

# Package ‘dittodb’

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**Title** A Test Environment for Database Requests

**Version** 0.1.3

**URL** <https://dittodb.jonkeane.com/>, <https://github.com/ropensci/dittodb>

**BugReports** <https://github.com/ropensci/dittodb/issues>

**Description** Testing and documenting code that communicates with remote databases can be painful. Although the interaction with R is usually relatively simple (e.g. data(frames) passed to and from a database), because they rely on a separate service and the data there, testing them can be difficult to set up, unsustainable in a continuous integration environment, or impossible without replicating an entire production cluster. This package addresses that by allowing you to make recordings from your database interactions and then play them back while testing (or in other contexts) all without needing to spin up or have access to the database your code would typically connect to.

**License** Apache License (>= 2.0)

**Encoding** UTF-8

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capture_requests	<i>Capture and record database transactions and save them as mocks</i>
------------------	--

---

### Description

When creating database fixtures, it can sometimes be helpful to record the responses from the database for use in crafting tests.

### Usage

```
start_db_capturing(path, redact_columns = NULL)

stop_db_capturing()

capture_db_requests(expr, path, redact_columns = NULL)
```

**Arguments**

path	the path to record mocks (default if missing: the first path in <code>db_mock_paths()</code> ).
redact_columns	a character vector of columns to redact. Any column that matches an entry will be redacted with a standard value for the column type (e.g. characters will be replaced with "[redacted]")
expr	an expression to evaluate while capturing requests (for <code>capture_db_requests()</code> )

**Details**

You can start capturing with `start_db_capturing()` and end it with `stop_db_capturing()`. All queries run against a database will be executed like normal, but their responses will be saved to the mock path given, so that if you use the same queries later inside of a `with_mock_db` block, the database functions will return as if they had been run against the database.

Alternatively, you can wrap the code that you are trying to capture in the function `capture_db_requests({...})` this does the same thing as `start_db_capturing()` and `stop_db_capturing()` but without needing to remember to stop the recording.

You can redact certain columns using the `redact_columns` argument. This will replace the values in the column with a generic redacted version. This works by always passing the data being saved through `redact_columns`.

*note* You should always call `DBI::dbConnect` inside of the capturing block. When you connect to the database, `dittodb` sets up the mocks for the specific database you're connecting to when you call `DBI::dbConnect`.

**Value**

NULL (invisibly)

**Examples**

```
if (check_for_pkg("RSQLite", message)) {
  # Temporary files for examples
  nycflights_path <- tempfile()

  con <- nycflights13_create_sqlite(location = nycflights_path)
  dbDisconnect(con)

  start_db_capturing()
  con <- dbConnect(RSQLite::SQLite(), nycflights_path)

  df_1 <- dbGetQuery(con, "SELECT * FROM airlines LIMIT 1")
  res <- dbSendQuery(con, "SELECT * FROM airlines LIMIT 2")
  df_2 <- dbFetch(res)
  dbClearResult(res)

  dbDisconnect(con)
  stop_db_capturing()

  start_db_capturing(redact_columns = "carrier")
}
```

```

con <- dbConnect(RSQLite::SQLite(), nycflights_path)

df_3 <- dbGetQuery(con, "SELECT * FROM airlines LIMIT 3")

dbDisconnect(con)
stop_db_capturing()

with_mock_db({
  con <- dbConnect(RSQLite::SQLite(), nycflights_path)

  # the result from df1 above
  print(dbGetQuery(con, "SELECT * FROM airlines LIMIT 1"))

  # the result from df3 above
  print(dbGetQuery(con, "SELECT * FROM airlines LIMIT 3"))
})
}

```

---

expect\_sql

*Detect if a specific SQL statement is sent*

---

## Description

### Experimental

## Usage

```
expect_sql(object, regexp = NULL, ...)
```

## Arguments

object	the expression to evaluate
regexp	the statement to match
...	arguments passed to <a href="#">testthat::expect_error()</a>

## Details

Sometimes all you need to check is if a specific SQL statement has been sent and you don't care about retrieving the results.

This works by raising an error that contains the statement that is sent to the database as well as the location of the result. Currently, `expect_sql()` only works with `DBI::dbSendQuery()` (and most implementations of `DBI::dbGetQuery()` which call `DBI::dbSendQuery()` internally).

*Note:* this function is experimental and will likely evolve over time. Please be prepared that new releases might break backwards compatibility.

