libdrizzle Documentation

Release 5.1.4

Drizzle Development Group

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CONTENTS

1 Introduction **1**
- 1.1 Differences from Libdrizzle . . . 1
- 1.2 Differences from libmysqlclient . . . 1

2 Licensing **3**
- 2.1 Documentation Content . . . 3
- 2.2 About the Drizzle logo . . . 3
- 2.3 Libdrizzle Redux License . . . 3
- 2.4 Trademarks . . . 4

3 Compiling Libdrizzle Redux **5**
- 3.1 Building Libdrizzle Redux . . . 5
- 3.2 Running the Test Suite . . . 5
- 3.3 Building For Windows (cross-compile) . . . 5
- 3.4 Linking Your Application . . . 6

4 Libdrizzle API **7**
- 4.1 Constants . . . 7
- 4.2 Library Functions . . . 21
- 4.3 Connection Functions . . . 21
- 4.4 Query Functions . . . 28
- 4.5 Prepared Statements . . . 36
- 4.6 Binlog Functions . . . 43

5 Code Examples **47**
- 5.1 Buffered Results . . . 47
- 5.2 Unbuffered Results . . . 48
- 5.3 Prepared Statements . . . 50
- 5.4 Binlog Retrieval . . . 51

Index **53**

CHAPTER

ONE

INTRODUCTION

Drizzle Redux is a project which aims to breath new life into the libdrizzle C connector. It is designed to allow you to connect to and query a MySQL database server using a simple API.

The connector is 3-clause BSD licensed so it can statically and dynamically link with almost any other open source or commercial software.

1.1 Differences from Libdrizzle

- The server-side functionality has been removed, it no longer acts as both a client and server API.
- The Drizzle prototype library functions have been removed. It now only talks to MySQL compatible servers.
- API functions have been simplified. In Libdrizzle there was a big confusion over whether the application or library should be doing the allocation and freeing of objects. It is now less ambiguous.
- New binlog API added. The library can now connect as a slave or mysqlbinlog client and retrieve binlog events.

There are many more new features to come.

1.2 Differences from libmysqlclient

- API is slightly different
- Currently missing server-side prepared statement support and protocol compression

These missing features are to be added.

CHAPTER

TWO

LICENSING

2.1 Documentation Content

Libdrizzle Redux Documentation is licensed under a Creative Commons Share Alike 3.0 license.

2.2 About the Drizzle logo

The Drizzle logo was created by Zak Greant under the Creative Commons Share Alike 3.0 license.

The logo is available in SVG format on Wikipedia.

2.3 Libdrizzle Redux License

Libdrizzle Redux is licensed under the BSD 3-Clause License.

```
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```

2.4 Trademarks

MySQL is a registered trademark of Oracle and/or its affiliates

CHAPTER

THREE

COMPILING LIBDRIZZLE REDUX

3.1 Building Libdrizzle Redux

To build libdrizzle-redux you can invoke bootstrap script:

```
bootstrap.sh
```

Alternatively you can build and customize:

```
autoreconf -fi
./configure
make
make install
```

3.2 Running the Test Suite

Libdrizzle has a unit test suite, it needs a running MySQL server which has a user that can create databases, tables and can connect as a MySQL slave.

The test suite uses system environment variables to find the MySQL server:

- `MYSQL_SERVER` - The hostname of the MySQL server (default localhost)
- `MYSQL_PORT` - The port number of the MySQL server (default 3306)
- `MYSQL_USER` - The username for the MySQL connection (default empty)
- `MYSQL_PASSWORD` - The password for the MySQL username (default empty)
- `MYSQL_SCHEMA` - The default database for the MySQL connection (default empty)

The test suite can then be run using `make check` or `make distcheck` for testing a source distribution rather than the straight bzr branch.

To test with valgrind you can run the following:

```
TESTS_ENVIRONMENT="./libtool --mode=execute valgrind --error-exitcode=1 --leak-check=yes --track-fds=
```

3.3 Building For Windows (cross-compile)

The bootstrap script can go into MinGW mode to cross compile for 32bit Windows targets. To do this you need to follow the following steps (this guide assumes you are running 64bit Fedora but other Linux based operating systems

should be similar).

1. Install MinGW, you will need these packages:

   ```
   mingw32-gcc
   mingw32-gcc-c++
   mingw32-zlib
   ```

2. Tell bootstrap to build using MinGW:

   ```
   ./bootstrap.sh mingw
   ```

The test suite can be run in wine, to do this follow these steps:

1. Install wine, you will need to install the `wine` package
2. Setup wine to find the MinGW dlls as follows:
   (a) Run wine as follows to create the required wine home directory:

   ```
   WINEARCH=win32 wine
   ```

   (b) Open the `~/.wine/system.reg` file for editing
   (c) Find the section called `[System\\CurrentControlSet\\Control\\Session Manager\\Environment]`
   (d) Under this find the `PATH` setting and add the path to MinGW's `bin` directory using the `Z:` drive. For Fedora 18 64bit this makes the entry:

   ```
   "PATH"=str(2):"C:\\windows\\system32;C:\\windows;C:\\windows\\system32\\wbem;Z:\\usr\\i686-w
   ```

3. Run the test suite as follows (see *Running the Test Suite* for more details and needed environment variables when running the test suite):

   ```
   WINEARCH=win32 TESTS_ENVIRONMENT=wine make check
   ```

3.4 Linking Your Application

To link your app to libdrizzle-redux you need to provide the following to GCC, this assumes that the library is in your library and include paths:

