Package ‘odbc’

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Title Connect to ODBC Compatible Databases (using the DBI Interface)

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Description A DBI-compatible interface to ODBC databases.

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BugReports https://github.com/r-dbi/odbc/issues

Depends R (>= 3.2.0)

Imports bit64,
  blob (>= 1.2.0),
  DBI (>= 1.0.0),
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SystemRequirements C++11, GNU make, An ODBC3 driver manager and drivers.

Collate 'odbc.R'
  'Driver.R'
  'Connection.R'
  'DataTypes.R'
  'RcppExports.R'
  'Result.R'
  'Table.R'
odbc-package

'Viewer.R'
'db.R'
'hidden.R'
'utilis.R'
'zzz.R'

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odbc-package  odbc: Connect to ODBC Compatible Databases (using the DBI Interface)

Description

A DBI-compatible interface to ODBC databases.

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dbConnect,OdbcDriver-method

Connect to an ODBC compatible database

Description

Connect to an ODBC compatible database

Usage

```r
## S4 method for signature 'OdbcDriver'
dbConnect(
  drv,
  dsn = NULL,
  ..., 
  timezone = "UTC",
  timezone_out = "UTC",
  encoding = "",
  bigint = c("integer64", "integer", "numeric", "character"),
  timeout = 10,
  driver = NULL,
  server = NULL,
  database = NULL,
  uid = NULL,
  pwd = NULL,
  dbms.name = NULL,
  .connection_string = NULL
)
```

Arguments

- `drv`: an object that inherits from DBI::Driver, or an existing DBI::Connection object (in order to clone an existing connection).
- `dsn`: The Data Source Name.
- `...`: Additional ODBC keywords, these will be joined with the other arguments to form the final connection string.

See Also

Useful links:

- https://github.com/r-dbi/odbc
- https://db.rstudio.com
- Report bugs at https://github.com/r-dbi/odbc/issues
timezone The Server time zone. Useful if the database has an internal timezone that is not 'UTC'. If the database is in your local timezone set to Sys.timezone(). See OlsonNames() for a complete list of available timezones on your system.

timezone_out The time zone returned to R. If you want to display datetime values in the local timezone, set to Sys.timezone().

encoding The text encoding used on the Database. If the database is not using UTF-8 you will need to set the encoding to get accurate re-encoding. See iconvlist() for a complete list of available encodings on your system. Note strings are always returned UTF-8 encoded.

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

timeout Time in seconds to timeout the connection attempt. Setting a timeout of Inf indicates no timeout. (defaults to 10 seconds).

driver The ODBC driver name.

server The server hostname.

database The database on the server.

uid The user identifier.

pwd The password to use.

dbms.name The database management system name. This should normally be queried automatically by the ODBC driver. This name is used as the class name for the OdbcConnect object returned from dbConnect(). However if the driver does not return a valid value it can be set manually with this parameter.

.connection_string A complete connection string, useful if you are copy pasting it from another source. If this argument is used any additional arguments will be appended to this string.

Details

The connection string keywords are driver dependent. The parameters documented here are common, but some drivers may not accept them. Please see the specific driver documentation for allowed parameters. 'https://www.connectionstrings.com' is also a useful resource of example connection strings for a variety of databases.

dbListFields,OdbcConnection,character-method

List field names of a remote table

Description

List field names of a remote table
Usage

## S4 method for signature 'OdbcConnection,character'

```
dbListFields(
  conn,
  name,
  catalog_name = NULL,
  schema_name = NULL,
  column_name = NULL,
  ...
)
```

Arguments

- `conn`: A `DBIConnection` object, as returned by `dbConnect()`.
- `name`: A character string with the name of the remote table.
- `catalog_name`: The name of the catalog to return, the default returns all catalogs.
- `schema_name`: The name of the schema to return, the default returns all schemas.
- `column_name`: The name of the column to return, the default returns all columns.
- `...`: Other parameters passed on to methods.

Details

- `%` can be used as a wildcard in any of the search parameters to match 0 or more characters. `_` can be used to match any single character.

Value

`dbListFields()` returns a character vector that enumerates all fields in the table in the correct order. This also works for temporary tables if supported by the database. The returned names are suitable for quoting with `dbQuoteIdentifier()`. If the table does not exist, an error is raised. Invalid types for the name argument (e.g., character of length not equal to one, or numeric) lead to an error. An error is also raised when calling this method for a closed or invalid connection.

Specification

The name argument can be

- a string
- the return value of `dbQuoteIdentifier()`
- a value from the table column from the return value of `dbListObjects()` where `is_prefix` is `FALSE`

A column named `row_names` is treated like any other column.