**Examples**

```

if (check_for_pkg("RSQLite", message)) {
  with_mock_db({
    con <- dbConnect(RSQLite::SQLite(), dbname = "not_a_db")

    expect_sql(
      dbGetQuery(con, "SELECT carrier, name FROM airlines LIMIT 3"),
      "SELECT carrier, name FROM airlines LIMIT 3"
    )
  })
}

```

---

mock-db-methods

*Methods for interacting with DB mocks instead of an actual database*


---

**Description**

Various methods (`dbSendQuery`, `dbFetchQuery`) that are mocks of the **DBI** methods of the same name. Instead of actually interacting with a database, they read in mock responses and the code proceeds after that. These aren't used directly, but are part of how `dittodb` works.

**Usage**

```

## S4 method for signature 'DBIMockConnection'
dbDisconnect(conn, ...)

## S4 method for signature 'DBIMockConnection,character'
dbExistsTable(conn, name, ...)

## S4 method for signature 'DBIMockConnection,Id'
dbExistsTable(conn, name, ...)

## S4 method for signature 'DBIMockConnection'
dbListTables(conn, ...)

## S4 method for signature 'DBIMockConnection,character'
dbListFields(conn, name, ...)

## S4 method for signature 'DBIMockConnection,Id'
dbListFields(conn, name, ...)

## S4 method for signature 'DBIMockConnection,ANY'
dbListFields(conn, name, ...)

## S4 method for signature 'DBIMockConnection,character'
dbSendQuery(conn, statement, ...)

```

```

## S4 method for signature 'DBIMockResult'
dbFetch(res, n = -1, ...)

## S4 method for signature 'DBIMockResult,ANY'
fetch(res, n = -1, ...)

## S4 method for signature 'DBIMockResult,missing'
fetch(res, n = -1, ...)

## S4 method for signature 'DBIMockResult'
dbClearResult(res, n, ...)

## S4 method for signature 'DBIMockResult'
dbHasCompleted(res, ...)

## S4 method for signature 'DBIMockRPostgreSQLConnection,character'
dbGetQuery(conn, statement, ...)

## S4 method for signature 'DBIMockConnection'
dbGetInfo(dbObj, ...)

## S4 method for signature 'DBIMockConnection,character,data.frame'
dbWriteTable(conn, name, value, ...)

## S4 method for signature 'DBIMockConnection,character'
dbRemoveTable(conn, name, ...)

## S4 method for signature 'DBIMockResult'
dbColumnInfo(res, ...)

## S4 method for signature 'DBIMockResult'
dbGetInfo(dbObj, ...)

## S4 method for signature 'DBIMockRPostgresConnection,character'
dbQuoteIdentifier(conn, x, ...)

## S4 method for signature 'DBIMockRPostgresConnection,SQL'
dbQuoteIdentifier(conn, x, ...)

```

## Arguments

conn	a database connection (for dispatch with these methods, it should be of class DBIMockConnection)
...	arguments passed on inside of the methods
name	name of the table (for <a href="#">dbListFields</a> , <a href="#">dbWriteTable</a> , <a href="#">dbRemoveTable</a> )
statement	an SQL statement to execute
res	a result object (for dispatch with these methods, it should be of class DBIMockResult)

n	number of results to fetch (ignored)
dbObj	a database object (a connection, result, etc.) for use in <a href="#">dbGetInfo</a>
value	a value (generally a <code>data.frame</code> ) for use in <a href="#">dbWriteTable</a>
x	a name to quote (for <a href="#">dbQuoteIdentifier</a> )

---

mockdb	<i>Run DBI queries against a mocked database</i>
--------	--

---

## Description

Wrap a chunk of code in `with_mock_db()` to use mocked databases that will use fixtures instead of connecting to a real database. Alternatively, you can start and stop using a mocked database with `start_mock_db()` and `stop_mock_db()` respectively to execute the whole thing without needing to remember to stop the mocking. When testing with `dittodb`, it will look for fixtures in all entries of [db\\_mock\\_paths](#).

## Usage

```
with_mock_db(expr)
```

```
start_mock_db()
```

```
stop_mock_db()
```

## Arguments

expr            the expression to execute

## Details

You only need to use one approach: either use `start_mock_db()` to start using mocks and then `stop_mock_db()` to stop or use `with_mock_db()` wrapped around the code you want to execute against the mocked database. You don't need to (and should not) use both at the same time. Generally `with_mock_db()` is preferred because it is slightly safer and you don't have to remember to `stop_mock_db()` when you're done. However, it is easier to step through tests interactively using `start_mock_db()/stop_mock_db()`.

Connections should be made after `start_mock_db()` if you're using that function or they should be made inside of `with_mock_db()` if you're using that function because `dittodb` uses the database name (given in `dbname` or `Database` argument of [dbConnect](#) depending on the driver) to separate different fixtures. For ODBC connections with only a `dsn` provided, the `dsn` is used for this directory.

