) query Function

`connection` db connection assumes pooling is handled outside of call

Method `executeFunction()`**:** Overrides ConnectionHandler Call. Does not translate or render sql.

Usage:

```
PooledConnectionHandler$executeFunction(sql, connection)
```

Arguments:

`sql` sql query string

`connection` DatabaseConnector connection. Assumes pooling is handled outside of call

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
PooledConnectionHandler$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

`pyPgUploadEnabled` *are python postgresql uploads enabled?*

Description

are python postgresql uploads enabled?

Usage

```
pyPgUploadEnabled()
```

`pyUploadCsv` *Py Upload CSV*

Description

Wrapper to python function to upload a csv using Postgres Copy functionality

Usage

```
pyUploadCsv(connection, table, filepath, schema, disableConstraints = FALSE)
```

Arguments

connection	DatabaseConnector connection instance
table	Table in database
filepath	path to csv
schema	database schema containing table reference
disableConstraints	(not reccomended) disable constraints prior to upload to speed up process

Examples

```
## Not run:
connection <- DabaseConnector::connect(
  dbms = "postgreql",
  server = "myserver.com",
  port = 5432,
  password = "s",
  user = "me",
  database = "some_db"
)
ResultModelManager::pyUploadCsv(connection,
  table = "my_table",
  filepath = "my_massive_csv.csv",
  schema = "my_schema"
)

## End(Not run)
```

---

pyUploadDataFrame *Py Upload data.frame*

Description

Wrapper to python function to upload a data.frame using Postgres Copy functionality

Usage

```
pyUploadDataFrame(data, connection, table, schema)
```

Arguments

data	data.frame
connection	DatabaseConnector connection instance
table	Table in database
schema	database schema containing table reference

Examples

```
## Not run:
connection <- DabaseConnector::connect(
  dbms = "postgreql",
  server = "myserver.com",
  port = 5432,
  password = "s",
  user = "me",
  database = "some_db"
)

ResultModelManager::pyUploadDataFrame(connection,
  table = "my_table",
  data.frame(id = 1:100, value = "some_value"),
  schema = "my_schema"
)

## End(Not run)
```

`QueryNamespace` *QueryNamespace*

Description

Given a results specification and ConnectionHandler instance - this class allow queries to be namespaced within any tables specified within a list of pre-determined tables. This allows the encapsulation of queries, using specific table names in a consistent manner that is striaghtforward to maintain over time.

Public fields

`tablePrefix` tablePrefix to use

Methods

Public methods:

- `QueryNamespace$new()`
- `QueryNamespace$setConnectionHandler()`
- `QueryNamespace$getConnectionHandler()`
- `QueryNamespace$addReplacementVariable()`
- `QueryNamespace$addTableSpecification()`
- `QueryNamespace$render()`
- `QueryNamespace$queryDb()`
- `QueryNamespace$executeSql()`
- `QueryNamespace$getVars()`
- `QueryNamespace$closeConnection()`

- QueryNamespace$clone()

Method `new()`: initialize class

Usage:

```
QueryNamespace$new(
  connectionHandler = NULL,
  tableSpecification = NULL,
  tablePrefix = "",
  ...
)
```

Arguments:

`connectionHandler` ConnectionHandler instance @seealsoConnectionHandler

`tableSpecification` tableSpecification data.frame

`tablePrefix` constant string to prefix all tables with

`...` additional replacement variables e.g. database_schema, vocabulary_schema etc Set Connection Handler

Method `setConnectionHandler()`: set connection handler object for object

Usage:

```
QueryNamespace$setConnectionHandler(connectionHandler)
```

Arguments:

`connectionHandler` ConnectionHandler instance Get connection handler

Method `getConnectionHandler()`: get connection handler obeject or throw error if not set

Usage:

```
QueryNamespace$getConnectionHandler()
```

Method `addReplacementVariable()`: add a variable to automatically be replaced in query strings (e.g. @database_schema.@table_name becomes 'database_schema.table_1')