```
gcc app.c -oapp -ldrizzle -lssl
```

A tool called **libdrizzle_config** is included to also assist with this.

CHAPTER

FOUR

LIBDRIZZLE API

4.1 Constants

4.1.1 Introduction

Libdrizzle Redux contains a number of constants, most of what are in the form of ENUMs. All ENUMs are typedef'd so no need to use the 'enum' keyword.

4.1.2 Library

drizzle_verbose_t
An ENUM of the verbosity for the library

DRIZZLE_VERBOSE_NEVER
Completely silent

DRIZZLE_VERBOSE_FATAL
Fatal errors only

DRIZZLE_VERBOSE_ERROR
All errors

DRIZZLE_VERBOSE_INFO
Information messages and errors

DRIZZLE_VERBOSE_DEBUG
Debugging messages and errors

DRIZZLE_VERBOSE_CRAZY
Everything

4.1.3 Return

drizzle_return_t
Function return status ENUM

DRIZZLE_RETURN_OK
Return is OK

DRIZZLE_RETURN_IO_WAIT
Waiting on IO

DRIZZLE_RETURN_PAUSE

DRIZZLE_RETURN_ROW_BREAK
Row break because row is larger than packet size

DRIZZLE_RETURN_MEMORY
Memory allocation error

DRIZZLE_RETURN_ERRNO
OS error code

DRIZZLE_RETURN_INTERNAL_ERROR
Internal error during handshake

DRIZZLE_RETURN_GETADDRINFO
Domain lookup failure

DRIZZLE_RETURN_NOT_READY
Client is not connected to server

DRIZZLE_RETURN_BAD_PACKET_NUMBER
Packets are out of sequence

DRIZZLE_RETURN_BAD_HANDSHAKE_PACKET
Bad packet received during handshake

DRIZZLE_RETURN_BAD_PACKET
Bad packet received (unused)

DRIZZLE_RETURN_PROTOCOL_NOT_SUPPORTED
Attempt to connect to a version of MySQL less than 4.1

DRIZZLE_RETURN_UNEXPECTED_DATA
Unexpected data in the receive buffer

DRIZZLE_RETURN_NO_SCRAMBLE
No password scrable received (usually if server is expecting an auth plugin but client didn't use one)

DRIZZLE_RETURN_AUTH_FAILED
Authentication failure

DRIZZLE_RETURN_NULL_SIZE
Internal status

DRIZZLE_RETURN_ERROR_CODE
Error code received from MySQL server

DRIZZLE_RETURN_TOO_MANY_COLUMNS
Unused

DRIZZLE_RETURN_ROW_END
Internal status

DRIZZLE_RETURN_LOST_CONNECTION
Connection failure

DRIZZLE_RETURN_COULD_NOT_CONNECT
Could not connect to server

DRIZZLE_RETURN_NO_ACTIVE_CONNECTIONS
Waiting on a connection which doesn't exist (this shouldn't happen)

DRIZZLE_RETURN_HANDSHAKE_FAILED
Handshake failure

DRIZZLE_RETURN_TIMEOUT
Timeout during connection

DRIZZLE_RETURN_INVALID_ARGUMENT
Bad arguments supplied to a function

DRIZZLE_RETURN_SSL_ERROR
An error occured during SSL handshake

DRIZZLE_RETURN_EOF
No more data to retrieve

DRIZZLE_RETURN_STMT_ERROR
A prepared statment error has occurred

DRIZZLE_RETURN_BINLOG_CRC
A checksum error has occurred in a MySQL 5.6 binlog

DRIZZLE_RETURN_TRUNCATED
The result has been truncated

DRIZZLE_RETURN_INVALID_CONVERSION
The data type cannot be converted into the requested type

DRIZZLE_RETURN_NOT_FOUND
The requested column was not found

4.1.4 Connection

drizzle_charset_t
An ENUM of the possible character set with colation ID

DRIZZLE_CHARSET_BIG5_CHINESE_CI

DRIZZLE_CHARSET_LATIN2_CZECH_CS

DRIZZLE_CHARSET_DEC8_SWEDISH_CI

DRIZZLE_CHARSET_CP850_GENERAL_CI

DRIZZLE_CHARSET_LATIN1_GERMAN1_CI

DRIZZLE_CHARSET_HP8_ENGLISH_CI

DRIZZLE_CHARSET_KOI8R_GENERAL_CI

DRIZZLE_CHARSET_LATIN1_SWEDISH_CI

DRIZZLE_CHARSET_LATIN2_GENERAL_CI

DRIZZLE_CHARSET_SWE7_SWEDISH_CI

DRIZZLE_CHARSET_ASCII_GENERAL_CI

DRIZZLE_CHARSET_UJIS_JAPANESE_CI

DRIZZLE_CHARSET_SJIS_JAPANESE_CI

DRIZZLE_CHARSET_CP1251_BULGARIAN_CI

DRIZZLE_CHARSET_LATIN1_DANISH_CI

DRIZZLE_CHARSET_HEBREW_GENERAL_CI

DRIZZLE_CHARSET_TIS620_THAI_CI

DRIZZLE_CHARSET_EUCKR_KOREAN_CI

DRIZZLE_CHARSET_LATIN7_ESTONIAN_CS

DRIZZLE_CHARSET_LATIN2_HUNGARIAN_CI

DRIZZLE_CHARSET_KOI8U_GENERAL_CI

DRIZZLE_CHARSET_CP1251_UKRAINIAN_CI

DRIZZLE_CHARSET_GB2312_CHINESE_CI

DRIZZLE_CHARSET_GREEK_GENERAL_CI

DRIZZLE_CHARSET_CP1250_GENERAL_CI

DRIZZLE_CHARSET_LATIN2_CROATIAN_CI

DRIZZLE_CHARSET_GBK_CHINESE_CI

DRIZZLE_CHARSET_CP1257_LITHUANIAN_CI

DRIZZLE_CHARSET_LATIN5_TURKISH_CI

DRIZZLE_CHARSET_LATIN1_GERMAN2_CI

DRIZZLE_CHARSET_ARMSCII8_GENERAL_CI

DRIZZLE_CHARSET_UTF8_GENERAL_CI

DRIZZLE_CHARSET_CP1250_CZECH_CS

DRIZZLE_CHARSET_UCS2_GENERAL_CI

DRIZZLE_CHARSET_CP866_GENERAL_CI

DRIZZLE_CHARSET_KEYBCS2_GENERAL_CI

DRIZZLE_CHARSET_MACCE_GENERAL_CI

DRIZZLE_CHARSET_MACROMAN_GENERAL_CI

DRIZZLE_CHARSET_CP852_GENERAL_CI

DRIZZLE_CHARSET_LATIN7_GENERAL_CI

DRIZZLE_CHARSET_LATIN7_GENERAL_CS

DRIZZLE_CHARSET_MACCE_BIN

DRIZZLE_CHARSET_CP1250_CROATIAN_CI

DRIZZLE_CHARSET_UTF8MB4_GENERAL_CI

DRIZZLE_CHARSET_UTF8MB4_BIN

DRIZZLE_CHARSET_LATIN1_BIN

DRIZZLE_CHARSET_LATIN1_GENERAL_CI

DRIZZLE_CHARSET_LATIN1_GENERAL_CS

DRIZZLE_CHARSET_CP1251_BIN

DRIZZLE_CHARSET_CP1251_GENERAL_CI

DRIZZLE_CHARSET_CP1251_GENERAL_CS

DRIZZLE_CHARSET_MACROMAN_BIN

DRIZZLE_CHARSET_UTF16_GENERAL_CI

DRIZZLE_CHARSET_UTF16_BIN

DRIZZLE_CHARSET_CP1256_GENERAL_CI

DRIZZLE_CHARSET_CP1257_BIN

DRIZZLE_CHARSET_CP1257_GENERAL_CI

DRIZZLE_CHARSET_UTF32_GENERAL_CI

DRIZZLE_CHARSET_UTF32_BIN

DRIZZLE_CHARSET_BINARY

DRIZZLE_CHARSET_ARMSCII8_BIN

DRIZZLE_CHARSET_ASCII_BIN

DRIZZLE_CHARSET_CP1250_BIN

DRIZZLE_CHARSET_CP1256_BIN

DRIZZLE_CHARSET_CP866_BIN

DRIZZLE_CHARSET_DEC8_BIN

DRIZZLE_CHARSET_GREEK_BIN

DRIZZLE_CHARSET_HEBREW_BIN

DRIZZLE_CHARSET_HP8_BIN

DRIZZLE_CHARSET_KEYBCS2_BIN

DRIZZLE_CHARSET_KOI8R_BIN

DRIZZLE_CHARSET_KOI8U_BIN

DRIZZLE_CHARSET_LATIN2_BIN

DRIZZLE_CHARSET_LATIN5_BIN

DRIZZLE_CHARSET_LATIN7_BIN

DRIZZLE_CHARSET_CP850_BIN

DRIZZLE_CHARSET_CP852_BIN

DRIZZLE_CHARSET_SWE7_BIN

DRIZZLE_CHARSET_UTF8_BIN

DRIZZLE_CHARSET_BIG5_BIN

DRIZZLE_CHARSET_EUCKR_BIN

DRIZZLE_CHARSET_GB2312_BIN

DRIZZLE_CHARSET_GBK_BIN

DRIZZLE_CHARSET_SJIS_BIN

DRIZZLE_CHARSET_TIS620_BIN

DRIZZLE_CHARSET_UCS2_BIN

DRIZZLE_CHARSET_UJIS_BIN

DRIZZLE_CHARSET_GEOSTD8_GENERAL_CI

DRIZZLE_CHARSET_GEOSTD8_BIN

DRIZZLE_CHARSET_LATIN1_SPANISH_CI

DRIZZLE_CHARSET_CP932_JAPANESE_CI

DRIZZLE_CHARSET_CP932_BIN

DRIZZLE_CHARSET_EUCJPMS_JAPANESE_CI

DRIZZLE_CHARSET_EUCJPMS_BIN

DRIZZLE_CHARSET_CP1250_POLISH_CI

DRIZZLE_CHARSET_UTF16_UNICODE_CI

DRIZZLE_CHARSET_UTF16_ICELANDIC_CI

DRIZZLE_CHARSET_UTF16_LATVIAN_CI

DRIZZLE_CHARSET_UTF16_ROMANIAN_CI

DRIZZLE_CHARSET_UTF16_SLOVENIAN_CI

DRIZZLE_CHARSET_UTF16_POLISH_CI

DRIZZLE_CHARSET_UTF16_ESTONIAN_CI

DRIZZLE_CHARSET_UTF16_SPANISH_CI

DRIZZLE_CHARSET_UTF16_SWEDISH_CI

DRIZZLE_CHARSET_UTF16_TURKISH_CI

DRIZZLE_CHARSET_UTF16_CZECH_CI

DRIZZLE_CHARSET_UTF16_DANISH_CI

DRIZZLE_CHARSET_UTF16_LITHUANIAN_CI

DRIZZLE_CHARSET_UTF16_SLOVAK_CI

DRIZZLE_CHARSET_UTF16_SPANISH2_CI

DRIZZLE_CHARSET_UTF16_ROMAN_CI

DRIZZLE_CHARSET_UTF16_PERSIAN_CI

DRIZZLE_CHARSET_UTF16_ESPERANTO_CI

DRIZZLE_CHARSET_UTF16_HUNGARIAN_CI

DRIZZLE_CHARSET_UTF16_SINHALA_CI

DRIZZLE_CHARSET_UCS2_UNICODE_CI

DRIZZLE_CHARSET_UCS2_ICELANDIC_CI

DRIZZLE_CHARSET_UCS2_LATVIAN_CI

DRIZZLE_CHARSET_UCS2_ROMANIAN_CI

DRIZZLE_CHARSET_UCS2_SLOVENIAN_CI

DRIZZLE_CHARSET_UCS2_POLISH_CI

DRIZZLE_CHARSET_UCS2_ESTONIAN_CI

DRIZZLE_CHARSET_UCS2_SPANISH_CI

DRIZZLE_CHARSET_UCS2_SWEDISH_CI

DRIZZLE_CHARSET_UCS2_TURKISH_CI

DRIZZLE_CHARSET_UCS2_CZECH_CI

DRIZZLE_CHARSET_UCS2_DANISH_CI

DRIZZLE_CHARSET_UCS2_LITHUANIAN_CI

DRIZZLE_CHARSET_UCS2_SLOVAK_CI

DRIZZLE_CHARSET_UCS2_SPANISH2_CI

DRIZZLE_CHARSET_UCS2_ROMAN_CI

DRIZZLE_CHARSET_UCS2_PERSIAN_CI

DRIZZLE_CHARSET_UCS2_ESPERANTO_CI

DRIZZLE_CHARSET_UCS2_HUNGARIAN_CI

DRIZZLE_CHARSET_UCS2_SINHALA_CI

DRIZZLE_CHARSET_UCS2_GENERAL_MYSQL500_CI

DRIZZLE_CHARSET_UTF32_UNICODE_CI

DRIZZLE_CHARSET_UTF32_ICELANDIC_CI

DRIZZLE_CHARSET_UTF32_LATVIAN_CI

DRIZZLE_CHARSET_UTF32_ROMANIAN_CI

DRIZZLE_CHARSET_UTF32_SLOVENIAN_CI

DRIZZLE_CHARSET_UTF32_POLISH_CI

DRIZZLE_CHARSET_UTF32_ESTONIAN_CI

DRIZZLE_CHARSET_UTF32_SPANISH_CI

DRIZZLE_CHARSET_UTF32_SWEDISH_CI

DRIZZLE_CHARSET_UTF32_TURKISH_CI

DRIZZLE_CHARSET_UTF32_CZECH_CI

DRIZZLE_CHARSET_UTF32_DANISH_CI

DRIZZLE_CHARSET_UTF32_LITHUANIAN_CI

DRIZZLE_CHARSET_UTF32_SLOVAK_CI

DRIZZLE_CHARSET_UTF32_SPANISH2_CI

DRIZZLE_CHARSET_UTF32_ROMAN_CI

DRIZZLE_CHARSET_UTF32_PERSIAN_CI

DRIZZLE_CHARSET_UTF32_ESPERANTO_CI

DRIZZLE_CHARSET_UTF32_HUNGARIAN_CI

DRIZZLE_CHARSET_UTF32_SINHALA_CI

DRIZZLE_CHARSET_UTF8_UNICODE_CI

DRIZZLE_CHARSET_UTF8_ICELANDIC_CI

DRIZZLE_CHARSET_UTF8_LATVIAN_CI

DRIZZLE_CHARSET_UTF8_ROMANIAN_CI

DRIZZLE_CHARSET_UTF8_SLOVENIAN_CI

DRIZZLE_CHARSET_UTF8_POLISH_CI

DRIZZLE_CHARSET_UTF8_ESTONIAN_CI

DRIZZLE_CHARSET_UTF8_SPANISH_CI

DRIZZLE_CHARSET_UTF8_SWEDISH_CI

DRIZZLE_CHARSET_UTF8_TURKISH_CI

DRIZZLE_CHARSET_UTF8_CZECH_CI

DRIZZLE_CHARSET_UTF8_DANISH_CI

DRIZZLE_CHARSET_UTF8_LITHUANIAN_CI

DRIZZLE_CHARSET_UTF8_SLOVAK_CI

DRIZZLE_CHARSET_UTF8_SPANISH2_CI

DRIZZLE_CHARSET_UTF8_ROMAN_CI

DRIZZLE_CHARSET_UTF8_PERSIAN_CI

DRIZZLE_CHARSET_UTF8_ESPERANTO_CI

DRIZZLE_CHARSET_UTF8_HUNGARIAN_CI

DRIZZLE_CHARSET_UTF8_SINHALA_CI

DRIZZLE_CHARSET_UTF8_GENERAL_MYSQL500_CI

DRIZZLE_CHARSET_UTF8MB4_UNICODE_CI

DRIZZLE_CHARSET_UTF8MB4_ICELANDIC_CI

DRIZZLE_CHARSET_UTF8MB4_LATVIAN_CI

DRIZZLE_CHARSET_UTF8MB4_ROMANIAN_CI

DRIZZLE_CHARSET_UTF8MB4_SLOVENIAN_CI

DRIZZLE_CHARSET_UTF8MB4_POLISH_CI

DRIZZLE_CHARSET_UTF8MB4_ESTONIAN_CI

DRIZZLE_CHARSET_UTF8MB4_SPANISH_CI

DRIZZLE_CHARSET_UTF8MB4_SWEDISH_CI

DRIZZLE_CHARSET_UTF8MB4_TURKISH_CI

DRIZZLE_CHARSET_UTF8MB4_CZECH_CI

DRIZZLE_CHARSET_UTF8MB4_DANISH_CI

DRIZZLE_CHARSET_UTF8MB4_LITHUANIAN_CI

DRIZZLE_CHARSET_UTF8MB4_SLOVAK_CI

DRIZZLE_CHARSET_UTF8MB4_SPANISH2_CI

DRIZZLE_CHARSET_UTF8MB4_ROMAN_CI

DRIZZLE_CHARSET_UTF8MB4_PERSIAN_CI

DRIZZLE_CHARSET_UTF8MB4_ESPERANTO_CI

DRIZZLE_CHARSET_UTF8MB4_HUNGARIAN_CI

DRIZZLE_CHARSET_UTF8MB4_SINHALA_CI

drizzle_status_t
An ENUM of connection statuses intended to be used in a bit field

DRIZZLE_CON_STATUS_NONE
No status set

DRIZZLE_CON_STATUS_IN_TRANS
In a transaction

DRIZZLE_CON_STATUS_AUTOCOMMIT
Autocommit is enabled

DRIZZLE_CON_STATUS_MORE_RESULTS_EXISTS
There are more result sets available

DRIZZLE_CON_STATUS_QUERY_NO_GOOD_INDEX_USED
No good index couldn't be used

DRIZZLE_CON_STATUS_QUERY_NO_INDEX_USED
No index was used

DRIZZLE_CON_STATUS_CURSOR_EXISTS
A cursor is available

DRIZZLE_CON_STATUS_LAST_ROW_SENT
The last row has been sent to the client

DRIZZLE_CON_STATUS_DB_DROPPED
The database has been dropped

DRIZZLE_CON_STATUS_NO_BACKSLASH_ESCAPES
NO_BACKSLASH_ESCAPES SQL mode set

DRIZZLE_CON_STATUS_QUERY_WAS_SLOW
Query hit the slow query timeout

drizzle_capabilities_t
An ENUM of connection capabilities intended to be used in a bit field

DRIZZLE_CAPABILITIES_NONE
No capabilities set

DRIZZLE_CAPABILITIES_LONG_PASSWORD
Long password support

DRIZZLE_CAPABILITIES_FOUND_ROWS
FOUND_ROWS support

DRIZZLE_CAPABILITIES_LONG_FLAG
Get all column flags

DRIZZLE_CAPABILITIES_IGNORE_SPACE
Ignore spaces before open brackets

DRIZZLE_CAPABILITIES_CONNECT_WITH_DB
A database can be specified upon connect

DRIZZLE_CAPABILITIES_NO_SCHEMA
Disable access to database.table.column way of accessing things

DRIZZLE_CAPABILITIES_COMPRESS
Enable compression protocol

DRIZZLE_CAPABILITIES_ODBC
An ODBC client

DRIZZLE_CAPABILITIES_LOCAL_FILES
Enables LOAD DATA LOCAL

DRIZZLE_CAPABILITIES_PROTOCOL_41
MySQL 4.1 and higher protocol

DRIZZLE_CAPABILITIES_INTERACTIVE
An interactive client

DRIZZLE_CAPABILITIES_SSL
Use SSL

DRIZZLE_CAPABILITIES_IGNORE_SIGPIPE
Ignore sigpipe

DRIZZLE_CAPABILITIES_TRANSACTIONS
Client understands transactions

DRIZZLE_CAPABILITIES_RESERVED
Unused

DRIZZLE_CAPABILITIES_SECURE_CONNECTION
MySQL 4.1 and higher authentication

DRIZZLE_CAPABILITIES_MULTI_STATEMENTS
Enable multiple statement support

DRIZZLE_CAPABILITIES_MULTI_RESULTS
Enable multiple result sets

DRIZZLE_CAPABILITIES_PS_MULTI_RESULTS

DRIZZLE_CAPABILITIES_PLUGIN_AUTH
Enable plugin authentication

DRIZZLE_CAPABILITIES_SSL_VERIFY_SERVER_CERT
Verify SSL cert

DRIZZLE_CAPABILITIES_REMEBER_OPTIONS

DRIZZLE_CAPABILITIES_CLIENT
Enables the following: DRIZZLE_CAPABILITIES_LONG_PASSWORD, DRIZZLE_CAPABILITIES_FOUND_ROWS, DRIZZLE_CAPABILITIES_LONG_FLAG, DRIZZLE_CAPABILITIES_CONNECT_WITH_DB, DRIZZLE_CAPABILITIES_PLUGIN_AUTH, DRIZZLE_CAPABILITIES_TRANSACTIONS, DRIZZLE_CAPABILITIES_PROTOCOL_41, DRIZZLE_CAPABILITIES_SECURE_CONNECTION

4.1.5 Query

drizzle_field_t
Field data (an alias for `char*`)

drizzle_row_t
Row data (an array of `drizzle_field_t`)

drizzle_column_type_t
An ENUM of column types

DRIZZLE_COLUMN_TYPE_DECIMAL
An old style decimal type

DRIZZLE_COLUMN_TYPE_TINY
A tiny int

DRIZZLE_COLUMN_TYPE_SHORT
A short int

DRIZZLE_COLUMN_TYPE_LONG
A long int

DRIZZLE_COLUMN_TYPE_FLOAT
A float

DRIZZLE_COLUMN_TYPE_DOUBLE
A double

DRIZZLE_COLUMN_TYPE_NULL
A NULL

DRIZZLE_COLUMN_TYPE_TIMESTAMP
A timestamp

DRIZZLE_COLUMN_TYPE_LONGLONG
A bigint

DRIZZLE_COLUMN_TYPE_INT24

DRIZZLE_COLUMN_TYPE_DATE

DRIZZLE_COLUMN_TYPE_TIME

DRIZZLE_COLUMN_TYPE_DATETIME

DRIZZLE_COLUMN_TYPE_YEAR

DRIZZLE_COLUMN_TYPE_NEWDATE

DRIZZLE_COLUMN_TYPE_VARCHAR

DRIZZLE_COLUMN_TYPE_BIT

DRIZZLE_COLUMN_TYPE_NEWDECIMAL

DRIZZLE_COLUMN_TYPE_ENUM

DRIZZLE_COLUMN_TYPE_SET

DRIZZLE_COLUMN_TYPE_TINY_BLOB

DRIZZLE_COLUMN_TYPE_MEDIUM_BLOB

DRIZZLE_COLUMN_TYPE_LONG_BLOB

DRIZZLE_COLUMN_TYPE_BLOB

DRIZZLE_COLUMN_TYPE_VAR_STRING
Text column type

DRIZZLE_COLUMN_TYPE_STRING

DRIZZLE_COLUMN_TYPE_GEOMETRY

drizzle_column_flags_t
An ENUM of column flags intended to be used in a bit field

DRIZZLE_COLUMN_FLAGS_NONE
No flags set

DRIZZLE_COLUMN_FLAGS_NOT_NULL
Column is not NULL

DRIZZLE_COLUMN_FLAGS_PRI_KEY
Column is a primary key

DRIZZLE_COLUMN_FLAGS_UNIQUE_KEY
Column is a unique key

DRIZZLE_COLUMN_FLAGS_MULTIPLE_KEY
Column is part of a multi-part key

DRIZZLE_COLUMN_FLAGS_BLOB
Column is a blob

DRIZZLE_COLUMN_FLAGS_UNSIGNED
Column in unsigned

DRIZZLE_COLUMN_FLAGS_ZEROFILL
Column has a zerofill

DRIZZLE_COLUMN_FLAGS_BINARY

DRIZZLE_COLUMN_FLAGS_ENUM
Column is an ENUM

DRIZZLE_COLUMN_FLAGS_AUTO_INCREMENT
Column has auto increment

DRIZZLE_COLUMN_FLAGS_TIMESTAMP
Column in a timestamp

DRIZZLE_COLUMN_FLAGS_SET
Column is a SET data type

DRIZZLE_COLUMN_FLAGS_NO_DEFAULT_VALUE
Column has no default value

DRIZZLE_COLUMN_FLAGS_ON_UPDATE_NOW
Column has on update now timestamp

DRIZZLE_COLUMN_FLAGS_PART_KEY
Column is part of a key

DRIZZLE_COLUMN_FLAGS_NUM
Column is a number

Note: Group and num are the same flag

DRIZZLE_COLUMN_FLAGS_GROUP

Note: Group and num are the same flag

DRIZZLE_COLUMN_FLAGS_UNIQUE

DRIZZLE_COLUMN_FLAGS_BINCMP

DRIZZLE_COLUMN_FLAGS_GET_FIXED_FIELDS

DRIZZLE_COLUMN_FLAGS_IN_PART_FUNC

DRIZZLE_COLUMN_FLAGS_IN_ADD_INDEX

DRIZZLE_COLUMN_FLAGS_RENAMED

4.1.6 Prepared Statement

drizzle_stmt_state_t
An internal state for prepared statements

drizzle_bind_options_t
An ENUM of prepared statement element options intended to be used in a bitmask

DRIZZLE_BIND_OPTION_NONE
Empty options

DRIZZLE_BIND_OPTION_NULL
Element is a NULL

DRIZZLE_BIND_OPTION_UNSIGNED
Element is an unsigned integer

DRIZZLE_BIND_OPTION_TRUNCATED
Element has been truncated

DRIZZLE_BIND_OPTION_LONG_DATA
Element is to be sent using `drizzle_stmt_send_long_data()`

4.1.7 Binlog

DRIZZLE_BINLOG_MAGIC
The 4-byte binlog header string

drizzle_binlog_event_types_t
