Package ‘RPostgres’

April 12, 2021

Title  ‘Rcpp’ Interface to ‘PostgreSQL’
Version  1.3.2
Date  2021-04-12
Description  Fully ‘DBI’-compliant ‘Rcpp’-backed interface to
‘PostgreSQL’ <https://www.postgresql.org/>, an open-source relational
database.
License  GPL-3
BugReports  https://github.com/r-dbi/RPostgres/issues
Depends  R (>= 3.1.0)
Imports  bit64, blob (>= 1.2.0), DBI (>= 1.1.0), hms (>= 0.5.0),
lubridate, methods, Rcpp (>= 0.11.4.2), withr
Suggests  callr, covr, DBItest (>= 1.7.0), knitr, rmarkdown, testthat
LinkingTo  plogr (>= 0.2.0), Rcpp
VignetteBuilder  knitr
Encoding  UTF-8
LazyLoad  true
RoxygenNote  7.1.1
SystemRequirements  libpq >= 9.0: libpq-dev (deb) or postgresql-devel
rpm
Collate  'PqDriver.R' 'PqConnection.R' 'PqResult.R' 'RPostgres-pkg.R'
'RcppExports.R' 'Redshift.R' 'default.R' 'export.R' 'names.R'
'quote.R' 'tables.R' 'transactions.R' 'utils.R'
NeedsCompilation  yes
Author  Hadley Wickham [aut],
  Jeroen Ooms [aut],
  Kirill Müller [aut, cre] (https://orcid.org/0000-0002-1416-3412),
  RStudio [cph],
  R Consortium [fnd],
  Tomoaki Nishiyama [ctb] (Code for encoding vectors into strings derived
  from RPostgreSQL)
RPostgres-package

Maintainer Kirill Müller <krlmlr+r@mailbox.org>
Repository CRAN
Date/Publication 2021-04-12 07:20:07 UTC

R topics documented:

RPostgres-package ..................................................... 2
Postgres ................................................................. 3
postgres-query ......................................................... 4
postgres-tables ......................................................... 6
postgres-transactions ................................................. 8
postgresHasDefault ................................................... 9
postgresWaitForNotify ................................................. 10
quote ................................................................. 11
Redshift ............................................................. 12

Index 14

RPostgres-package RPostgres: 'Rcpp' Interface to 'PostgreSQL'

Description

Fully 'DBI'-compliant 'Rcpp'-backed interface to 'PostgreSQL' <https://www.postgresql.org/>, an open-source relational database.

Author(s)

Maintainer: Kirill Müller <krlmlr+r@mailbox.org> (ORCID)
Authors:
  • Hadley Wickham
  • Jeroen Ooms
Other contributors:
  • RStudio [copyright holder]
  • R Consortium [funder]
  • Tomoaki Nishiyama (Code for encoding vectors into strings derived from RPostgreSQL) [contributor]

See Also

Useful links:
  • https://rpostgres.r-dbi.org
  • https://github.com/r-dbi/RPostgres
  • Report bugs at https://github.com/r-dbi/RPostgres/issues
Description

DBI::dbConnect() establishes a connection to a database. Set drv = RPostgres::Postgres() to connect to a SQL database using the RPostgres package.

Manually disconnecting a connection is not necessary with RPostgres, but still recommended; if you delete the object containing the connection, it will be automatically disconnected during the next GC with a warning.

Usage

Postgres()

```r
## S4 method for signature 'PqDriver'
dbConnect(
  drv,
  dbname = NULL,
  host = NULL,
  port = NULL,
  password = NULL,
  user = NULL,
  service = NULL,
  ..., 
  bigint = c("integer64", "integer", "numeric", "character"),
  check_interrupts = FALSE,
  timezone = "UTC",
  timezone_out = NULL
)
```

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

Arguments

drv Should be set to Postgres() to use the RPostgres package.

dbname Database name. If NULL, defaults to the user name. Note that this argument can only contain the database name, it will not be parsed as a connection string (internally, expand_dbname is set to false in the call to PQconnectdbParams()).