Usage:

```
QueryNamespace$addReplacementVariable(key, value, replace = FALSE)
```

Arguments:

`key` variable name string (without @) to be replaced, eg. "table_name"

`value` atomic value for replacement

`replace` if a variable of the same key is found, overwrite it add table specification

Method `addTableSpecification()`: add a variable to automatically be replaced in query strings (e.g. @database_schema.@table_name becomes 'database_schema.table_1')

Usage:

```
QueryNamespace$addTableSpecification(
  tableSpecification,
  useTablePrefix = TRUE,
  tablePrefix = self$tablePrefix,
  replace = TRUE
)
```

Arguments:

`tableSpecification` table specification data.frame conforming to column names tableName, columnName, dataType and primaryKey

`useTablePrefix` prefix the results with the tablePrefix (TRUE)

`tablePrefix` prefix string - defaults to class variable set during initialization

`replace` replace existing variables of the same name Render

Method `render()`**:** Call to SqlRender::render replacing names stored in this class

Usage:

```
QueryNamespace$render(sql, ...)
```

Arguments:

`sql` query string

`...` additional variables to be passed to SqlRender::render - will overwrite anything in namespace query Sql

Method `queryDb()`**:** Call to

Usage:

```
QueryNamespace$queryDb(sql, ...)
```

Arguments:

`sql` query string

`...` additional variables to send to SqlRender::render execute Sql

Method `executeSql()`**:** Call to execute sql within namespaced queries

Usage:

```
QueryNamespace$executeSql(sql, ...)
```

Arguments:

`sql` query string

`...` additional variables to send to SqlRender::render get vars

Method `getVars()`**:** returns full list of variables that will be replaced closeConnection

Usage:

```
QueryNamespace$getVars()
```

Method `closeConnection()`**:** close connection, if active

Usage:

```
QueryNamespace$closeConnection()
```

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
QueryNamespace$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

Examples

```
library(ResultModelManager)

# Create some junk test data
connectionDetails <-
  DatabaseConnector::createConnectionDetails(
    server = "test_db.sqlite",
    dbms = "sqlite"
  )

conn <- DatabaseConnector::connect(connectionDetails)
DatabaseConnector::insertTable(
  connection = conn,
  tableName = "cd_cohort",
  data = data.frame(
    cohort_id = c(1, 2, 3),
    cohort_name = c("cohort one", "cohort two", "cohort three"),
    json = "{}",
    sql = "SELECT 1"
  )
)
DatabaseConnector::disconnect(conn)

connectionHandler <- ConnectionHandler$new(connectionDetails = connectionDetails)
tableSpecification <- data.frame(
  tableName = "cohort",
  columnName = c(
    "cohort_id",
    "cohort_name",
    "json",
    "sql"
  ),
  primaryKey = c(TRUE, FALSE, FALSE, FALSE),
  dataType = c("int", "varchar", "varchar", "varchar")
)

cohortNamespace <- QueryNamespace$new(
  connectionHandler = connectionHandler,
  tableSpecification = tableSpecification,
  result_schema = "main",
  tablePrefix = "cd_"
)
sql <- "SELECT * FROM @result_schema.@cohort WHERE cohort_id = @cohort_id"
# Returns : "SELECT * FROM main.cd_cohort WHERE cohort_id = @cohort_id"
print(cohortNamespace$render(sql))
# Returns query result
result <- cohortNamespace$queryDb(sql, cohort_id = 1)
# cleanup test data
unlink("test_db.sqlite")
```

`ResultExportManager` *Result Set Export Manager*

Description

EXPERIMENTAL - this feature is still in design stage and it is not reccomended that you implement this for your package at this stage. Utility for simplifying export of results to files from sql queries

Note that this utility is not strictly thread safe though seperate processes can export separate tables without issue. When exporting a the same table across multiple threads primary key checks may create issues.