See Also

`dbColumnInfo()` to get the type of the fields.

Other `DBIConnection` generics: `DBIConnection-class`, `dbAppendTable()`, `dbCreateTable()`, `dbDataType()`, `dbDisconnect()`, `dbExecute()`, `dbExistsTable()`, `dbGetException()`, `dbGetInfo()`, `dbGetQuery()`, `dbIsReadOnly()`, `dbIsValid()`, `dbListObjects()`, `dbListResults()`, `dbListTables()`, `dbReadTable()`, `dbRemoveTable()`, `dbSendQuery()`, `dbSendStatement()`, `dbWriteTable()`
Examples

con <- dbConnect(RSQLite::SQLite(), "\:memory:\")

dbWriteTable(con, "mtcars", mtcars)
dbListFields(con, "mtcars")

dbDisconnect(con)

dbListTables, OdbcConnection-method

List remote tables

Description

Returns the unquoted names of remote tables accessible through this connection. This should include views and temporary objects, but not all database backends (in particular RMariaDB and RMySQL) support this.

Usage

## S4 method for signature 'OdbcConnection'
dbListTables(
  conn,
  catalog_name = NULL,
  schema_name = NULL,
  table_name = NULL,
  table_type = NULL,
  ...
)

Arguments

- **conn**: A DBIConnection object, as returned by `dbConnect()`.
- **catalog_name**: The name of the catalog to return, the default returns all catalogs.
- **schema_name**: The name of the schema to return, the default returns all schemas.
- **table_name**: The name of the table to return, the default returns all tables.
- **table_type**: The type of the table to return, the default returns all table types.
- **...**: Other parameters passed on to methods.

Details

% can be used as a wildcard in any of the search parameters to match 0 or more characters. _ can be used to match any single character.

Value

dbListTables() returns a character vector that enumerates all tables and views in the database. Tables added with `dbWriteTable()` are part of the list. As soon a table is removed from the database, it is also removed from the list of database tables.

The same applies to temporary tables if supported by the database.

The returned names are suitable for quoting with `dbQuoteIdentifier()`. An error is raised when calling this method for a closed or invalid connection.
See Also

The ODBC documentation on Pattern Value Arguments for further details on the supported syntax.

Examples

```r
con <- dbConnect(RSQLite::SQLite(), ":memory:")

dbListTables(con)
dbWriteTable(con, "mtcars", mtcars)
dbListTables(con)

dbDisconnect(con)
```

---

**Description**

~~ Methods for function `dbListTables` in package DBI ~~

**Methods**

signature(conn = "Teradata")

---

**dbQuoteString-methods**

~~ Methods for Function `dbQuoteString` in Package DBI ~~

**Description**

~~ Methods for function `dbQuoteString` in package DBI ~~

**Methods**

signature(conn = "DBIConnection", x = "ANY")
signature(conn = "DBIConnection", x = "character")
signature(conn = "DBIConnection", x = "SQL")
signature(conn = "Hive", x = "character")
odbc

Driver for an ODBC database.

odbc()

## Not run:
#
'library(DBI)
odbc::odbc()

## End(Not run)

odbc-tables

Convenience functions for reading/writing DBMS tables

Convenience functions for reading/writing DBMS tables

Usage

## S4 method for signature 'OdbcConnection,character,data.frame'
dbWriteTable(
  conn,
  name,
  value,
  overwrite = FALSE,
  append = FALSE,
  temporary = FALSE,
  row.names = NA,
  field.types = NULL,
  batch_rows = getOption("odbc.batch_rows", NA),
  ...
)

## S4 method for signature 'OdbcConnection,Id,data.frame'
dbWriteTable(
  conn,
  name,
  value,
  overwrite = FALSE,
  append = FALSE,
  temporary = FALSE,
row.names = NA,
field.types = NULL,
batch_rows = getOption("odbc.batch_rows", NA),
...)

## S4 method for signature 'OdbcConnection,SQL,data.frame'
dbWriteTable(
  conn,
  name,
  value,
  overwrite = FALSE,
  append = FALSE,
  temporary = FALSE,
  row.names = NA,
  field.types = NULL,
  batch_rows = getOption("odbc.batch_rows", NA),
  ...
)

## S4 method for signature 'OdbcConnection'
dbAppendTable(conn, name, value, ..., row.names = NULL)

## S4 method for signature 'OdbcConnection'
sqlData(con, value, row.names = NA, ...)

## S4 method for signature 'OdbcConnection'
sqlCreateTable(
  con,
  table,
  fields,
  field.types = NULL,
  row.names = NA,
  temporary = FALSE,
  ...)