host, port Host and port. If NULL, will be retrieved from PGHOST and PGPORT env vars.

user, password User name and password. If NULL, will be retrieved from PGUSER and PGPASSWORD env vars, or from the appropriate line in ~/.pgpass. See http://www.postgresql.org/docs/9.6/static/libpq-pgpass.html for more details.
service

Name of service to connect as. If NULL, will be ignored. Otherwise, connection parameters will be loaded from the pg_service.conf file and used. See http://www.postgresql.org/docs/9.6/static/libpq-pgservice.html for details on this file and syntax.

... Other name-value pairs that describe additional connection options as described at http://www.postgresql.org/docs/9.6/static/libpq-connect.html#LIBPQ-PARAMKEYWORDS

bigint

The R type that 64-bit integer types should be mapped to, default is bit64::integer64, which allows the full range of 64 bit integers.

check_interrupts

Should user interrupts be checked during the query execution (before first row of data is available)? Setting to TRUE allows interruption of queries running too long.

timezone

Sets the timezone for the connection. The default is "UTC". If NULL then no timezone is set, which defaults to the server’s time zone.

timezone_out

The time zone returned to R, defaults to timezone. If you want to display date-time values in the local timezone, set to Sys.timezone() or "". This setting does not change the time values returned, only their display.

conn

Connection to disconnect.

Examples

if (postgresHasDefault()) {
library(DBI)
  # Pass more arguments as necessary to dbConnect()
  con <- dbConnect(RPostgres::Postgres())
  dbDisconnect(con)
}

postgres-query

Execute a SQL statement on a database connection

Description

To retrieve results a chunk at a time, use dbSendQuery(), dbFetch(), then dbClearResult(). Alternatively, if you want all the results (and they’ll fit in memory) use dbGetQuery() which sends, fetches and clears for you.

Usage

## S4 method for signature 'PqConnection,character'
dbSendQuery(conn, statement, params = NULL, ...)

## S4 method for signature 'PqResult'
dbFetch(res, n = -1, ..., row.names = FALSE)

## S4 method for signature 'PqResult'
postgres-query

    dbBind(res, params, ...)
    ## S4 method for signature 'PqResult'
    dbHasCompleted(res, ...)
    ## S4 method for signature 'PqResult'
    dbClearResult(res, ...)

Arguments

- **conn**
  A **PqConnection** created by `dbConnect()`.  

- **statement**
  An SQL string to execute.

- **params**
  A list of query parameters to be substituted into a parameterised query. Query parameters are sent as strings, and the correct type is imputed by PostgreSQL. If this fails, you can manually cast the parameter with e.g. "$1::bigint".

- **...**
  Other arguments needed for compatibility with generic (currently ignored).

- **res**
  Code a **PqResult** produced by `DBI::dbSendQuery()`.

- **n**
  Number of rows to return. If less than zero returns all rows.

- **row.names**
  Either TRUE, FALSE, NA or a string.  
  If TRUE, always translate row names to a column called "row_names". If FALSE, never translate row names. If NA, translate rownames only if they’re a character vector.  
  A string is equivalent to TRUE, but allows you to override the default name.  
  For backward compatibility, NULL is equivalent to FALSE.

Examples

```r
# For running the examples on systems without PostgreSQL connection:
run <- postgresHasDefault()

library(DBI)
if (run) db <- dbConnect(RPostgres::Postgres())
if (run) dbWriteTable(db, "usarrests", datasets::USArrests, temporary = TRUE)

# Run query to get results as dataframe
if (run) dbGetQuery(db, "SELECT * FROM usarrests LIMIT 3")

# Send query to pull requests in batches
if (run) res <- dbSendQuery(db, "SELECT * FROM usarrests")
if (run) dbFetch(res, n = 2)
if (run) dbFetch(res, n = 2)
if (run) dbHasCompleted(res)
if (run) dbClearResult(res)

if (run) dbRemoveTable(db, "usarrests")

if (run) dbDisconnect(db)
```
Description

dbWriteTable() executes several SQL statements that create/overwrite a table and fill it with values. **RPostgres** does not use parameterised queries to insert rows because benchmarks revealed that this was considerably slower than using a single SQL string.

dbAppendTable() is overridden because **RPostgres** uses placeholders of the form $1, $2 etc. instead of ?.