Public fields

`exportDir` direcotry path to export files to Init

Methods

Public methods:

- `ResultExportManager$new()`
- `ResultExportManager$getTableSpec()`
- `ResultExportManager$getMinColValues()`
- `ResultExportManager$checkRowTypes()`
- `ResultExportManager$listTables()`
- `ResultExportManager$checkPrimaryKeys()`
- `ResultExportManager$exportDataFrame()`
- `ResultExportManager$exportQuery()`
- `ResultExportManager$getManifestList()`
- `ResultExportManager$writeManifest()`
- `ResultExportManager$clone()`

Method `new()`**:** Create a class for exporting results from a study in a standard, consistend manner

Usage:

```
ResultExportManager$new(
  tableSpecification,
  exportDir,
  minCellCount = getOption("ohdsi.minCellCount", default = 5),
  validateTypes = FALSE,
  usePrimaryKeyCheck = FALSE,
  databaseId = NULL
)
```

Arguments:

`tableSpecification` Table specification data.frame

`exportDir` Directory files are being exported to

`minCellCount` Minimum cell count - reccomended that you set with options("ohdsi.minCellCount" = count) in all R projects. Default is 5

`validateTypes` Test if row values strictly conform to types - optional, not currently reccomended outside of development

`usePrimaryKeyCheck` Test if primary key fields are violated at export step. - optional, not currently reccomended outside of development get table spec

`databaseId` database identifier - required when exporting according to many specs

Method `getTableSpec()`**:** Get specification of table

Usage:

```
ResultExportManager$getTableSpec(exportTableName)
```

Arguments:

`exportTableName` table name Get min col values

Method `getMinColValues()`**:** Columns to convert to minimum for a given table name

Usage:

```
ResultExportManager$getMinColValues(rows, exportTableName)
```

Arguments:

`rows` data.frame of rows

`exportTableName` stering table name - must be defined in spec Check row types

Method `checkRowTypes()`**:** Check types of rows before exporting

Usage:

```
ResultExportManager$checkRowTypes(rows, exportTableName)
```

Arguments:

`rows` data.frame of rows to export

`exportTableName` table name List tables

Method `listTables()`**:** list all tables in schema Check primary keys of exported data

Usage:

```
ResultExportManager$listTables()
```

Method `checkPrimaryKeys()`**:** Checks to see if the rows conform to the valid primary keys If the same table has already been checked in the life of this object set "invalidateCache" to TRUE as the keys will be cached in a temporary file on disk.

Usage:

```
ResultExportManager$checkPrimaryKeys(
  rows,
  exportTableName,
  invalidateCache = FALSE
)
```

Arguments:

`rows` data.frame to export

`exportTableName` Table name (must be in spec)

`invalidateCache` logical - if starting a fresh export use this to delete cache of primary keys Export data frame

Method `exportDataFrame()`**:** This method is intended for use where exporting a data.frame and not a query from a rdbms table For example, if you perform a transformation in R this method will check primary keys, min cell counts and data types before writing the file to according to the table spec

Usage:

```
ResultExportManager$exportDataFrame(rows, exportTableName, append = FALSE)
```

Arguments:

`rows` Rows to export

`exportTableName` Table name

`append` logical - if true will append the result to a file, otherwise the file will be overwritten Export Data table with sql query

Method `exportQuery()`**:** Writes files in batch to stop overflowing system memory Checks primary keys on write Checks minimum cell count

Usage:

```
ResultExportManager$exportQuery(
  connection,
  sql,
  exportTableName,
  transformFunction = NULL,
  transformFunctionArgs = list(),
  append = FALSE,
  ...
)
```

Arguments:

`connection` DatabaseConnector connection instance

`sql` OHDSI sql string to export tables

`exportTableName` Name of table to export (in snake_case format)

`transformFunction` (optional) transformation of the data set callback. must take two paramters - rows and pos

```
Following this transformation callback, results will be verified against data model,
 Primary keys will be checked and minCellValue rules will be enforced
```

`transformFunctionArgs` arguments to be passed to the transformation function

`append` Logical add results to existing file, if FALSE (default) creates a new file and removes primary key validation cache