Arguments

conn a OdbcConnection 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.
overwrite Allow overwriting the destination table. Cannot be TRUE if append is also TRUE.
append Allow appending to the destination table. Cannot be TRUE if overwrite is also TRUE.
temporary If TRUE, will generate a temporary table statement.
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.

field.types  Additional field types used to override derived types.
batch_rows   The number of rows to retrieve. Defaults to NA, which is set dynamically to the size of the input. Depending on the database, driver, dataset and free memory setting this to a lower value may improve performance.
...           Other arguments used by individual methods.
con           A database connection.
table         Name of the table. Escaped with `dbQuoteIdentifier()`.
fields        Either a character vector or a data frame.
              A named character vector: Names are column names, values are types. Names are escaped with `dbQuoteIdentifier()`. Field types are unescaped.
              A data frame: field types are generated using `dbDataType()`.

Examples

```r
## Not run:
library(DBI)
con <- dbConnect(odbc::odbc())
dbListTables(con)
dbWriteTable(con, "mtcars", mtcars, temporary = TRUE)
dbReadTable(con, "mtcars")

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

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

dbDisconnect(con)
```

---

**OdbcConnection**

**Odbc Connection Methods**

**Description**

Implementations of pure virtual functions defined in the DBI package for OdbcConnection objects.

**Usage**

```r
## S4 method for signature 'OdbcConnection'
show(object)

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

## S4 method for signature 'OdbcConnection'
```
OdbcConnection

```
OdbcConnection

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

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

# S4 method for signature 'OdbcConnection,character'
dbSendStatement(conn, statement, params = NULL, ..., immediate = FALSE)

# S4 method for signature 'OdbcConnection,ANY'
dbDataType(dbObj, obj, ...)

# S4 method for signature 'OdbcConnection,data.frame'
dbDataType(dbObj, obj, ...)

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

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

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

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

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

# S4 method for signature 'OdbcConnection,character'
dbGetQuery(conn, statement, n = -1, params = NULL, ...)

# S4 method for signature 'OdbcConnection'
dbBegin(conn, ...)

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

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

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

# S4 method for signature 'OdbcConnection,SQL'
dbExistsTable(conn, name, ...)

Arguments

  object Any R object
  dbObj An object inheriting from DBIObject, i.e. DBIDriver, DBIConnection, or a DBIResult
```
... Other arguments to methods.

conn  A DBIConnection object, as returned by dbConnect().

statement  a character string containing SQL.

params  Query parameters to pass to dbBind(). See dbBind() for details.

immediate  If TRUE, SQLExecDirect will be used instead of SQLPrepare, and the params argument is ignored

obj  An R object whose SQL type we want to determine.

x  A character vector, SQL or Id object to quote as identifier.

name  A character string specifying a DBMS table name.

n  maximum number of records to retrieve per fetch. Use n = -1 or n = Inf to retrieve all pending records. Some implementations may recognize other special values.

odbcConnectionActions

List the actions supported for the connection

Description

Return a list of actions that can be performed on the connection.

Usage

odbcConnectionActions(connection)

Arguments

collection  A connection object, as returned by dbConnect().

Details

The list returned is a named list of actions, where each action has the following properties:

callback  A function to be invoked to perform the action

icon  An optional path to an icon representing the action

Value

A named list of actions that can be performed on the connection.
odbcConnectionColumns

Description

For a given table this function returns detailed information on all fields / columns. The expectation is that this is a relatively thin wrapper around the ODBC SQLColumns function call, with some of the field names renamed / re-ordered according to the return specifications below.

Usage

```r
odbcConnectionColumns(conn, name, ...)  
# S4 method for signature 'OdbcConnection,Id'
odbcConnectionColumns(conn, name, column_name = NULL)  
# S4 method for signature 'OdbcConnection,character'
odbcConnectionColumns(
  conn,
  name,
  catalog_name = NULL,
  schema_name = NULL,
  column_name = NULL
)
```

Arguments

- **conn**: OdbcConnection
- **name**: table we wish to get information on
- **...**: additional parameters to methods
- **column_name**: The name of the column to return, the default returns all columns.
- **catalog_name**: character catalog where the table is located
- **schema_name**: character schema where the table is located

Details

In `dbWriteTable()` we make a call to this method to get details on the fields of the table we are writing to. In particular the columns `data_type`, `column_size`, and `decimal_digits` are used. An implementation is not necessary for `dbWriteTable()` to work.