Usage

```r
## S4 method for signature 'PqConnection,character,data.frame'

dbWriteTable(
    conn,
    name,
    value,
    ..., 
    row.names = FALSE,
    overwrite = FALSE,
    append = FALSE,
    field.types = NULL,
    temporary = FALSE,
    copy = TRUE
)

## S4 method for signature 'PqConnection'

sqlData(con, value, row.names = FALSE, ...)

## S4 method for signature 'PqConnection'

dbAppendTable(conn, name, value, ..., row.names = NULL)

## S4 method for signature 'PqConnection,character'

dbReadTable(conn, name, ..., check.names = TRUE, row.names = FALSE)

## S4 method for signature 'PqConnection'

dbListTables(conn, ...)

## S4 method for signature 'PqConnection,character'

dbExistsTable(conn, name, ...)

## S4 method for signature 'PqConnection,Id'

dbExistsTable(conn, name, ...)

## S4 method for signature 'PqConnection,character'
```
postgres-tables

```
dbRemoveTable(conn, name, ..., temporary = FALSE, fail_if_missing = TRUE)
```  
## S4 method for signature 'PqConnection,character'
```
dbListFields(conn, name, ...)
```  
## S4 method for signature 'PqConnection,Id'
```
dbListFields(conn, name, ...)
```  
## S4 method for signature 'PqConnection'
```
dbListObjects(conn, prefix = NULL, ...)
```

Arguments

- `conn` a `PqConnection` object, produced by `DBI::dbConnect()`
- `name` a character string specifying a table name. Names will be automatically quoted so you can use any sequence of characters, not just any valid bare table name.
- `value` A data.frame to write to the database.
- `...` Ignored.
- `row.names` Either `TRUE`, `FALSE`, `NA` or a string. If `TRUE`, always translate row names to a column called "row_names". If `FALSE`, never translate row names. If `NA`, translate rownames only if they’re a character vector. A string is equivalent to `TRUE`, but allows you to override the default name. For backward compatibility, `NULL` is equivalent to `FALSE`.
- `overwrite` a logical specifying whether to overwrite an existing table or not. Its default is `FALSE`.
- `append` a logical specifying whether to append to an existing table in the DBMS. Its default is `FALSE`.
- `field.types` character vector of named SQL field types where the names are the names of new table’s columns. If missing, types inferred with `DBI::dbDataType()`.
- `temporary` If `TRUE`, only temporary tables are considered.
- `copy` If `TRUE`, serializes the data frame to a single string and uses COPY name FROM stdin. This is fast, but not supported by all postgres servers (e.g. Amazon’s Redshift). If `FALSE`, generates a single SQL string. This is slower, but always supported.
- `con` A database connection.
- `check.names` If `TRUE`, the default, column names will be converted to valid R identifiers.
- `fail_if_missing` If `FALSE`, `dbRemoveTable()` succeeds if the table doesn’t exist.
- `prefix` A fully qualified path in the database’s namespace, or `NULL`. This argument will be processed with `dbUnquoteIdentifier()`. If given the method will return all objects accessible through this prefix.
Examples

# For running the examples on systems without PostgreSQL connection:
run <- postgresHasDefault()

library(DBI)
if (run) con <- dbConnect(RPostgres::Postgres())
if (run) dbListTables(con)
if (run) dbWriteTable(con, "mtcars", mtcars, temporary = TRUE)
if (run) dbReadTable(con, "mtcars")

if (run) dbListTables(con)
if (run) dbExistsTable(con, "mtcars")

# A zero row data frame just creates a table definition.
if (run) dbWriteTable(con, "mtcars2", mtcars[0, ], temporary = TRUE)
if (run) dbReadTable(con, "mtcars2")

if (run) dbDisconnect(con)

---

postgres-transactions  Transaction management.