`...` extra parameters passed to sql get manifest list

Method `getManifestList()`**:** Create a meta data set for each collection of result files with sha256 has for all files

Usage:

```
ResultExportManager$getManifestList(
  packageName = NULL,
  packageVersion = NULL,
  migrationsPath = NULL,
  migrationRegexp = .defaultMigrationRegexp
)
```

Arguments:

`packageName` if an R analysis package, specify the name

`packageVersion` if an analysis package, specify the version

`migrationsPath` path to sql migrations (use top level folder (e.g. sql/sql_server/migrations)

`migrationRegexp` (optional) regular expression to search for sql files. It is not reccomended to change the default. Write manifest

Method `writeManifest()`**:** Write manifest json

Usage:

```
ResultExportManager$writeManifest(...)
```

Arguments:

`...` @seealso getManifestList

Method `clone()`**:** The objects of this class are cloneable with this method.

Usage:

```
ResultExportManager$clone(deep = FALSE)
```

Arguments:

`deep` Whether to make a deep clone.

`unzipResults` *Unzips a results.zip file and enforces standards required by* `uploadResults`

Description

This function will unzip the zipFile to the resultsFolder and assert that the file resultsDataModel-Specification.csv exists in the resultsFolder to ensure that it will work with `uploadResults`

Usage

```
unzipResults(zipFile, resultsFolder)
```

Arguments

`zipFile`	The location of the .zip file that holds the results to upload
`resultsFolder`	The folder to use when unzipping the .zip file. If this folder does not exist, this function will attempt to create the folder.

uploadResults *Upload results to the database server.*

Description

Requires the results data model tables have been created using following the specifications, generateSqlSchema function.

Results files should be in the snake_case format for table headers and not camelCase

Set the POSTGRES_PATH environmental variable to the path to the folder containing the psql executable to enable bulk upload (recommended).

Usage

```
uploadResults(
  connection = NULL,
  connectionDetails = NULL,
  schema,
  resultsFolder,
  tablePrefix = "",
  forceOverWriteOfSpecifications = FALSE,
  purgeSiteDataBeforeUploading = TRUE,
  databaseIdentifierFile = "cdm_source_info.csv",
  runCheckAndFixCommands = FALSE,
  warnOnMissingTable = TRUE,
  purgeDataModel = FALSE,
  specifications
)
```

Arguments

connection	An object of type connection as created using the connect function in the DatabaseConnector package. Can be left NULL if connectionDetails is provided, in which case a new connection will be opened at the start of the function, and closed when the function finishes.
connectionDetails	An object of type connectionDetails as created using the createConnectionDetails function in the DatabaseConnector package.
schema	The schema on the postgres server where the tables have been created.
resultsFolder	The path to the folder containing the results to upload. See unzipResults for more information.
tablePrefix	String to prefix table names with - default is empty string
forceOverWriteOfSpecifications	If TRUE, specifications of the phenotypes, cohort definitions, and analysis will be overwritten if they already exist on the database. Only use this if these specifications have changed since the last upload.

`purgeSiteDataBeforeUploading`
: If TRUE, before inserting data for a specific databaseId all the data for that site will be dropped. This assumes the results folder contains the full data for that data site.

`databaseIdentifierFile`
: File contained that references databaseId field (used when purgeSiteDataBefore-Uploading == TRUE). You may specify a relative path for the cdmSourceFile and the function will assume it resides in the resultsFolder. Alternatively, you can provide a path outside of the resultsFolder for this file.

`runCheckAndFixCommands`
: If TRUE, the upload code will attempt to fix column names, data types and duplicate rows. This parameter is kept for legacy reasons - it is strongly recommended that you correct errors in your results where those results are assembled instead of relying on this option to try and fix it during upload.

`warnOnMissingTable`
: Boolean, print a warning if a table file is missing.

`purgeDataModel`
: This function will purge all data from the tables in the specification prior to upload. Use with care. If interactive this will require further input.

`specifications`
: A tibble data frame object with specifications.

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