

Package ‘pool’

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Type Package

Title Object Pooling

Version 1.0.1

Description Enables the creation of object pools, which make it less computationally expensive to fetch a new object. Currently the only supported pooled objects are 'DBI' connections.

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URL <https://github.com/rstudio/pool>, <http://rstudio.github.io/pool/>

BugReports <https://github.com/rstudio/pool/issues>

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DBI-custom	<i>Unsupported DBI methods</i>
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Description

Most pool methods for DBI generics check out a connection, perform the operation, and then return the connection to the pool, as described in [DBI-wrap](#).

This page describes the exceptions:

- `DBI::dbSendQuery()` and `DBI::dbSendStatement()` can't work with pool because they return result sets that are bound to a specific connection. Instead use `DBI::dbGetQuery()`, `DBI::dbExecute()`, or `localCheckout()`.
- `DBI::dbBegin()`, `DBI::dbRollback()`, `DBI::dbCommit()`, and `DBI::dbWithTransaction()` can't work with pool because transactions are bound to a connection. Instead use `poolWithTransaction()`.
- `DBI::dbDisconnect()` can't work because pool handles disconnection.
- `DBI::dbGetInfo()` returns information about the pool, not the database connection.
- `DBI::dbIsValid()` returns whether or not the entire pool is valid (i.e. not closed).

Usage

```
## S4 method for signature 'Pool'
dbSendQuery(conn, statement, ...)
```

```
## S4 method for signature 'Pool,ANY'
dbSendStatement(conn, statement, ...)
```

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

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

```
## S4 method for signature 'Pool'
dbIsValid(dbObj, ...)
```

```
## S4 method for signature 'Pool'
```

```

dbBegin(conn, ...)

## S4 method for signature 'Pool'
dbCommit(conn, ...)

## S4 method for signature 'Pool'
dbRollback(conn, ...)

## S4 method for signature 'Pool'
dbWithTransaction(conn, code)

```

Arguments

conn, dbObj A Pool object, as returned from `dbPool()`.
statement, code, ... See DBI documentation.

dbPool	<i>Create a pool of database connections</i>
--------	--

Description

`dbPool()` is a drop-in replacement for `DBI::dbConnect()` that provides a shared pool of connections that can automatically reconnect to the database if needed.

Usage

```

dbPool(
  drv,
  ...,
  minSize = 1,
  maxSize = Inf,
  onCreate = NULL,
  idleTimeout = 60,
  validationInterval = 60,
  validateQuery = NULL
)

```

Arguments

drv A [DBI Driver](#), e.g. `RSQLite::SQLite()`, `RPostgres::Postgres()`, `odbc::odbc()` etc.

... Arguments passed on to `DBI::dbConnect()`. These are used to identify the database and provide needed authentication.

minSize, maxSize The minimum and maximum number of objects in the pool.

onCreate	A function that takes a single argument, a connection, and is called when the connection is created. Use this with <code>DBI::dbExecute()</code> to set default options on every connection created by the pool.
idleTimeout	Number of seconds to wait before destroying idle objects (i.e. objects available for checkout over and above <code>minSize</code>).
validationInterval	Number of seconds to wait between validating objects that are available for checkout. These objects are validated in the background to keep them alive. To force objects to be validated on every checkout, set <code>validationInterval = 0</code> .
validateQuery	A simple query that can be used to verify that the connection is valid. If not provided, <code>dbPool()</code> will try a few common options, but these don't work for all databases.

Examples

```
# You use a dbPool in the same way as a standard DBI connection
pool <- dbPool(RSQLite::SQLite())
pool

DBI::dbWriteTable(pool, "mtcars", mtcars)
dbGetQuery(pool, "SELECT * FROM mtcars LIMIT 4")

# Always close a pool when you're done using it
poolClose(pool)

# Using the RMySQL package
if (requireNamespace("RMySQL", quietly = TRUE)) {
  pool <- dbPool(
    drv = RMySQL::MySQL(),
    dbname = "shinydemo",
    host = "shiny-demo.csa7qlmguqrf.us-east-1.rds.amazonaws.com",
    username = "guest",
    password = "guest"
  )

  dbGetQuery(pool, "SELECT * from City LIMIT 5;")

  poolClose(pool)
}
```

Pool-class

Create a pool of reusable objects

Description

A generic pool class that holds objects. These can be fetched from the pool and released back to it at will, with very little computational cost. The pool should be created only once and closed when it is no longer needed, to prevent leaks.

See `dbPool()` for an example of object pooling applied to DBI database connections.

Usage

```
poolCreate(
  factory,
  minSize = 1,
  maxSize = Inf,
  idleTimeout = 60,
  validationInterval = 60,
  state = NULL
)

poolClose(pool)

## S4 method for signature 'Pool'
poolClose(pool)
```

Arguments

<code>factory</code>	A zero-argument function called to create the objects that the pool will hold (e.g. for DBI database connections, <code>dbPool()</code> uses a wrapper around <code>DBI::dbConnect()</code>).
<code>minSize</code> , <code>maxSize</code>	The minimum and maximum number of objects in the pool.
<code>idleTimeout</code>	Number of seconds to wait before destroying idle objects (i.e. objects available for checkout over and above <code>minSize</code>).
<code>validationInterval</code>	Number of seconds to wait between validating objects that are available for checkout. These objects are validated in the background to keep them alive. To force objects to be validated on every checkout, set <code>validationInterval = 0</code> .
<code>state</code>	A pool public variable to be used by backend authors.
<code>pool</code>	A Pool object previously created with <code>poolCreate</code>

<code>poolCheckout</code>	<i>Check out and return object from the pool</i>
---------------------------	--

Description

Use `poolCheckout()` to check out an object from the pool and `poolReturn()` to return it. You will receive a warning if all objects aren't returned before the pool is closed.