Description

dbBegin() starts a transaction. dbCommit() and dbRollback() end the transaction by either committing or rolling back the changes.

Usage

```r
## S4 method for signature 'PqConnection'
dbBegin(conn, ...)
```

```r
## S4 method for signature 'PqConnection'
dbCommit(conn, ...)
```

```r
## S4 method for signature 'PqConnection'
dbRollback(conn, ...)
```

Arguments

- `conn` a `PqConnection` object, produced by `DBI::dbConnect()`
- ... Unused, for extensibility.

Value

A boolean, indicating success or failure.
Examples

# For running the examples on systems without PostgreSQL connection:
run <- postgresHasDefault()

library(DBI)
if (run) con <- dbConnect(RPostgres::Postgres())
if (run) dbWriteTable(con, "USarrests", datasets::USArrests, temporary = TRUE)
if (run) dbGetQuery(con, 'SELECT count(*) from "USarrests"')

if (run) dbBegin(con)
if (run) dbExecute(con, 'DELETE from "USarrests" WHERE "Murder" > 1')
if (run) dbGetQuery(con, 'SELECT count(*) from "USarrests"')
if (run) dbRollback(con)

# Rolling back changes leads to original count
if (run) dbGetQuery(con, 'SELECT count(*) from "USarrests"')

if (run) dbRemoveTable(con, "USarrests")
if (run) dbDisconnect(con)

postgresHasDefault  Check if default database is available.

Description

RPostgres examples and tests connect to a default database via dbConnect(Postgres()). This function checks if that database is available, and if not, displays an informative message.

postgresDefault() works similarly but returns a connection on success and throws a testthat skip condition on failure, making it suitable for use in tests.

Usage

postgresHasDefault(...)  

postgresDefault(...)  

Arguments

...  Additional arguments passed on to dbConnect()

Examples

if (postgresHasDefault()) {
  db <- postgresDefault()
  dbListTables(db)
  dbDisconnect(db)
}
postgresWaitForNotify  
*Wait for and return any notifications that return within timeout*

**Description**

Once you subscribe to notifications with `LISTEN`, use this to wait for responses on each channel.

**Usage**

```r
postgresWaitForNotify(conn, timeout = 1)
```

**Arguments**

- **conn**  
a `PqConnection` object, produced by `DBI::dbConnect()`  
- **timeout**  
How long to wait, in seconds. Default 1

**Value**

If a notification was available, a list of:

- **channel**  
Name of channel  
- **pid**  
PID of notifying server process  
- **payload**  
Content of notification

If no notifications are available, return NULL

**Examples**

```r
# For running the examples on systems without PostgreSQL connection:
if (postgresHasDefault()) {
    library(DBI)
    library(callr)

    # listen for messages on the grapevine
    db_listen <- dbConnect(RPostgres::Postgres())
    dbExecute(db_listen, "LISTEN grapevine")

    # Start another process, which sends a message after a delay
    rp <- r_bg(function () {
        library(DBI)
        Sys.sleep(0.3)
        db_notify <- dbConnect(RPostgres::Postgres())
        dbExecute(db_notify, "NOTIFY grapevine, 'psst'")
        dbDisconnect(db_notify)
    })

    # Sleep until we get the message
    n <- NULL
    while (is.null(n)) {
        n <- postgresWaitForNotify(db_listen, timeout = 1)
    }
}
```
n <- RPostgres::postgresWaitForNotify(db_listen, 60)
}
stopifnot(n$payload == 'psst')

# Tidy up
rp$wait()

dbDisconnect(db_listen)

---

**Quote postgres strings, identifiers, and literals**

**Description**

If an object of class `Id` is used for `dbQuoteIdentifier()`, it needs at most one table component and at most one schema component.