An ENUM of binlog event types

DRIZZLE_EVENT_TYPE_UNKNOWN
An unknown event

DRIZZLE_EVENT_TYPE_START
A binlog start event

DRIZZLE_EVENT_TYPE_QUERY
A MySQL query for SBR

DRIZZLE_EVENT_TYPE_STOP
Binlog end event

DRIZZLE_EVENT_TYPE_ROTATE
Binlog file rotate event

DRIZZLE_EVENT_TYPE_INTVAR
Insert ID event

DRIZZLE_EVENT_TYPE_LOAD
Load data from file event

DRIZZLE_EVENT_TYPE_CREATE_FILE
Create file event

DRIZZLE_EVENT_TYPE_APPEND_BLOCK
Append block data to a file

DRIZZLE_EVENT_TYPE_EXEC_LOAD
Exec load event

DRIZZLE_EVENT_TYPE_DELETE_FILE
Delete file event

DRIZZLE_EVENT_TYPE_NEW_LOAD
New load data from file event

DRIZZLE_EVENT_TYPE_RAND
Seeds for RAND() functions

DRIZZLE_EVENT_TYPE_USER_VAR
A user variable

DRIZZLE_EVENT_TYPE_FORMAT_DESCRIPTION
A description of the binlog file (a replacement for DRIZZLE_EVENT_TYPE_START in MySQL 5.0 onwards)

DRIZZLE_EVENT_TYPE_XID
XA Transaction ID

DRIZZLE_EVENT_TYPE_BEGIN_LOAD_QUERY
Truncate file and save block data

DRIZZLE_EVENT_TYPE_EXECUTE_LOAD_QUERY
Execute load query event

DRIZZLE_EVENT_TYPE_TABLE_MAP
A table map event for RBR

DRIZZLE_EVENT_TYPE_OBSOLETE_WRITE_ROWS
RBR Write rows event for MySQL 5.1 pre-release

DRIZZLE_EVENT_TYPE_OBSOLETE_UPDATE_ROWS
RBR Update rows event for MySQL 5.1 pre-release

DRIZZLE_EVENT_TYPE_OBSOLETE_DELETE_ROWS
RBR Delete rows event for MySQL 5.1 pre-release

DRIZZLE_EVENT_TYPE_V1_WRITE_ROWS
RBR Write rows event

DRIZZLE_EVENT_TYPE_V1_UPDATE_ROWS
RBR Update rows event

DRIZZLE_EVENT_TYPE_V1_DELETE_ROWS
RBR Delete rows event

DRIZZLE_EVENT_TYPE_INCIDENT
Replication incident message

DRIZZLE_EVENT_TYPE_HEARTBEAT
Repliaction heartbeat event

DRIZZLE_EVENT_TYPE_IGNORABLE

DRIZZLE_EVENT_TYPE_ROWS_QUERY

DRIZZLE_EVENT_TYPE_V2_WRITE_ROWS
A MySQL 5.6 RBR Write rows event

DRIZZLE_EVENT_TYPE_V2_UPDATE_ROWS
A MySQL 5.6 RBR Update rows event

DRIZZLE_EVENT_TYPE_V2_DELETE_ROWS
A MySQL 5.6 RBR Delete rows event

DRIZZLE_EVENT_TYPE_GTID

DRIZZLE_EVENT_TYPE_ANONYMOUS_GTID

DRIZZLE_EVENT_TYPE_PREVIOUS_GTIDS

4.2 Library Functions

4.2.1 Introduction

This section outlines the functions related to the Libdrizzle Redux library

4.2.2 Functions

void **drizzle_library_init** (void)
Setup of the SSL and Windows connection libraries. Should be run before any Libdrizzle Redux function. Only required if using SSL or Windows.

void **drizzle_library_deinit** (void)
Deinitialize the library. Only required for Windows

const char* **drizzle_version** (void)
Gives the version string for the Libdrizzle Redux library

Returns A string of the library version

const char* **drizzle_bugreport** (void)
Gives the URL for reporting library bugs

Returns A string containing the bug report URL

const char* **drizzle_verbose_name** (drizzle_verbose_t *verbose*)
Gives the verbosity name for a given verbosity type

Returns A string containing the verbosity name

4.3 Connection Functions

4.3.1 Introduction

This section outlines the connection functions

4.3.2 Structs

drizzle_st
The internal drizzle connection object struct

drizzle_options_st
The internal structure containing connection options

4.3.3 Functions

drizzle_st* **drizzle_create** (const char **host*, in_port_t *port*, const char **user*, const char **password*, const char **db*, drizzle_options_st **options*)
Creates a connection connection object. If a path beginning with / is given as the host the library will connect as a UDS socket. Otherwise a TCP/IP conection is made.

Note: a connection does not happen until the first query or an explicit `drizzle_connect()` call is made

---

Parameters

- **host** – The socket path, hostname or IP of the server
- **port** – The port number of the server (if TCP/IP)
- **user** – The username of the server
- **password** – The password of the server
- **db** – The default DB to connect to on the server
- **options** – A pointer to a `drizzle_options_st` created using `drizzle_options_create()` or `NULL`

Returns A newly allocated and setup connection object

int **drizzle_timeout** (const drizzle_st **con*)
Gets the current connection timeout set in the connection object

Parameters

- **drizzle** – A connection object

Returns The current timeout

void **drizzle_set_timeout** (drizzle_st **con*, int *timeout*)
Sets the connection timeout for the connection object

Parameters

- **drizzle** – A connection object
- **timeout** – The new timeout to set

drizzle_verbose_t **drizzle_verbose** (const drizzle_st **con*)
Gets the verbosity level set in the connection object

Parameters

- **drizzle** – A connection object

Returns The verbosity level from `drizzle_verbose_t`

void **drizzle_set_verbose** (drizzle_st **con*, drizzle_verbose_t *verbose*)
Sets the verbosity level for the connection object

Parameters

- **drizzle** – A connection object

- **verbose** – The verbosity level from `drizzle_verbose_t`

void **drizzle_set_log_fn**(drizzle_st *con, drizzle_log_fn *function, void *context)
Sets a callback function for log handling

Parameters

- **drizzle** – A connection object
- **function** – The function to use in the format of `drizzle_log_fn()`
- **context** – A pointer to data to pass to the log function

const char* **drizzle_error**(const drizzle_st *con)
Get the last error from a connection

Parameters

- **con** – A connection object

Returns A string containing the error message

int **drizzle_errno**(const drizzle_st *con)
Get the last OS error code from a connection

Parameters

- **con** – A connection object

Returns The OS error code

uint16_t **drizzle_error_code**(const drizzle_st *con)
Gets the last error code from a connection

Parameters

- **con** – A connection object

Returns The server error code

const char* **drizzle_sqlstate**(const drizzle_st *con)
Gets the last sqlstate from a connection

Parameters

- **con** – A connection object

Returns A string containing the sqlstate

drizzle_options_st ***drizzle_options_create**(void)
Create a new connection options object

Returns The new connection options object

void **drizzle_options_destroy**(drizzle_options_st *options)
Destroys a connection options object

Parameters

- **options** – The options object to be destroyed

void **drizzle_options_set_non_blocking**(drizzle_options_st *options, bool state)
Sets/unsets non-blocking connect option

Parameters

- **options** – The options object to modify
- **state** – Set option to true/false

bool **drizzle_options_get_non_blocking**(drizzle_options_st *options)
Gets the non-blocking connect option

Parameters

- **options** – The options object to get the value from

Returns The state of the non-blocking option

void **drizzle_options_set_raw_scramble**(drizzle_options_st *options, bool state)
Sets/unsets the raw scramble connect option

Parameters

- **options** – The options object to modify
- **state** – Set to true/false

bool **drizzle_options_get_raw_scramble**(drizzle_options_st *options)
Gets the raw scramble connect option

Parameters

- **options** – The options object to get the value from

Returns The state of the raw scramble option

void **drizzle_options_set_found_rows**(drizzle_options_st *options, bool state)
Sets/unsets the found rows connect option

Parameters

- **options** – The options object to modify
- **state** – Set to true/false

bool **drizzle_options_get_found_rows**(drizzle_options_st *options)
Gets the found rows connect option

Parameters

- **options** – The options object to get the value from

Returns The state of the found rows option

void **drizzle_options_set_interactive**(drizzle_options_st *options, bool state)
Sets/unsets the interactive connect option

Parameters

- **options** – The options object to modify
- **state** – Set to true/false

bool **drizzle_options_get_interactive**(drizzle_options_st *option)
Gets the interactive connect option

Parameters

- **options** – The options object to get the value from

Returns The state of the interactive option

void **drizzle_options_set_multi_statements**(drizzle_options_st *options, bool state)
Sets/unsets the multi-statements connect option

Parameters

- **options** – The options object to modify

Parma state Set to true/false

bool **drizzle_options_get_multi_statements** (drizzle_options_st *options*)
Gets the multi-statements connect option

Parameters

- **options** – The options object to get the value from

Returns The state of the multi-statements option

void **drizzle_options_set_auth_plugin** (drizzle_options_st *options*, bool *state*)
Sets/unsets the auth plugin connect option

Parameters

- **options** – The optoins object to modify
- **state** – Set to true/false

bool **drizzle_options_get_auth_plugin** (drizzle_options_st *options*)
Gets the auth plugin connect option

Parameters

- **options** – The options object to get the value from

Returns The state of the auth plugin option

const char* **drizzle_host** (const drizzle_st *con*)
Gets the host name from a TCP/IP connection

Parameters

- **con** – A connection object

Returns A string containing the host name or NULL for a UDS connection

in_port_t **drizzle_port** (const drizzle_st *con*)
Gets the port number from a TCP/IP connection

Parameters

- **con** – A connection object

Returns The port number or 0 for a UDS connection

const char* **drizzle_user** (const drizzle_st *con*)
Gets the user name used at connection time

Parameters

- **con** – A connection object

Returns A string containing the user name

const char* **drizzle_db** (const drizzle_st *con*)
Gets the default database used at connection time

Parameters

- **con** – A connection object

Returns A string containing the DB name

uint8_t **drizzle_protocol_version** (const drizzle_st *con*)
Gets the protocol version used for a connection

Parameters

- **con** – A connection object

Returns The protocol version

const char* **drizzle_server_version** (const drizzle_st *con)
Gets the server version string for a connection

Parameters

- **con** – A connection object

Returns A string containing the server version

uint32_t **drizzle_server_version_number** (const drizzle_st *con)
Gets the server version number for a connection

Parameters

- **con** – A connection object

Returns An integer containing the server version number

uint32_t **drizzle_thread_id** (const drizzle_st *con)
Gets the server thread ID for a connection

Parameters

- **con** – A connection object

Returns The server thread ID

drizzle_capabilities_t **drizzle_capabilities** (const drizzle_st *con)
Gets the server capabilites for a connection

Parameters

- **con** – A connection object

Returns A bit field of capabilities

drizzle_charset_t **drizzle_charset** (const drizzle_st *con)
Gets the character set ID for the connection

Parameters

- **con** – A connection object

Returns The character set used

drizzle_status_t **drizzle_status** (const drizzle_st *con)
Gets the status of the connection

Parameters

- **con** – A connection object

Returns The status of the connection

uint32_t **drizzle_max_packet_size** (const drizzle_st *con)
Gets the max packet size for a connection

Parameters

- **con** – A connection object

Returns The max packet size for the connection

drizzle_return_t **drizzle_connect** (drizzle_st *con)
Open connection to the specified server

Parameters

- **con** – A connection object

Returns A `drizzle_return_t` status. `DRIZZLE_RETURN_OK` upon success

drizzle_return_t **drizzle_close** (drizzle_st *con)
Gracefully disconnect from a server (leaves the connection object available for a reconnect

Parameters

- **con** – A connection object

Returns A `drizzle_return_t` response for the quit command sent to the server

drizzle_return_t **drizzle_quit** (drizzle_st *con)
Gracefully disconnect from a server and free the connection object

Parameters

- **con** – A connection object

Returns A `drizzle_return_t` response for the quit command sent to the server

drizzle_return_t **drizzle_select_db** (drizzle_st *con, const char *db)
Change the current default database

Parameters

- **con** – A connection object
- **db** – The new default database

Returns A `drizzle_return_t` response

drizzle_result_st* **drizzle_shutdown** (drizzle_st *con, drizzle_return_t *ret_ptr)
Send a shutdown command to the server

Parameters

- **con** – A connection object
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns A newly allocated result object

drizzle_result_st* **drizzle_kill** (drizzle_st *con, uint32_t *connection_id*, drizzle_return_t *ret_ptr)
Sends a query kill command to the server

Parameters

- **con** – A connection object
- **connection_id** – The connection ID to kill a query from
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns A newly allocated result object

drizzle_result_st* **drizzle_ping** (drizzle_st *con, drizzle_return_t *ret_ptr)
Sends a ping to the server

Parameters

- **con** – A connection object
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns A newly allocated result object

4.3.4 Callback Functions

These are templates to be used when creating callback functions for the Libdrizzle Redux library.

void **drizzle_log_fn** (const char **log_buffer*, drizzle_verbose_t *verbose*, void **context*)
The format of a callback function for log handling

Parameters

- **log_buffer** – The log message passed to the function
- **verbose** – The verbosity level of the message
- **context** – A pointer to data set in `drizzle_set_log_fn()`

4.4 Query Functions

4.4.1 Introduction

This section outlines the query and result functions

4.4.2 Structs

drizzle_query_st
The internal query object struct

drizzle_result_st
The internal result object struct

drizzle_column_st
The internal column object struct

4.4.3 Functions

drizzle_return_t **drizzle_set_ssl** (drizzle_st **con*, const char **key*, const char **cert*, const char **ca*, const char **capath*, const char **cipher*)
Sets the SSL data

Parameters

- **con** – A connection object
- **key** – The path to a key file
- **cert** – The path to a certificate file
- **ca** – The path to a certificate authority file
- **capath** – The path to a directory that contains trusted CA certificate files
- **cipher** – A list of allowed ciphers for SSL encryption

Returns A return status code, `DRIZZLE_RETURN_OK` upon success

drizzle_result_st* **drizzle_query** (drizzle_st **con*, const char **query*, size_t *size*, drizzle_return_t **ret_ptr*)
Executes a query and returns a newly allocated result struct

Parameters

- **con** – A connection object
- **query** – The query to execute
- **size** – The length of the query string, if set to 0 then `strlen()` is used to calculate the length
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns A newly allocated result object

ssize_t **drizzle_escape_string**(drizzle_st *con, char **to, const const char *from, const size_t from_size)