`localCheckout()` is a convenience function that can be used inside functions (and other function-scoped operations like `shiny::reactive()` and `local()`). It checks out an object and automatically returns it when the function exits

Note that validation is only performed when the object is checked out, so you generally want to keep the checked out around for as little time as possible.

Usage

```
poolCheckout(pool)

## S4 method for signature 'Pool'
poolCheckout(pool)

poolReturn(object)

## S4 method for signature 'ANY'
poolReturn(object)

localCheckout(pool, env = parent.frame())
```

Arguments

pool	The pool to get the object from.
object	Object to return
env	Environment corresponding to the execution frame. For expert use only.

Examples

```
pool <- dbPool(RSQLite::SQLite())
con <- poolCheckout(pool)
con
poolReturn(con)

f <- function() {
  con <- localCheckout(pool)
  # do something ...
}
f()

poolClose(pool)
```

poolWithTransaction *Self-contained database transactions using pool*

Description

This function allows you to use a pool object directly to execute a transaction on a database connection, without ever having to actually check out a connection from the pool and then return it. Using this function instead of the direct transaction methods will guarantee that you don't leak connections or forget to commit/rollback a transaction.

Usage

```
poolWithTransaction(pool, func)
```

Arguments

pool	The pool object to fetch the connection from.
func	A function that has one argument, conn (a database connection checked out from pool).

Details

This function is similar to `DBI::dbWithTransaction()`, but its arguments work a little differently. First, it takes in a pool object, instead of a connection. Second, instead of taking an arbitrary chunk of code to execute as a transaction (i.e. either run all the commands successfully or not run any of them), it takes in a function. This function (the `func` argument) gives you an argument to use in its body, a database connection. So, you can use connection methods without ever having to check out a connection. But you can also use arbitrary R code inside the `func`'s body. This function will be called once we fetch a connection from the pool. Once the function returns, we release the connection back to the pool.

Like its DBI sister `DBI::dbWithTransaction()`, this function calls `dbBegin()` before executing the code, and `dbCommit()` after successful completion, or `dbRollback()` in case of an error. This means that calling `poolWithTransaction` always has side effects, namely to commit or roll back the code executed when `func` is called. In addition, if you modify the local R environment from within `func` (e.g. setting global variables, writing to disk), these changes will persist after the function has returned.

Also, like `DBI::dbWithTransaction()`, there is also a special function called `dbBreak()` that allows for an early, silent exit with rollback. It can be called only from inside `poolWithTransaction`.

Value

`func`'s return value.

Examples

```
if (requireNamespace("RSQLite", quietly = TRUE)) {
  pool <- dbPool(RSQLite::SQLite(), dbname = ":memory:")

  dbWriteTable(pool, "cars", head(cars, 3))
  dbReadTable(pool, "cars") # there are 3 rows

  ## successful transaction
  poolWithTransaction(pool, function(conn) {
    dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (1, 1);")
    dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (2, 2);")
    dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (3, 3);")
  })
  dbReadTable(pool, "cars") # there are now 6 rows

  ## failed transaction -- note the missing comma
  tryCatch(
    poolWithTransaction(pool, function(conn) {
      dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (1, 1);")
      dbExecute(conn, "INSERT INTO cars (speed dist) VALUES (2, 2);")
    })
  )
}
```

```

    dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (3, 3);")
  }},
  error = identity
)
dbReadTable(pool, "cars") # still 6 rows

## early exit, silently
poolWithTransaction(pool, function(conn) {
  dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (1, 1);")
  dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (2, 2);")
  if (nrow(dbReadTable(conn, "cars")) > 7) dbBreak()
  dbExecute(conn, "INSERT INTO cars (speed, dist) VALUES (3, 3);")
})
dbReadTable(pool, "cars") # still 6 rows

poolClose(pool)

} else {
  message("Please install the 'RSQLite' package to run this example")
}

```

tbl.Pool

Use pool with dbplyr

Description

Wrappers for key dplyr (and dbplyr) methods so that pool works seamlessly with **dbplyr**.

Usage

```
tbl.Pool(src, from, ..., vars = NULL)
```

```
copy_to.Pool(
  dest,
  df,
  name = deparse(substitute(df)),
  overwrite = FALSE,
  temporary = TRUE,
  ...
)
```

Arguments

src, dest	A dbPool .
from	Name table or dbplyr::sql() string.
...	Other arguments passed on to the individual methods
vars	A character vector of variable names in src. For expert use only.

df	A local data frame, a tbl_sql from same source, or a tbl_sql from another source. If from another source, all data must transition through R in one pass, so it is only suitable for transferring small amounts of data.
name	name for new remote table.
overwrite	If TRUE, will overwrite an existing table with name name. If FALSE, will throw an error if name already exists.
temporary	if TRUE, will create a temporary table that is local to this connection and will be automatically deleted when the connection expires

Examples

```
library(dplyr)

pool <- dbPool(RSQLite::SQLite())
# copy a table into the database
copy_to(pool, mtcars, "mtcars", temporary = FALSE)

# retrieve a table
mtcars_db <- tbl(pool, "mtcars")
mtcars_db
mtcars_db %>% select(mpg, cyl, disp)
mtcars_db %>% filter(cyl == 6) %>% collect()

poolClose(pool)
```

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