**Usage**

```r
## S4 method for signature 'PqConnection, character'
dbQuoteString(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, SQL'
dbQuoteString(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, character'
dbQuoteIdentifier(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, SQL'
dbQuoteIdentifier(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, Id'
dbQuoteIdentifier(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, SQL'
dbUnquoteIdentifier(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, logical'
dbQuoteLiteral(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, integer'
dbQuoteLiteral(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, numeric'
dbQuoteLiteral(conn, x, ...)
```

```r
## S4 method for signature 'PqConnection, factor'
dbQuoteLiteral(conn, x, ...)
```
## S4 method for signature 'PqConnection,Date'
\texttt{dbQuoteLiteral(conn, x, ...)}

## S4 method for signature 'PqConnection,POSIXt'
\texttt{dbQuoteLiteral(conn, x, ...)}

## S4 method for signature 'PqConnection,difftime'
\texttt{dbQuoteLiteral(conn, x, ...)}

## S4 method for signature 'PqConnection,list'
\texttt{dbQuoteLiteral(conn, x, ...)}

## S4 method for signature 'PqConnection,blob'
\texttt{dbQuoteLiteral(conn, x, ...)}

## S4 method for signature 'PqConnection,character'
\texttt{dbQuoteLiteral(conn, x, ...)}

### Arguments
- **conn**: A \texttt{PqConnection} created by \texttt{dbConnect()}
- **x**: A character vector to be quoted.
- **...**: Other arguments needed for compatibility with generic (currently ignored).

### Examples

``` r
# For running the examples on systems without PostgreSQL connection:
run <- postgresHasDefault()

library(DBI)
if (run) con <- dbConnect(RPostgres::Postgres())

x <- c("a", "b c", "d'e", \"\f")
if (run) dbQuoteString(con, x)
if (run) dbQuoteIdentifier(con, x)
if (run) dbDisconnect(con)
```

---

### Redshift

**Redshift**

### Description

Redshift currently uses all the same methods as Postgres, but provides an extension point for future methods and downstream packages.
Usage

Redshift()

## S4 method for signature 'RedshiftDriver'

```
dbConnect(
  drv,
  dbname = NULL,
  host = NULL,
  port = NULL,
  password = NULL,
  user = NULL,
  service = NULL,
  ...
  bigint = c("integer64", "integer", "numeric", "character"),
  check_interrupts = FALSE,
  timezone = "UTC"
)
```

Arguments

- **drv**
  Should be set to `Postgres()` to use the `RPostgres` package.

- **dbname**
  Database name. If NULL, defaults to the user name. Note that this argument can only contain the database name, it will not be parsed as a connection string (internally, `expand_dbname` is set to false in the call to `PQconnectdbParams()`).

- **host**
  Host and port. If NULL, will be retrieved from PGHOST and PGPORT env vars.

- **port**
  Host and port. If NULL, will be retrieved from PGHOST and PGPORT env vars.

- **password**
  User name and password. If NULL, will be retrieved from PGUSER and PGPASSWORD envvars, or from the appropriate line in ~/.pgpass. See [http://www.postgresql.org/docs/9.6/static/libpq-pgpass.html](http://www.postgresql.org/docs/9.6/static/libpq-pgpass.html) for more details.

- **user**
  User name and password. If NULL, will be retrieved from PGUSER and PGPASSWORD envvars, or from the appropriate line in ~/.pgpass. See [http://www.postgresql.org/docs/9.6/static/libpq-pgpass.html](http://www.postgresql.org/docs/9.6/static/libpq-pgpass.html) for more details.

- **service**
  Name of service to connect as. If NULL, will be ignored. Otherwise, connection parameters will be loaded from the pg_service.conf file and used. See [http://www.postgresql.org/docs/9.6/static/libpq-pgservice.html](http://www.postgresql.org/docs/9.6/static/libpq-pgservice.html) for details on this file and syntax.

- **...**
  Other name-value pairs that describe additional connection options as described at [http://www.postgresql.org/docs/9.6/static/libpq-connect.html#LIBPQ-PARAMKEYWORDS](http://www.postgresql.org/docs/9.6/static/libpq-connect.html#LIBPQ-PARAMKEYWORDS)

- **bigint**
  The R type that 64-bit integer types should be mapped to, default is `bit64::integer64`, which allows the full range of 64 bit integers.