Escape a string for an SQL query. The `to` parameter is allocated by the function and needs to be freed by the application when finished with.

Parameters

- **con** – a connection object
- **to** – the destination string
- **from** – the source string
- **from_size** – the length of the source string

Returns the length of the 'to' string or -1 upon error due to empty parameters or overflow

void **drizzle_result_free**(drizzle_result_st *result)

Frees a result object

Parameters

- **result** – the result set to free

void **drizzle_result_free_all**(drizzle_st *con)

Frees all result objects for a given connection object

Parameters

- **con** – A connection object

drizzle_st* **drizzle_result_drizzle_con**(drizzle_result_st *result)

Gets the connection object from a given result object

Parameters

- **result** – A result object

Returns The connection object associated to the result object

bool **drizzle_result_eof**(drizzle_result_st *result)

Tests to see if an EOF packet has been hit

Parameters

- **result** – A result object

Returns true on EOF or false

const char* **drizzle_result_message**(drizzle_result_st *result)

Get error or information message from result set

Parameters

- **result** – A result object

Returns The message to be returned

uint16_t **drizzle_result_error_code** (drizzle_result_st **result*)
Gets the error code from a result set

Parameters

- **result** – A result object

Returns The error code

const char* **drizzle_result_sqlstate** (drizzle_result_st **result*)
Gets the SQL state from a result set

Parameters

- **result** – A result object

Returns The SQL state string

uint16_t **drizzle_result_warning_count** (drizzle_result_st **result*)
Gets the warning count from a result set

Parameters

- **result** – A result object

Retuns The warning count

uint64_t **drizzle_result_insert_id** (drizzle_result_st **result*)
Gets the insert ID for an auto_increment column in a result set

---

Note: With a MySQL server this returns the first ID with multiple inserts in a query.

Parameters

- **result** – A result object

Returns The insert ID

uint64_t **drizzle_result_affected_rows** (drizzle_result_st **result*)
Gets the affected row count from a result set

Parameters

- **result** – A result object

Returns The affected row count

uint16_t **drizzle_result_column_count** (drizzle_result_st **result*)
Gets the column count from a result set

Parameters

- **result** – A result object

Returns The column count

uint64_t **drizzle_result_row_count** (drizzle_result_st **result*)
Gets the row count from a result set buffered with `drizzle_result_buffer()`

Parameters

- **result** – A result object

Returns The row count

drizzle_result_st* **drizzle_result_read** (drizzle_st *con, drizzle_return_t *ret_ptr)
Reads the next result in a multi-result return

Parameters

- **con** – A connection object
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns The result struct for the new object

drizzle_return_t **drizzle_result_buffer** (drizzle_result_st *result)
Buffers a result set

Parameters

- **result** – A result object

Returns A return status code, `DRIZZLE_RETURN_OK` upon success

drizzle_result_st* **drizzle_column_drizzle_result** (drizzle_column_st *column)
Gets a result set for a given column object

Parameters

- **column** – A column object

Returns A result object

const char* **drizzle_column_catalog** (drizzle_column_st *column)
Gets the catalog name for a given column

Parameters

- **column** – A column object

Returns The catalog name

const char* **drizzle_column_db** (drizzle_column_st *column)
Gets the database name for a given column

Parameters

- **column** – A column object

Returns The database name

const char* **drizzle_column_table** (drizzle_column_st *column)
Get the table name (or table alias) for a given column

Parameters

- **column** – A column object

Returns The table name

const char* **drizzle_column_orig_table** (drizzle_column_st *column)
Gets the original table name (if an alias has been used) for a given column

Parameters

- **column** – A column object

Returns The original table name

const char* **drizzle_column_name** (drizzle_column_st *column)
Gets the column name (or column alias) for a given column

Parameters

- **column** – A column object

Returns The column name

const char* **drizzle_column_orig_name** (drizzle_column_st **column*)
Gets the original column name (if an alias has been used) for a given column

Parameters

- **column** – A column object

Returns The original column name

drizzle_charset_t **drizzle_column_charset** (drizzle_column_st **column*)
Gets the character set ID for a given column

Parameters

- **column** – A column object

Returns The character set ID

uint32_t **drizzle_column_size** (drizzle_column_st **column*)
Gets the size of a given column

Parameters

- **column** – A column object

Returns The column size

size_t **drizzle_column_max_size** (drizzle_column_st **column*)
Gets the maximum size of a given column

Parameters

- **column** – A column object

Returns The maximum size

drizzle_column_type_t **drizzle_column_type** (drizzle_column_st **column*)
Gets the type of data for the column

Parameters

- **column** – A column object

Returns The column type

drizzle_column_flags_t **drizzle_column_flags** (drizzle_column_st **column*)
Gets the flags for a given column

Parameters

- **column** – A column object

Returns The column flags

uint8_t **drizzle_column_decimals** (drizzle_column_st **column*)
Gets the number of decimal places for a given column

Parameters

- **column** – A column object

Returns The number of decimal places

const unsigned char* **drizzle_column_default_value** (drizzle_column_st **column*, size_t **size*)
Gets the default value for a given column

Parameters

- **column** – A column object

Returns A string containing the default value

drizzle_return_t **drizzle_column_skip** (drizzle_result_st **result*)
Skips the next column in a result set when using `drizzle_column_read()` to get the column data

Parameters

- **result** – A result object

Returns A return status code, `DRIZZLE_RETURN_OK` upon success

void **drizzle_column_free** (drizzle_column_st **column*)
Frees a column when using `drizzle_column_read()` to get the column data

Parameters

- **column** – The column to be freed

drizzle_column_st* **drizzle_column_read** (drizzle_result_st **result*, drizzle_return_t **ret_ptr*)
Reads a column from network buffer

Parameters

- **result** – A result object
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns A newly allocated column

drizzle_return_t **drizzle_column_buffer** (drizzle_result_st **result*)
Buffers all the columns for a result set

Parameters

- **result** – A result object

Returns A return status code, `DRIZZLE_RETURN_OK` upon success

drizzle_column_st* **drizzle_column_next** (drizzle_result_st **result*)
Gets the next column in a buffered column result set

Parameters

- **result** – A result object

Returns A column object

drizzle_column_st* **drizzle_column_prev** (drizzle_result_st **result*)
Gets the previous column in a buffered column result set

Parameters

- **result** – A result object

Returns A column object

void **drizzle_column_seek** (drizzle_result_st **result*, uint16_t *column*)
Seeks to a given column in a buffered column result set

Parameters

- **result** – A result object
- **column** – The column number

drizzle_column_st* **drizzle_column_index** (drizzle_result_st *result, uint16_t *column*)
Gets a given column in a column buffered result set

Parameters

- **result** – A result object
- **column** – The column number

Returns A column object

uint16_t **drizzle_column_current** (drizzle_result_st *result)
Gets the column number in a buffered or unbuffered column result set

Parameters

- **result** – A result object:

Returns The column number

uint64_t **drizzle_row_read** (drizzle_result_st *result, drizzle_return_t *ret_ptr)
Reads the next row header and returns the row number for unbuffered row reads. Use `drizzle_field_read()` or `drizzle_field_buffer()` to get the field data after this call.

Parameters

- **result** – A result object
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns The row number

drizzle_row_t **drizzle_row_buffer** (drizzle_result_st *result, drizzle_return_t *ret_ptr)
Read and buffer one entire row, must be freed with c:func:*drizzle_row_free*

Parameters

- **result** – A result object
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns The newly allocated row buffer

void **drizzle_row_free** (drizzle_result_st *result, drizzle_row_t *row*)
Free a buffered row read

Parameters

- **result** – A result object
- **row** – The row data to be freed

size_t* **drizzle_row_field_sizes** (drizzle_result_st *result)
Gets an array of the field sizes for buffered rows

Parameters

- **result** – A result object

Returns An array of row sizes

drizzle_row_t **drizzle_row_next** (drizzle_result_st *result)
Gets the next row in a buffered result set

Parameters

- **result** – A result object

Returns The row data

drizzle_row_t **drizzle_row_prev** (drizzle_result_st **result*)
Gets the previous row in a buffered result set

Parameters

- **result** – A result object

Returns The row data

void **drizzle_row_seek** (drizzle_result_st **result*, uint64_t *row*)
Seeks to a given row in a buffered result set

Parameters

- **result** – A result object
- **row** – The row number to seek to

drizzle_row_t **drizzle_row_index** (drizzle_result_st **result*, uint64_t *row*)
Gets a row at the given index in a buffered result set

Parameters

- **result** – A result object
- **row** – The row number to get

Returns The row data

uint64_t **drizzle_row_current** (drizzle_result_st **result*)
Gets the current row number

Parameters

- **result** – A result object

Returns The row number

drizzle_field_t **drizzle_field_read** (drizzle_result_st **result*, size_t **offset*, size_t **size*, size_t **total*, drizzle_return_t **ret_ptr*)
Reads the next field from the network buffer. Useful for large blobs without buffering the entire blob.

Parameters

- **result** – A result object
- **offset** – The offset position of the blob for this read, to be written to by the function
- **size** – The size of the read, to be written to by the function
- **total** – The total size of the field, to be written to by the function
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns The field data

drizzle_field_t **drizzle_field_buffer** (drizzle_result_st **result*, size_t **total*, drizzle_return_t **ret_ptr*)
Read and buffer the entire field for an unbuffered row read.

Parameters

- **result** – A result object
- **total** – The total size of the field, to be written to by the function
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns The field data

void **drizzle_field_free** (drizzle_field_t *field*)
Frees field data for unbuffered row reads

Parameters

- **field** – The field data to free

4.5 Prepared Statements

4.5.1 Introduction

This section outlines the prepared statement functionality

4.5.2 Structs

drizzle_stmt_st
The internal struct containing the prepared statment object

drizzle_datetime_st
The internal struct for passing a date/time to/from the prepared statement API

4.5.3 Functions

drizzle_stmt_st* **drizzle_stmt_prepare** (drizzle_st **con*, const char **statement*, size_t *size*, drizzle_return_t **ret_ptr*)
Prepare a new statememt

Parameters

- **con** – A connection object
- **statement** – The prepared statement with question marks ('?') for the elements to be provided as parameters
- **size** – The length of the statement
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into

Returns A newly allocated and prepared statement object (or NULL on error)

drizzle_return_t **drizzle_stmt_set_tiny** (drizzle_stmt_st **stmt*, uint16_t *param_num*, uint8_t *value*, bool *is_unsigned*)
Sets a parameter of a prepared statement to a tinyint value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter
- **is_unsigned** – Set to true if the parameter is unsigned

Returns A return status code, `DRIZZLE_RETURN_OK` upon success

drizzle_return_t **drizzle_stmt_set_short** (drizzle_stmt_st **stmt*, uint16_t *param_num*, uint16_t *value*, bool *is_unsigned*)
Sets a parameter of a prepared statement to a short int value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter
- **is_unsigned** – Set to true if the parameter is unsigned

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_int**(drizzle_stmt_st **stmt*, uint16_t *param_num*, uint32_t *value*, bool *is_unsigned*)

Sets a parameter of a prepared statement to an int value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter
- **is_unsigned** – Set to true if the parameter is unsigned

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_bigint**(drizzle_stmt_st **stmt*, uint16_t *param_num*, uint64_t *value*, bool *is_unsigned*)

Sets a parameter of a prepared statement to a bigint value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter
- **is_unsigned** – Set to true if the parameter is unsigned

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_double**(drizzle_stmt_st **stmt*, uint16_t *param_num*, double *value*)

Sets a parameter of a prepared statement to a double value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_float**(drizzle_stmt_st **stmt*, uint16_t *param_num*, float *value*)

Sets a parameter of a prepared statement to a float value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_string**(drizzle_stmt_st **stmt*, uint16_t *param_num*, char **value*, size_t *length*)

Sets a parameter of a prepared statement to a string value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **value** – The value to set the parameter
- **length** – The length of the value data

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_null**(drizzle_stmt_st **stmt*, uint16_t *param_num*)

Sets a parameter of a prepared statement to a NULL value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_time**(drizzle_stmt_st **stmt*, uint16_t *param_num*, uint32_t *days*, uint8_t *hours*, uint8_t *minutes*, uint8_t *seconds*, uint32_t *microseconds*, bool *is_negative*)

Sets a parameter of a prepared statement to a time value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **days** – The number of days for the time
- **hours** – The number of hours for the time
- **minutes** – The number of minutes for the time
- **seconds** – The number of seconds for the time
- **microseconds** – The number of microseconds for the time

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_set_timestamp**(drizzle_stmt_st **stmt*, uint16_t *param_num*, uint16_t *year*, uint8_t *month*, uint8_t *day*, uint8_t *hours*, uint8_t *minutes*, uint8_t *seconds*, uint32_t *microseconds*)