Value

data.frame with columns

- **name**
- **field.type** - equivalent to type_name in SQLColumns output
- **table_name**
- **schema_name**
- **catalog_name**
• data_type
• column_size
• buffer_length
• decimal_digits
• numeric_precision_radix
• column_default
• sql_data_type
• sql_datetime_subtype
• char_octet_length
• ordinal_position
• nullable

See Also

The ODBC documentation on SQLColumns for further details.

odbcConnectionIcon

Get an icon representing a connection.

Description

Return the path on disk to an icon representing a connection.

Usage

odbcConnectionIcon(connection)

Arguments

connection A connection object, as returned by dbConnect().

Details

The icon returned should be a 32x32 square image file.

Value

The path to an icon file on disk.
**odbcDataType**

Return the corresponding ODBC data type for an R object

**Description**

This is used when creating a new table with `dbWriteTable()`. Databases with default methods defined are

- MySQL
- PostgreSQL
- SQL Server
- Oracle
- SQLite
- Spark
- Hive
- Impala
- Redshift
- Vertica
- BigQuery
- Teradata
- Access

**Usage**

`odbcDataType(con, obj, ...)`

**Arguments**

- `con` A driver connection object, as returned by `dbConnect()`.
- `obj` An R object.
- `...` Additional arguments passed to methods.

**Details**

If you are using a different database and `dbWriteTable()` fails with a SQL parsing error the default method is not appropriate, you will need to write a new method.

**Value**

Corresponding SQL type for the obj.
Defining a new dbDataType method

The object type for your connection will be the database name retrieved by `dbGetInfo(con)$dbms.name`. Use the documentation provided with your database to determine appropriate values for each R data type. An example method definition of a fictional `foo` database follows.

```r
con <- dbConnect(odbc::odbc(), "FooConnection")
dbGetInfo(con)$dbms.name
#> [1] "foo"

`odbcDataType.foo <- function(con, obj, ...) {
  switch_type(obj,
    factor = "VARCHAR(255)",
    datetime = "TIMESTAMP",
    date = "DATE",
    binary = "BINARY",
    integer = "INTEGER",
    double = "DOUBLE",
    character = "VARCHAR(255)",
    logical = "BIT",
    list = "VARCHAR(255)",
    stop("Unsupported type", call. = FALSE)
  )
}
```

---

**OdbcDriver**

**Odbc Driver Methods**

---

**Description**

Implementations of pure virtual functions defined in the DBI package for OdbcDriver objects.

**Usage**

```r
## S4 method for signature 'OdbcDriver'
show(object)

## S4 method for signature 'OdbcDriver,ANY'
dbDataType(dbObj, obj, ...)

## S4 method for signature 'OdbcDriver,list'
dbDataType(dbObj, obj, ...)

## S4 method for signature 'OdbcDriver,data.frame'
dbDataType(dbObj, obj, ...)

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

## S4 method for signature 'OdbcDriver'
dbGetInfo(dbObj, ...)
```
**odbcListColumns**  
*List columns in an object.*

**Arguments**
- **object** Any R object
- **dbObj** A object inheriting from `DBIDriver` or `DBIConnection`
- **obj** An R object whose SQL type we want to determine.
- **...** Other arguments passed on to methods.

**Description**
Lists the names and types of each column (field) of a specified object.

**Usage**

```r
odbcListColumns(connection, ...)
```

**Arguments**
- **connection** A connection object, as returned by `dbConnect()`.
- **...** Parameters specifying the object.

**Details**
The object to inspect must be specified as one of the arguments (e.g. `table = "employees"`); depending on the driver and underlying data store, additional specification arguments may be required.

**Value**
A data frame with name and type columns, listing the object’s fields.

---

**odbcListDataSources**  
*List Available Data Source Names*

**Description**
List the available data sources on your system. See the DSN Configuration files section of the package README for details on how to install data sources for the most common databases.

**Usage**

```r
odbcListDataSources()
```

**Value**
A data frame with two columns.

- **name** Name of the data source
- **description** Data Source description
**odbcListDrivers**  
*List Available ODBC Drivers*

**Description**

List the available drivers on your system. See the **Installation** section of the package README for details on how to install drivers for the most common databases.

**Usage**

```r
odbcListDrivers(
    keep =getOption("odbc.drivers_keep"),
    filter =getOption("odbc.drivers_filter")
)
```

**Arguments**

- **keep**  
  A character vector of driver names to keep in the results, if NULL (the default) will keep all drivers.

- **filter**  
  A character vector of driver names to filter from the results, if NULL (the default) will not filter any drivers.