- **check_interrupts**
  Should user interrupts be checked during the query execution (before first row of data is available)? Setting to TRUE allows interruption of queries running too long.

- **timezone**
  Sets the timezone for the connection. The default is "UTC". If NULL then no timezone is set, which defaults to the server’s time zone.
Index

bit64::integer64, 4, 13

dbAppendTable(), 6
dbAppendTable, PqConnection-method
(postgres-tables), 6
dbBegin, PqConnection-method
(postgres-transactions), 8
dbBind, PqResult-method
(postgres-query), 4
dbClearResult, PqResult-method
(postgres-query), 4
dbCommit, PqConnection-method
(postgres-transactions), 8
dbConnect(), 5, 9
dbConnect, PqDriver-method (Postgres), 3
dbConnect, RedshiftDriver-method
(Redshift), 12
dbDisconnect, PqConnection-method
(Postgres), 3
dbExistsTable, PqConnection, character-method
(postgres-tables), 6
dbExistsTable, PqConnection, Id-method
(postgres-tables), 6
dbFetch, PqResult-method
(postgres-query), 4
dbHasCompleted, PqResult-method
(postgres-query), 4
DBI::dbConnect(), 7, 8, 10
DBI::dbDataType(), 7
DBI::dbSendQuery(), 5
dbListFields, PqConnection, character-method
(postgres-tables), 6
dbListFields, PqConnection, Id-method
(postgres-tables), 6
dbListObjects, PqConnection-method
(postgres-tables), 6
dbListTables, PqConnection-method
(postgres-tables), 6
dbQuoteIdentifier, PqConnection, character-method
(quote), 11
dbQuoteIdentifier, PqConnection, Id-method
(quote), 11
dbQuoteIdentifier, PqConnection, SQL-method
(quote), 11
dbQuoteLiteral, PqConnection, blob-method
(quote), 11
dbQuoteLiteral, PqConnection, character-method
(quote), 11
dbQuoteLiteral, PqConnection, Date-method
(quote), 11
dbQuoteLiteral, PqConnection, difftime-method
(quote), 11
dbQuoteLiteral, PqConnection, factor-method
(quote), 11
dbQuoteLiteral, PqConnection, integer-method
(quote), 11
dbQuoteLiteral, PqConnection, list-method
(quote), 11
dbQuoteLiteral, PqConnection, logical-method
(quote), 11
dbQuoteLiteral, PqConnection, numeric-method
(quote), 11
dbQuoteLiteral, PqConnection, POSIXt-method
(quote), 11
dbQuoteString, PqConnection, character-method
(quote), 11
dbQuoteString, PqConnection, SQL-method
(quote), 11
dbReadTable, PqConnection, character-method
(postgres-tables), 6
dbRemoveTable, PqConnection, character-method
(postgres-tables), 6
dbRollback, PqConnection-method
(postgres-transactions), 8
dbSendQuery, PqConnection, character-method
(postgres-query), 4
dbUnquoteIdentifier(), 7
Index

- dbWriteTable(), 6
- dbWriteTable, PqConnection, character, data.frame-method (postgres-tables), 6

- Id, 11

- Postgres, 3
- Postgres(), 3, 9, 13
- postgres-query, 4
- postgres-tables, 6
- postgres-transactions, 8
- postgresDefault (postgresHasDefault), 9
- postgresHasDefault, 9
- postgresWaitForNotify, 10
- PqConnection, 5, 7, 8, 10, 12
- PqResult, 5

- quote, 11

- Redshift, 12
- RedshiftConnection-class (Redshift), 12
- RedshiftDriver-class (Redshift), 12
- RPostgres (RPostgres-package), 2
- RPostgres-package, 2

- sqlData, PqConnection-method (postgres-tables), 6
- Sys.timezone(), 4