Sets a parameter of a prepared statement to a datetime/timestamp value

Parameters

- **stmt** – A prepared statement object
- **param_num** – The parameter number to set (starting at 0)
- **year** – The year number for the timestamp
- **month** – The month number for the timestamp
- **day** – The day number for the timestamp
- **hours** – The hour number for the timestamp

- **minutes** – The minute number for the timestamp
- **seconds** – The minute number for the timestamp
- **microseconds** – The minute number for the timestamp

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_execute** (drizzle_stmt_st **stmt*)
Executes a prepared statement

Parameters

- **stmt** – The prepared statement object

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_send_long_data** (drizzle_stmt_st **stmt*, uint16_t *param_num*, unsigned char **data*, size_t *len*)
Send long binary data packet

Parameters

- **stmt** – The prepared statement object
- **param_num** – The parameter number this data is for
- **data** – A pointer to the data
- **len** – The length of the data

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_reset** (drizzle_stmt_st **stmt*)
Reset a statement to the prepared state

Parameters

- **stmt** – The prepared statment object

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_fetch** (drizzle_stmt_st **stmt*)
Fetch a row from the result set, can be used with buffered or unbuffered result sets

Parameters

- **stmt** – The prepared statement object

Returns A return status code, DRIZZLE_RETURN_OK upon success

drizzle_return_t **drizzle_stmt_buffer** (drizzle_stmt_st **stmt*)
Buffer the entire result set

Parameters

- **stmt** – The prepared statement object

Returns A return status code, DRIZZLE_RETURN_OK upon success

bool **drizzle_stmt_get_is_null** (drizzle_stmt_st **stmt*, uint16_t *column_number*, drizzle_return_t **ret_ptr*)
Check if a column for a fetched row is set to NULL

Parameters

- **stmt** – The prepared statement object
- **column_number** – The column number to get (starting at 0)

- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into

Returns True if NULL

bool **drizzle_stmt_get_is_null_from_name**(drizzle_stmt_st *stmt, const char *column_name, drizzle_return_t *ret_ptr)

Check if a column for a fetched row is set to NULL using a column name

Parameters

- **stmt** – The prepared statement object
- **column_name** – The column name to get
- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into, DRIZZLE_RETURN_NOT_FOUND if the column name cannot be found

Returns True if NULL

bool **drizzle_stmt_get_is_unsigned**(drizzle_stmt_st *stmt, uint16_t column_number, drizzle_return_t *ret_ptr)

Check if a column for a fetched row is unsigned

Parameters

- **stmt** – The prepared statement object
- **column_number** – The column number to get (starting at 0)
- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into

Returns True if unsigned

bool **drizzle_stmt_get_is_unsigned_from_name**(drizzle_stmt_st *stmt, const char *column_name, drizzle_return_t *ret_ptr)

Check if a column for a fetched row is unsigned using a column name

Parameters

- **stmt** – The prepared statement object
- **column_name** – The column name to get
- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into, DRIZZLE_RETURN_NOT_FOUND if the column name cannot be found

Returns True if unsigned

const char ***drizzle_stmt_get_string**(drizzle_stmt_st *stmt, uint16_t column_number, size_t *len, drizzle_return_t *ret_ptr)

Get the string value for a column of a fetched row (int types are automatically converted)

Parameters

- **stmt** – The prepared statement object
- **column_number** – The column number to get (starting at 0)
- **len** – A pointer to a size_t to store the result length into
- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into

Returns A pointer to the string value

const char ***drizzle_stmt_get_string_from_name**(drizzle_stmt_st *stmt, const char *column_name, size_t *len, drizzle_return_t *ret_ptr)

Get the string value for a column of a fetched row (int types are automatically converted) using a column name

Parameters

- **stmt** – The prepared statement object
- **column_name** – The column name to get
- **len** – A pointer to a `size_t` to store the result length into
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into, `DRIZZLE_RETURN_NOT_FOUND` if the column name cannot be found

Returns A pointer to the string value

uint32_t **drizzle_stmt_get_int**(drizzle_stmt_st **stmt*, uint16_t *column_number*, drizzle_return_t **ret_ptr*)

Get the int value for a column of a fetched row

Parameters

- **stmt** – The prepared statement object
- **column_number** – The column number to get (starting at 0)
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into `DRIZZLE_RETURN_TRUNCATED` if a truncation has occurred

Returns The int value

uint32_t **drizzle_stmt_get_int_from_name**(drizzle_stmt_st **stmt*, const char **column_name*, drizzle_return_t **ret_ptr*)

Get the int value for a column of a fetched row using a column name

Parameters

- **stmt** – The prepared statement object
- **column_name** – The column name to get
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into `DRIZZLE_RETURN_TRUNCATED` if a truncation has occurred, `DRIZZLE_RETURN_NOT_FOUND` if the column name cannot be found

Returns The int value

uint64_t **drizzle_stmt_get_bigint**(drizzle_stmt_st **stmt*, uint16_t *column_number*, drizzle_return_t **ret_ptr*)

Get the bigint value for a column of a fetched row

Parameters

- **stmt** – The prepared statement object
- **column_number** – The column number to get (starting at 0)
- **ret_ptr** – A pointer to a `drizzle_return_t` to store the return status into `DRIZZLE_RETURN_TRUNCATED` if a truncation has occurred

Returns The bigint value

uint64_t **drizzle_stmt_get_bigint_from_name**(drizzle_stmt_st **stmt*, const char **column_name*, drizzle_return_t **ret_ptr*)

Get the bigint value for a column of a fetched row using a column name

Parameters

- **stmt** – The prepared statement object
- **column_name** – The column name to get

- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into DRIZZLE_RETURN_TRUNCATED if a truncation has occurred, DRIZZLE_RETURN_NOT_FOUND if the column name cannot be found

Returns The bigint value

double **drizzle_stmt_get_double**(drizzle_stmt_st **stmt*, uint16_t *column_number*, drizzle_return_t **ret_ptr*)

Get the double value for a column of a fetched row

Parameters

- **stmt** – The prepared statement object
- **column_number** – The column number to get (starting at 0)
- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into DRIZZLE_RETURN_TRUNCATED if a truncation has occurred

Returns The double value

double **drizzle_stmt_get_double_from_name**(drizzle_stmt_st **stmt*, const char **column_name*, drizzle_return_t **ret_ptr*)

Get the double value for a column of a fetched row from a column name

Parameters

- **stmt** – The prepared statement object
- **column_name** – The column name to get
- **ret_ptr** – A pointer to a drizzle_return_t to store the return status into DRIZZLE_RETURN_TRUNCATED if a truncation has occurred, DRIZZLE_RETURN_NOT_FOUND if the column name cannot be found

Returns The double value

drizzle_return_t **drizzle_stmt_close**(drizzle_stmt_st **stmt*)

Close and free a prepared statement

Parameters

- **stmt** – The prepared statement object

Returns A return status code, DRIZZLE_RETURN_OK upon success

uint16_t **drizzle_stmt_column_count**(drizzle_stmt_st **stmt*)

Gets the column count for a result set which has been executed using drizzle_stmt_execute()

Parameters

- **stmt** – The prepared statement object

Returns The column count

uint64_t **drizzle_stmt_affected_rows**(drizzle_stmt_st **stmt*)

Gets the affected rows count for a result set which has been executed using drizzle_stmt_execute()

Parameters

- **stmt** – The prepared statement object

Returns The column count

uint64_t **drizzle_stmt_insert_id**(drizzle_stmt_st **stmt*)

Gets the insert ID for a result set which has been executed using drizzle_stmt_execute()

Parameters

- **stmt** – The prepared statement object

Returns The insert ID

uint16_t **drizzle_stmt_param_count** (drizzle_stmt_st *stmt)
Gets the number of parameters expected for a result set that has been prepared with `drizzle_stmt_prepare()`

Parameters

- **stmt** – The prepared statement object

Returns The number of parameters

uint64_t **drizzle_stmt_row_count** (drizzle_stmt_st *stmt)
Gets the row count for a statement buffered with `drizzle_stmt_buffer()`

On error it returns UINT64_MAX;

Parameters

- **stmt** – The prepared statement object

Returns The row count

4.6 Binlog Functions

4.6.1 Introduction

Libdrizzle Redux contains functions which give it the capabilities to connect as a MySQL slave or a mysqlbinlog type client and retrieve the events.

Warning: You should start a binlog retrieval on a new connection only. Running on a connection that has already executed queries has an undefined (usually bad) behaviour.

The binlog functions use a callback API so that a function in the user application will be called whenever there is a new event to retrieve.

4.6.2 Structs

drizzle_binlog_st
The internal struct containing the binlog stream information

drizzle_binlog_event_st
The internal struct containing the binlog event header and data

4.6.3 Callback Functions

There are two callback functions. The first is called whenever a new event is available to retrieve. The second is triggered whenever an error (or EOF) occurs.

void **(drizzle_binlog_fn)** (drizzle_binlog_event_st *event, void *context)
This defines the function that will be supplied to accept binlog events

Warning: Event data needs to be copied/processed before exiting the function, it will be erased before the next callback.

Parameters

- **event** – A pointer to the event struct
- **context** – A user defined pointer supplied in `drizzle_binlog_init()`

void **(drizzle_binlog_error_fn)** (drizzle_return_t *error*, drizzle_st **con*, void **context*)
This defines the function that will be supplied to accept binlog errors

Parameters

- **error** – The `drizzle_return_t` for the error (or `DRIZZLE_RETURN_EOF` when all events have been retrieved
- **con** – The connection object the error occured on
- **context** – A user defined pointer supplied in `drizzle_binlog_init()`

4.6.4 Functions

drizzle_binlog_st ***drizzle_binlog_init** (drizzle_st **con*, drizzle_binlog_fn **binlog_fn*, drizzle_binlog_error_fn **error_fn*, void **context*, bool *verify_checksums*)
Initializes a binlog object for the connection and sets the event callback functions

Parameters

- **con** – The connection the binlog retrieval will be on
- **binlog_fn** – The function callback defined in `(drizzle_binlog_fn)()`
- **error_fn** – The function callback defined in `(drizzle_binlog_error_fn)()`
- **context** – A pointer to user data which will be used for the callback functions
- **verify_checksums** – Set to true if MySQL 5.6 and higher checksums should be verified

void **drizzle_binlog_free** (drizzle_binlog_st **binlog*)
Frees a binlog object created with `drizzle_binlog_init()`

Parameters

- **binlog** – The binlog object to be freed

drizzle_return_t **drizzle_binlog_start** (drizzle_binlog_st **binlog*, uint32_t *server_id*, const char **file*, uint32_t *start_position*)
Start the binlog transaction. Set the server_id to 0 to disconnect automatically at the end of the last log.

Parameters

- **binlog** – A binlog object created using `drizzle_binlog_init()`
- **server_id** – A unique server ID (or 0) to connect to the MySQL server with
- **file** – The start binlog file, can be empty to start at the first known file
- **start_position** – The position of the binlog file to start at, a value of less than 4 is set to 4 due to the binlog header taking the first 4 bytes

Returns A Drizzle return type. `DRIZZLE_RETURN_OK` upon success.

uint32_t **drizzle_binlog_event_timestamp** (drizzle_binlog_event_st **event*)
Get the timestamp for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The timestamp for the binlog event

drizzle_binlog_event_types_t **drizzle_binlog_event_type** (drizzle_binlog_event_st **event*)
Get the event type for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The timestamp for the binlog event

uint32_t **drizzle_binlog_event_server_id** (drizzle_binlog_event_st **event*)
Get the server_id for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The server_id for the binlog event

uint32_t **drizzle_binlog_event_length** (drizzle_binlog_event_st **event*)
Get the length of the event data received by the event callback

Parameters

- **event** – The event from binlog stream

Returns The event data length

uint32_t **drizzle_binlog_event_next_pos** (drizzle_binlog_event_st **event*)
Get the next event position from the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The next event position

uint16_t **drizzle_binlog_event_flags** (drizzle_binlog_event_st **event*)
Get the flags for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The event flags

uint16_t **drizzle_binlog_event_extra_flags** (drizzle_binlog_event_st **event*)
Get the extra flags for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The extra event flags

const unsigned char* **drizzle_binlog_event_data** (drizzle_binlog_event_st **event*)
Get the event data for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns A pointer to the event data

const unsigned char* **drizzle_binlog_event_raw_data** (drizzle_binlog_event_st **event*)
Get the raw event data (including header) for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns A pointer to the raw event data

uint32_t **drizzle_binlog_event_raw_length** (drizzle_binlog_event_st **event*)

Get the length of the raw event data (including header) for the event received by the event callback

Parameters

- **event** – The event from the binlog stream

Returns The length of the raw event data

CHAPTER

FIVE

CODE EXAMPLES

5.1 Buffered Results

5.1.1 Introduction

In this example `drizzle_query()` is used to send a select query to a MySQL server. The whole result set is then retrieved and stored in memory using `drizzle_result_buffer()`.

The number of columns is retrieved using `drizzle_result_column_count()`. Each row is iterated through by calling `drizzle_row_next()` which returns an array containing string of the row data. We know how many elements are in this array due to the earlier call to `drizzle_result_column_count()`. The data from each element in the row is finally echoed to the console.

To end the query the result set is freed using `drizzle_result_free()`

5.1.2 Code