## Value

nothing

**Examples**

```

# Add the mocks included with dttodb to the db_mock_paths to use them below
db_mock_paths(system.file("nycflight_mocks", package = "dttodb"), last = TRUE)

if (check_for_pkg("RSQLite", message) & check_for_pkg("testthat", message)) {
  # using `with_mock_db()`
  with_mock_db({
    con <- dbConnect(
      RSQLite::SQLite(),
      dbname = "nycflights"
    )

    testthat::test_that("We get one airline", {
      one_airline <- dbGetQuery(
        con,
        "SELECT carrier, name FROM airlines LIMIT 1"
      )
      testthat::expect_s3_class(one_airline, "data.frame")
      testthat::expect_equal(nrow(one_airline), 1)
      testthat::expect_equal(one_airline$carrier, "9E")
      testthat::expect_equal(one_airline$name, "Endeavor Air Inc.")
    })

    dbDisconnect(con)
  })

  # using `start_mock_db()` and `stop_mock_db()`
  start_mock_db()
  con <- dbConnect(
    RSQLite::SQLite(),
    dbname = "nycflights"
  )

  testthat::test_that("We get one airline", {
    one_airline <- dbGetQuery(
      con,
      "SELECT carrier, name FROM airlines LIMIT 1"
    )
    testthat::expect_s3_class(one_airline, "data.frame")
    testthat::expect_equal(nrow(one_airline), 1)
    testthat::expect_equal(one_airline$carrier, "9E")
    testthat::expect_equal(one_airline$name, "Endeavor Air Inc.")
  })

  dbDisconnect(con)
  stop_mock_db()
}

```



**Description**

Using the connection given in `con`, create a database including a few tables from the `nycflights13` dataset.

**Usage**

```
nycflights13_create_sql(con, schema = "", ...)
```

**Arguments**

<code>con</code>	an SQL connection (i.e a PostgreSQL connection)
<code>schema</code>	schema to write the tables ("", or no schema by default)
<code>...</code>	additional parameters to connect to a database

**Value**

the connection given in `con` invisibly, generally called for the side effects of writing to the database

**Examples**

```
if (check_for_pkg("RSQLite", message)) {  
  con <- DBI::dbConnect(RSQLite::SQLite(), ":memory:")  
  
  nycflights13_create_sql(con)  
  
  DBI::dbGetQuery(  
    con,  
    "SELECT year, month, day, carrier, flight, tailnum FROM flights LIMIT 10"  
  )  
  
  DBI::dbDisconnect(con)  
}
```

---

nycflights13\_create\_sqlite

*Create an in-memory SQLite database for testing*

---

**Description**

Create an in-memory SQLite database for testing

**Usage**

```
nycflights13_create_sqlite(location = ":memory:", ...)
```

**Arguments**

location            where to store the database  
...                additional parameters to connect to a database (most are passed on to [nycflights13\\_create\\_sql](#))

**Value**

RSQLiteConnection

**Examples**

```
if (check_for_pkg("RSQLite", message)) {  
  con <- nycflights13_create_sqlite()  
  
  DBI::dbGetQuery(  
    con,  
    "SELECT year, month, day, carrier, flight, tailnum FROM flights LIMIT 10"  
  )  
  
  DBI::dbDisconnect(con)  
}
```

---

nycflights\_sqlite      *An SQLite connection to a subset of nycflights13*

---

**Description**

Included with dttodb is a small subset of [nycflights13](#) prepopulated into a sqlite database.

**Usage**

```
nycflights_sqlite()
```

**Details**

This database is helpful for getting to know dttodb and running example code. It contains a small subset of the data in [nycflights13](#): namely only the flights and planes that had a destination of ORD or MDW (the codes for the two major airports in Chicago) in February of 2013. The airports table has also been limited to only the New York and Chicago area airports.

**Value**

an RSQLiteConnection

**Examples**

```

if (check_for_pkg("RSQLite", message)) {
  con <- nycflights_sqlite()

  DBI::dbGetQuery(con, "SELECT flight, tailnum, origin, dest FROM flights LIMIT 10")
  DBI::dbGetQuery(con, "SELECT faa, name, lat, lon, alt, tz FROM airports")

  DBI::dbDisconnect(con)
}

```

---

redact\_columns

*Redact columns from a dataframe with the default redactors*


---

**Description**

This function redacts the columns specified in `columns` in the data given in `data` using `dittodb`'s standard redactors.