**Value**

A data frame with three columns. If a given driver does not have any attributes the last two columns will be `NA`. Drivers can be excluded from being returned by setting the `odbc.drivers.filter` option.

- **name**  
  Name of the driver

- **attribute**  
  Driver attribute name

- **value**  
  Driver attribute value

---

**odbcListObjects**  
*List objects in a connection.*

**Description**

Lists all of the objects in the connection, or all the objects which have specific attributes.

**Usage**

```r
odbcListObjects(connection, ...)
```

**Arguments**

- **connection**  
  A connection object, as returned by `dbConnect()`.

- **...**  
  Attributes to filter by.
Details

When used without parameters, this function returns all of the objects known by the connection. Any parameters passed will filter the list to only objects which have the given attributes; for instance, passing schema = "foo" will return only objects matching the schema foo.

Value

A data frame with name and type columns, listing the objects.

odbcListObjectTypes

Return the object hierarchy supported by a connection.

Description

Lists the object types and metadata known by the connection, and how those object types relate to each other.

Usage

odbcListObjectTypes(connection)

Arguments

connection A connection object, as returned by dbConnect().

Details

The returned hierarchy takes the form of a nested list, in which each object type supported by the connection is a named list with the following attributes:

contains A list of other object types contained by the object, or "data" if the object contains data
icon An optional path to an icon representing the type

For instance, a connection in which the top-level object is a schema that contains tables and views, the function will return a list like the following:

list(schema = list(contains = list(  list(name = "table", contains = "data")  list(name = "view", contains = "data"))))

Value

The hierarchy of object types supported by the connection.
odbcPreviewObject  Preview the data in an object.

Description
Return the data inside an object as a data frame.

Usage
odbcPreviewObject(connection, rowLimit, ...)

Arguments
connection  A connection object, as returned by dbConnect().
rowLimit  The maximum number of rows to display.
...  Parameters specifying the object.

Details
The object to previewed must be specified as one of the arguments (e.g. table = "employees"); depending on the driver and underlying data store, additional specification arguments may be required.

Value
A data frame containing the data in the object.

OdbcResult  Odbc Result Methods

Description
Implementations of pure virtual functions defined in the DBI package for OdbcResult objects.

Usage
## S4 method for signature 'OdbcResult'
dbClearResult(res, ...)

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

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

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

## S4 method for signature 'OdbcResult'
odbcSetTransactionIsolationLevel

Set the Transaction Isolation Level for a Connection

Description
Set the Transaction Isolation Level for a Connection

Usage
odbcSetTransactionIsolationLevel(conn, levels)

Arguments
conn A DBIConnection object, as returned by dbConnect().
levels One or more of ‘read_uncommitted’, ‘read_committed’, ‘repeatable_read’, ‘serializable’.

See Also
test_roundtrip

Examples

```r
## Not run:
# Can use spaces or underscores in between words.
odbSetTransactionIsolationLevel(con, "read uncommitted")

# Can also use the full constant name.
odbSetTransactionIsolationLevel(con, "SQL_TXN_READ_UNCOMMITTED")

## End(Not run)
```

sqlCreateTable-methods

```
```

Description

```
Methods

signature(con = "DB2/AIX64")
signature(con = "DBIConnection")
signature(con = "HDB")
signature(con = "Oracle")
signature(con = "Teradata")
```

Description

```
This tests all the supported data types, including missing values. It first writes them to the database,
then reads them back and verifies the data is identical to the original.
```

Usage

```
test_roundtrip(
  con = DBI::connect(DBI::get_default_context()),
  columns = "",
  invert = TRUE,
  force_sorted = FALSE
)
```
**test_roundtrip**

**Arguments**

- **con**: An established DBI connection.
- **columns**: Table columns to exclude (default) or include, dependent on the value of `invert`. One of `datetime`, `date`, `binary`, `integer`, `double`, `character`, `logical`.
- **invert**: If `TRUE`, change the definition of columns to be exclusive, rather than inclusive.
- **force_sorted**: If `TRUE`, a sorted `id` column is added to the sent data, and the received data is sorted by this column before doing the comparison. This is necessary for some databases that do not preserve row order.

**Details**

This function is not exported and should only be used during tests and as a sanity check when writing new `odbcDataType()` methods.

**Examples**

```r
## Not run:
test_roundtrip(con)

# exclude a few columns
test_roundtrip(con, c("integer", "double"))

# Only test a specific column
test_roundtrip(con, "integer", invert = FALSE)

## End(Not run)
```
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