```
#include <libdrizzle-5.1/libdrizzle.h>
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char *argv[])
{
  (void) argc;
  (void) argv;
  drizzle_st *con;
  drizzle_return_t ret;
  drizzle_result_st *result;
  drizzle_row_t row;
  int num_fields;

  con = drizzle_create("localhost", 3306, "user", "pass", "test", 0);
  if (con == NULL)
  {
    printf("Drizzle connection object creation error\n");
    return EXIT_FAILURE;
  }
  ret = drizzle_connect(con);
  if (ret != DRIZZLE_RETURN_OK)
  {
    printf("Drizzle connection failure\n");
    return EXIT_FAILURE;
```

```
  }

  result= drizzle_query(con, "select * from libdrizzle.t1", 0, &ret);
  if (ret != DRIZZLE_RETURN_OK)
  {
    printf("Select failure\n");
    return EXIT_FAILURE;
  }
  drizzle_result_buffer(result);
  num_fields= drizzle_result_column_count(result);

  printf("%d fields\n", num_fields);
  while ((row = drizzle_row_next(result)))
  {
    printf("Data: ");
    for (uint16_t col=0; col < num_fields; col++)
    {
      printf("%s", row[col]);
    }
    printf("\n");
  }

  drizzle_result_free(result);

  drizzle_quit(con);
  return EXIT_SUCCESS;
}
```

5.2 Unbuffered Results

5.2.1 Introduction

In this example `drizzle_query()` is used to send a select query to a MySQL server. The first thing that is sent back in the results is a list of columns, so this list needs to be retieved. The simplist way of doing this is to buffer the column data using `drizzle_column_buffer()`.

The number of columns is retrieved using `drizzle_result_column_count()`. Each row is iterated through by calling `drizzle_row_buffer()` which buffers and returns an array containing string of the row data. We know how many elements are in this array due to the earlier call to `drizzle_result_column_count()`. The data from each element in the row is finally echoed to the console. The row data is freed using `drizzle_row_free()`.

To end the query the result set is freed using `drizzle_result_free()`

5.2.2 Code