**Usage**

```
redact_columns(data, columns, ignore.case = TRUE, ...)
```

**Arguments**

<code>data</code>	a dataframe to redact
<code>columns</code>	character, the columns to redact
<code>ignore.case</code>	should case be ignored? (default: TRUE)
<code>...</code>	additional options to pass on to <code>grep()</code> when matching the column names

**Details**

The column names given in the `columns` argument are treated as regular expressions, however they always have `^` and `$` added to the beginning and end of the strings. So if you would like to match any column that starts with the string `sensitive` (e.g. `sensitive_name`, `sensitive_date`) you could use `"sensitive.*"` and this would catch all of those columns (though it would not catch a column called `most_sensitive_name`).

The standard redactors replace all values in the column with the following values based on the columns type:

- integer – 9L
- numeric – 9
- character – "[redacted]"
- POSIXct (date times) – `as.POSIXct("1988-10-11T17:00:00", tz = tzzone)`

**Value**

`data`, with the columns specified in `columns` duly redacted

## Examples

```
if (check_for_pkg("nycflights13", message)) {
  small_flights <- head(nycflights13::flights)

  # with no columns specified, redacting does nothing
  redact_columns(small_flights, columns = NULL)

  # integer
  redact_columns(small_flights, columns = c("arr_time"))

  # numeric
  redact_columns(small_flights, columns = c("arr_delay"))

  # characters
  redact_columns(small_flights, columns = c("origin", "dest"))

  # datetimes
  redact_columns(small_flights, columns = c("time_hour"))
}
```

---

set\_dittodb\_debug\_level

*Set dittodb's debug level*

---

## Description

It can be helpful to see what's going on by increasing dittodb's verbosity which will show what's going on under the hood (e.g. what queries are being requested, from where). This sets the option `dittodb.debug` to the value given in the `level` argument. The option can be set directly with `options(dittodb.debug = n)` as well.

## Usage

```
set_dittodb_debug_level(level)
```

## Arguments

`level` a numeric, the level to set to (e.g. 1)

## Details

The `level` argument is a numeric, where 0 is the default and (relatively) silent. The higher the level, the more verbose dittodb will be.

Currently, dittodb only has one level of debugging (any value 1 or greater), but more might be used in the future.

## Value

the level, invisibly

## Examples

```
set_dittodb_debug_level(1)
set_dittodb_debug_level(0)
```

---

use_dittodb	<i>Use dittodb in your tests</i>
-------------	----------------------------------

---

## Description

If you would like to use `dittodb` in your package, and you are already using `testthat`, use this function to add `dittodb` to `Suggests` in the package `DESCRIPTION` and loads it in `tests/testthat/helper.R`. Call it once when you're setting up a new package test suite.

## Usage

```
use_dittodb(path = ".")
```

## Arguments

`path` character path to the package

## Details

This function should be called with the path to your package source as the `path` argument. The function is idempotent: if `dittodb` is already added to these files, no additional changes will be made.

It will:

- add `dittodb` to the `Suggests` field of the `DESCRIPTION` file in the current working directory
- add `library(dittodb)` to the file `tests/testthat/helper.R` (creating it if it doesn't already exist)

## Value

Nothing: called for file system side effects.

## Examples

```
## Not run:
use_dittodb()
use_dittodb("/path/to/package")

## End(Not run)
```

---

with_mock_path	<i>Run the DBI queries in an alternate mock directory</i>
----------------	---

---

### Description

When testing with `dittodb`, wrap your tests in `with_mock_path({})` to use the database fixtures located in other directories. `dittodb` will look for fixtures in the directory specified by the user, which can be a temporary or permanent location.

### Usage

```
with_mock_path(path, expr, replace = FALSE)
```

### Arguments

<code>path</code>	the alternate directory
<code>expr</code>	the expression to execute
<code>replace</code>	logical, should the path replace the current mock paths (TRUE) or should they be appended (to the beginning) of the current mock paths (default, FALSE)

### Value

nothing, called to execute the expression(s) in `expr`

### Examples

```
# Only run if RSQLite and testthat are available
if (check_for_pkg("RSQLite", message) & check_for_pkg("testthat", message)) {
  with_mock_path(
    system.file("nycflight_mocks", package = "dittodb"),
    with_mock_db({
      con <- DBI::dbConnect(
        RSQLite::SQLite(),
        dbname = "nycflights"
      )

      one_airline <- dbGetQuery(
        con,
        "SELECT carrier, name FROM airlines LIMIT 1"
      )
      testthat::test_that("We get one airline", {
        testthat::expect_s3_class(one_airline, "data.frame")
        testthat::expect_equal(nrow(one_airline), 1)
        testthat::expect_equal(one_airline$carrier, "9E")
        testthat::expect_equal(one_airline$name, "Endeavor Air Inc.")
      })
      one_airline
    })
  )
}
```

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