```
#include <libdrizzle-5.1/libdrizzle.h>
#include <stdio.h>
#include <stdlib.h>

int main(int argc, char *argv[])
{
  (void) argc;
  (void) argv;
  drizzle_st *con;
```

```
drizzle_return_t ret;
drizzle_result_st *result;
drizzle_row_t row;
int num_fields;

con = drizzle_create("localhost", 3306, "root", "", "libdrizzle", 0);
if (con == NULL)
{
  printf("Drizzle connection object creation error\n");
  return EXIT_FAILURE;
}
ret = drizzle_connect(con);
if (ret != DRIZZLE_RETURN_OK)
{
  printf("Drizzle connection failure\n");
  return EXIT_FAILURE;
}

result= drizzle_query(con, "select * from libdrizzle.t1", 0, &ret);
if (ret != DRIZZLE_RETURN_OK)
{
  printf("Select failure\n");
  return EXIT_FAILURE;
}

if (drizzle_column_buffer(result) != DRIZZLE_RETURN_OK)
{
  printf("Column buffer failure\n");
  return EXIT_FAILURE;
}
num_fields= drizzle_result_column_count(result);

printf("%d fields\n", num_fields);
while(1)
{
  row= drizzle_row_buffer(result, &ret);
  if (ret != DRIZZLE_RETURN_OK)
  {
    printf("Row retrieval error\n");
    break;
  }
  if (row == NULL)
  {
    // EOF
    break;
  }
  printf("Data: ");
  for (uint16_t col=0; col < num_fields; col++)
  {
    printf("%s", row[col]);
  }
  printf("\n");
  drizzle_row_free(result, row);
}

drizzle_result_free(result);
```

```
  drizzle_quit(con);
  return EXIT_SUCCESS;
}
```

5.3 Prepared Statements

5.3.1 Introduction

This code example has been simplified to make it easier to read, the connection and error handling code has been removed.

In this example a basic select query has been defined which has one element to replace using the '?' character. The statement is prepared using `drizzle_stmt_prepare()` and we can get the number of parameters the server is expecting with `drizzle_stmt_param_count()`. In this example we know that there is only one parameter required so we send one INT type parameter using `drizzle_stmt_set_int()` stating that this is parameter 0 and a signed value.

Once the parameters have been provided the statement is executed using `drizzle_stmt_execute()` and the results buffered using `drizzle_stmt_buffer()`. Once buffered the row count can be obtained using `drizzle_stmt_row_count()`.

Finally we get the result data. A call to `drizzle_stmt_fetch()` gets the next row from either the network or the buffer (the buffer in this case). The int data is retreived using `drizzle_stmt_get_int()`, a call for each column in the row (in example the table only has one column) is made using the `drizzle_stmt_get_` functions.

When we are done the statement is closed and cleaned up using `drizzle_stmt_close()`. It can also be reused with `drizzle_stmt_reset()` or executed again with `drizzle_stmt_execute()` (this is useful for inserts).

5.3.2 Code

```
drizzle_stmt_st *stmt;
const char *query= "select * from libdrizzle.t1 where a > ?";
stmt= drizzle_stmt_prepare(con, query, strlen(query), &ret);

printf("Params: %" PRIu16 "\n", drizzle_stmt_param_count(stmt));

uint32_t val= 1;
ret = drizzle_stmt_set_int(stmt, 0, val, false);

ret = drizzle_stmt_execute(stmt);

ret = drizzle_stmt_buffer(stmt);

printf("Rows found: %" PRIu64 "\n", drizzle_stmt_row_count(stmt));
while (drizzle_stmt_fetch(stmt) != DRIZZLE_RETURN_ROW_END)
{
  uint32_t res_val;
  res_val= drizzle_stmt_get_int(stmt, 0, &ret);
  printf("Got value: %" PRIu32 "\n", *res_val);
}
ret = drizzle_stmt_close(stmt);
```

5.4 Binlog Retrieval

```
#include <libdrizzle-5.1/libdrizzle.h>
#include <stdio.h>
#include <stdlib.h>

void binlog_error(drizzle_return_t ret, drizzle_st *connection, void *context)
{
  (void) context;
  if (ret != DRIZZLE_RETURN_EOF)
  {
    printf("Error retrieving binlog: %s\n", drizzle_error(connection));
  }
}


void binlog_event(drizzle_binlog_event_st *event, void *context)
{
  (void) context;
  printf("Timestamp: %"PRIu32"\n", drizzle_binlog_event_timestamp(event));
  printf("Type: %"PRIu8"\n", drizzle_binlog_event_type(event));
  printf("Server-id: %"PRIu32"\n", drizzle_binlog_event_server_id(event));
  printf("Next-pos: %"PRIu32"\n", drizzle_binlog_event_next_pos(event));
  length= drizzle_binlog_event_length(event);
  printf("Length: %"PRIu32"\n", length);
  data= drizzle_binlog_event_data(event);
  printf("Data: 0x");
  for (i=0; i<length; i++)
    printf("%02X ", data[i]);
  printf("\n\n");
}



int main(int argc, char *argv[])
{
  (void) argc;
  (void) argv;
  drizzle_st *con;
  drizzle_return_t ret;
  drizzle_binlog_st *binlog;

  con = drizzle_create("localhost", 3306, "root", "", "", 0);
  if (con == NULL)
  {
    printf("Drizzle connection object creation error\n");
    return EXIT_FAILURE;
  }
  ret = drizzle_connect(con);
  if (ret != DRIZZLE_RETURN_OK)
  {
    printf("Drizzle connection failure\n");
    return EXIT_FAILURE;
  }

  binlog= drizzle_binlog_init(con, binlog_event, binlog_error, NULL, true);
  ret= drizzle_binlog_start(binlog, 0, "", 0);
  if (ret != DRIZZLE_RETURN_EOF)
```

```
  {
    printf("Drizzle binlog start failure\n");
    return EXIT_FAILURE;
  }



  drizzle_quit(con);
  return EXIT_SUCCESS;
}
```

INDEX

Symbols

(drizzle_binlog_error_fn) (C function), 44
(drizzle_binlog_fn) (C function), 43

D

DRIZZLE_BIND_OPTION_LONG_DATA (built-in variable), 19
DRIZZLE_BIND_OPTION_NONE (built-in variable), 19
DRIZZLE_BIND_OPTION_NULL (built-in variable), 19
DRIZZLE_BIND_OPTION_TRUNCATED (built-in variable), 19
DRIZZLE_BIND_OPTION_UNSIGNED (built-in variable), 19
drizzle_bind_options_t (C type), 19
drizzle_binlog_event_data (C function), 45
drizzle_binlog_event_extra_flags (C function), 45
drizzle_binlog_event_flags (C function), 45
drizzle_binlog_event_length (C function), 45
drizzle_binlog_event_next_pos (C function), 45
drizzle_binlog_event_raw_data (C function), 45
drizzle_binlog_event_raw_length (C function), 46
drizzle_binlog_event_server_id (C function), 45
drizzle_binlog_event_st (C type), 43
drizzle_binlog_event_timestamp (C function), 44
drizzle_binlog_event_type (C function), 45
drizzle_binlog_event_types_t (C type), 19
drizzle_binlog_free (C function), 44
drizzle_binlog_init (C function), 44
DRIZZLE_BINLOG_MAGIC (C type), 19
drizzle_binlog_st (C type), 43
drizzle_binlog_start (C function), 44
drizzle_bugreport (C function), 21
drizzle_capabilities (C function), 26
DRIZZLE_CAPABILITIES_CLIENT (built-in variable), 16
DRIZZLE_CAPABILITIES_COMPRESS (built-in variable), 15
DRIZZLE_CAPABILITIES_CONNECT_WITH_DB (built-in variable), 15
DRIZZLE_CAPABILITIES_FOUND_ROWS (built-in variable), 15
DRIZZLE_CAPABILITIES_IGNORE_SIGPIPE (built-in variable), 16
DRIZZLE_CAPABILITIES_IGNORE_SPACE (built-in variable), 15
DRIZZLE_CAPABILITIES_INTERACTIVE (built-in variable), 16
DRIZZLE_CAPABILITIES_LOCAL_FILES (built-in variable), 16
DRIZZLE_CAPABILITIES_LONG_FLAG (built-in variable), 15
DRIZZLE_CAPABILITIES_LONG_PASSWORD (built-in variable), 15
DRIZZLE_CAPABILITIES_MULTI_RESULTS (built-in variable), 16
DRIZZLE_CAPABILITIES_MULTI_STATEMENTS (built-in variable), 16
DRIZZLE_CAPABILITIES_NO_SCHEMA (built-in variable), 15
DRIZZLE_CAPABILITIES_NONE (built-in variable), 15
DRIZZLE_CAPABILITIES_ODBC (built-in variable), 15
DRIZZLE_CAPABILITIES_PLUGIN_AUTH (built-in variable), 16
DRIZZLE_CAPABILITIES_PROTOCOL_41 (built-in variable), 16
DRIZZLE_CAPABILITIES_PS_MULTI_RESULTS (built-in variable), 16
DRIZZLE_CAPABILITIES_REMEBER_OPTIONS (built-in variable), 16
DRIZZLE_CAPABILITIES_RESERVED (built-in variable), 16
DRIZZLE_CAPABILITIES_SECURE_CONNECTION (built-in variable), 16
DRIZZLE_CAPABILITIES_SSL (built-in variable), 16
DRIZZLE_CAPABILITIES_SSL_VERIFY_SERVER_CERT (built-in variable), 16
drizzle_capabilities_t (C type), 15
DRIZZLE_CAPABILITIES_TRANSACTIONS (built-in variable), 16

drizzle_charset (C function), 26
DRIZZLE_CHARSET_ARMSCII8_BIN (built-in variable), 11
DRIZZLE_CHARSET_ARMSCII8_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_ASCII_BIN (built-in variable), 11
DRIZZLE_CHARSET_ASCII_GENERAL_CI (built-in variable), 9
DRIZZLE_CHARSET_BIG5_BIN (built-in variable), 11
DRIZZLE_CHARSET_BIG5_CHINESE_CI (built-in variable), 9
DRIZZLE_CHARSET_BINARY (built-in variable), 11
DRIZZLE_CHARSET_CP1250_BIN (built-in variable), 11
DRIZZLE_CHARSET_CP1250_CROATIAN_CI (built-in variable), 10
DRIZZLE_CHARSET_CP1250_CZECH_CS (built-in variable), 10
DRIZZLE_CHARSET_CP1250_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_CP1250_POLISH_CI (built-in variable), 12
DRIZZLE_CHARSET_CP1251_BIN (built-in variable), 10
DRIZZLE_CHARSET_CP1251_BULGARIAN_CI (built-in variable), 9
DRIZZLE_CHARSET_CP1251_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_CP1251_GENERAL_CS (built-in variable), 10
DRIZZLE_CHARSET_CP1251_UKRAINIAN_CI (built-in variable), 10
DRIZZLE_CHARSET_CP1256_BIN (built-in variable), 11
DRIZZLE_CHARSET_CP1256_GENERAL_CI (built-in variable), 11
DRIZZLE_CHARSET_CP1257_BIN (built-in variable), 11
DRIZZLE_CHARSET_CP1257_GENERAL_CI (built-in variable), 11
DRIZZLE_CHARSET_CP1257_LITHUANIAN_CI (built-in variable), 10
DRIZZLE_CHARSET_CP850_BIN (built-in variable), 11
DRIZZLE_CHARSET_CP850_GENERAL_CI (built-in variable), 9
DRIZZLE_CHARSET_CP852_BIN (built-in variable), 11
DRIZZLE_CHARSET_CP852_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_CP866_BIN (built-in variable), 11
DRIZZLE_CHARSET_CP866_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_CP932_BIN (built-in variable), 12
DRIZZLE_CHARSET_CP932_JAPANESE_CI (built-in variable), 12
DRIZZLE_CHARSET_DEC8_BIN (built-in variable), 11
DRIZZLE_CHARSET_DEC8_SWEDISH_CI (built-in variable), 9
DRIZZLE_CHARSET_EUCJPMS_BIN (built-in variable), 12
DRIZZLE_CHARSET_EUCJPMS_JAPANESE_CI (built-in variable), 12
DRIZZLE_CHARSET_EUCKR_BIN (built-in variable), 11
DRIZZLE_CHARSET_EUCKR_KOREAN_CI (built-in variable), 9
DRIZZLE_CHARSET_GB2312_BIN (built-in variable), 11
DRIZZLE_CHARSET_GB2312_CHINESE_CI (built-in variable), 10
DRIZZLE_CHARSET_GBK_BIN (built-in variable), 11
DRIZZLE_CHARSET_GBK_CHINESE_CI (built-in variable), 10
DRIZZLE_CHARSET_GEOSTD8_BIN (built-in variable), 11
DRIZZLE_CHARSET_GEOSTD8_GENERAL_CI (built-in variable), 11
DRIZZLE_CHARSET_GREEK_BIN (built-in variable), 11
DRIZZLE_CHARSET_GREEK_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_HEBREW_BIN (built-in variable), 11
DRIZZLE_CHARSET_HEBREW_GENERAL_CI (built-in variable), 9
DRIZZLE_CHARSET_HP8_BIN (built-in variable), 11
DRIZZLE_CHARSET_HP8_ENGLISH_CI (built-in variable), 9
DRIZZLE_CHARSET_KEYBCS2_BIN (built-in variable), 11
DRIZZLE_CHARSET_KEYBCS2_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_KOI8R_BIN (built-in variable), 11
DRIZZLE_CHARSET_KOI8R_GENERAL_CI (built-in variable), 9
DRIZZLE_CHARSET_KOI8U_BIN (built-in variable), 11
DRIZZLE_CHARSET_KOI8U_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN1_BIN (built-in variable), 10
DRIZZLE_CHARSET_LATIN1_DANISH_CI (built-in

variable), 9
DRIZZLE_CHARSET_LATIN1_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN1_GENERAL_CS (built-in variable), 10
DRIZZLE_CHARSET_LATIN1_GERMAN1_CI (built-in variable), 9
DRIZZLE_CHARSET_LATIN1_GERMAN2_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN1_SPANISH_CI (built-in variable), 11
DRIZZLE_CHARSET_LATIN1_SWEDISH_CI (built-in variable), 9
DRIZZLE_CHARSET_LATIN2_BIN (built-in variable), 11
DRIZZLE_CHARSET_LATIN2_CROATIAN_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN2_CZECH_CS (built-in variable), 9
DRIZZLE_CHARSET_LATIN2_GENERAL_CI (built-in variable), 9
DRIZZLE_CHARSET_LATIN2_HUNGARIAN_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN5_BIN (built-in variable), 11
DRIZZLE_CHARSET_LATIN5_TURKISH_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN7_BIN (built-in variable), 11
DRIZZLE_CHARSET_LATIN7_ESTONIAN_CS (built-in variable), 10
DRIZZLE_CHARSET_LATIN7_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_LATIN7_GENERAL_CS (built-in variable), 10
DRIZZLE_CHARSET_MACCE_BIN (built-in variable), 10
DRIZZLE_CHARSET_MACCE_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_MACROMAN_BIN (built-in variable), 10
DRIZZLE_CHARSET_MACROMAN_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_SJIS_BIN (built-in variable), 11
DRIZZLE_CHARSET_SJIS_JAPANESE_CI (built-in variable), 9
DRIZZLE_CHARSET_SWE7_BIN (built-in variable), 11
DRIZZLE_CHARSET_SWE7_SWEDISH_CI (built-in variable), 9
drizzle_charset_t (C type), 9
DRIZZLE_CHARSET_TIS620_BIN (built-in variable), 11
DRIZZLE_CHARSET_TIS620_THAI_CI (built-in variable), 9
DRIZZLE_CHARSET_UCS2_BIN (built-in variable), 11
DRIZZLE_CHARSET_UCS2_CZECH_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_DANISH_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_ESPERANTO_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_ESTONIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_UCS2_GENERAL_MYSQL500_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_HUNGARIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_ICELANDIC_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_LATVIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_LITHUANIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_PERSIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_POLISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_ROMAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_ROMANIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_SINHALA_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_SLOVAK_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_SLOVENIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_SPANISH2_CI (built-in variable), 13
DRIZZLE_CHARSET_UCS2_SPANISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_SWEDISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_TURKISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UCS2_UNICODE_CI (built-in variable), 12
DRIZZLE_CHARSET_UJIS_BIN (built-in variable), 11
DRIZZLE_CHARSET_UJIS_JAPANESE_CI (built-in variable), 9
DRIZZLE_CHARSET_UTF16_BIN (built-in variable), 10
DRIZZLE_CHARSET_UTF16_CZECH_CI (built-in variable), 12

DRIZZLE_CHARSET_UTF16_DANISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_ESPERANTO_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_ESTONIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_UTF16_HUNGARIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_ICELANDIC_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_LATVIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_LITHUANIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_PERSIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_POLISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_ROMAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_ROMANIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_SINHALA_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_SLOVAK_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_SLOVENIAN_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_SPANISH2_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_SPANISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_SWEDISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_TURKISH_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF16_UNICODE_CI (built-in variable), 12
DRIZZLE_CHARSET_UTF32_BIN (built-in variable), 11
DRIZZLE_CHARSET_UTF32_CZECH_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_DANISH_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_ESPERANTO_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_ESTONIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_GENERAL_CI (built-in variable), 11
DRIZZLE_CHARSET_UTF32_HUNGARIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_ICELANDIC_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_LATVIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_LITHUANIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_PERSIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_POLISH_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_ROMAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_ROMANIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_SINHALA_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_SLOVAK_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_SLOVENIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_SPANISH2_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_SPANISH_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_SWEDISH_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_TURKISH_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF32_UNICODE_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF8_BIN (built-in variable), 11
DRIZZLE_CHARSET_UTF8_CZECH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_DANISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_ESPERANTO_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_ESTONIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_UTF8_GENERAL_MYSQL500_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_HUNGARIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_ICELANDIC_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF8_LATVIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF8_LITHUANIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_PERSIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_POLISH_CI (built-in

variable), 13
DRIZZLE_CHARSET_UTF8_ROMAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_ROMANIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF8_SINHALA_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_SLOVAK_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_SLOVENIAN_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF8_SPANISH2_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_SPANISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_SWEDISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_TURKISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8_UNICODE_CI (built-in variable), 13
DRIZZLE_CHARSET_UTF8MB4_BIN (built-in variable), 10
DRIZZLE_CHARSET_UTF8MB4_CZECH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_DANISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_ESPERANTO_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_ESTONIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_GENERAL_CI (built-in variable), 10
DRIZZLE_CHARSET_UTF8MB4_HUNGARIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_ICELANDIC_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_LATVIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_LITHUANIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_PERSIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_POLISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_ROMAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_ROMANIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_SINHALA_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_SLOVAK_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_SLOVENIAN_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_SPANISH2_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_SPANISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_SWEDISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_TURKISH_CI (built-in variable), 14
DRIZZLE_CHARSET_UTF8MB4_UNICODE_CI (built-in variable), 14
drizzle_close (C function), 27
drizzle_column_buffer (C function), 33
drizzle_column_catalog (C function), 31
drizzle_column_charset (C function), 32
drizzle_column_current (C function), 34
drizzle_column_db (C function), 31
drizzle_column_decimals (C function), 32
drizzle_column_default_value (C function), 32
drizzle_column_drizzle_result (C function), 31
drizzle_column_flags (C function), 32
DRIZZLE_COLUMN_FLAGS_AUTO_INCREMENT (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_BINARY (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_BINCMP (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_BLOB (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_ENUM (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_GET_FIXED_FIELDS (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_GROUP (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_IN_ADD_INDEX (built-in variable), 19
DRIZZLE_COLUMN_FLAGS_IN_PART_FUNC (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_MULTIPLE_KEY (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_NO_DEFAULT_VALUE (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_NONE (built-in variable), 17
DRIZZLE_COLUMN_FLAGS_NOT_NULL (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_NUM (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_ON_UPDATE_NOW (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_PART_KEY (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_PRI_KEY (built-in vari-

able), 18
DRIZZLE_COLUMN_FLAGS_RENAMED (built-in variable), 19
DRIZZLE_COLUMN_FLAGS_SET (built-in variable), 18
drizzle_column_flags_t (C type), 17
DRIZZLE_COLUMN_FLAGS_TIMESTAMP (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_UNIQUE (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_UNIQUE_KEY (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_UNSIGNED (built-in variable), 18
DRIZZLE_COLUMN_FLAGS_ZEROFILL (built-in variable), 18
drizzle_column_free (C function), 33
drizzle_column_index (C function), 33
drizzle_column_max_size (C function), 32
drizzle_column_name (C function), 31
drizzle_column_next (C function), 33
drizzle_column_orig_name (C function), 32
drizzle_column_orig_table (C function), 31
drizzle_column_prev (C function), 33
drizzle_column_read (C function), 33
drizzle_column_seek (C function), 33
drizzle_column_size (C function), 32
drizzle_column_skip (C function), 33
drizzle_column_st (C type), 28
drizzle_column_table (C function), 31
drizzle_column_type (C function), 32
DRIZZLE_COLUMN_TYPE_BIT (built-in variable), 17
DRIZZLE_COLUMN_TYPE_BLOB (built-in variable), 17
DRIZZLE_COLUMN_TYPE_DATE (built-in variable), 17
DRIZZLE_COLUMN_TYPE_DATETIME (built-in variable), 17
DRIZZLE_COLUMN_TYPE_DECIMAL (built-in variable), 16
DRIZZLE_COLUMN_TYPE_DOUBLE (built-in variable), 17
DRIZZLE_COLUMN_TYPE_ENUM (built-in variable), 17
DRIZZLE_COLUMN_TYPE_FLOAT (built-in variable), 17
DRIZZLE_COLUMN_TYPE_GEOMETRY (built-in variable), 17
DRIZZLE_COLUMN_TYPE_INT24 (built-in variable), 17
DRIZZLE_COLUMN_TYPE_LONG (built-in variable), 17
DRIZZLE_COLUMN_TYPE_LONG_BLOB (built-in variable), 17
DRIZZLE_COLUMN_TYPE_LONGLONG (built-in variable), 17
DRIZZLE_COLUMN_TYPE_MEDIUM_BLOB (built-in variable), 17
DRIZZLE_COLUMN_TYPE_NEWDATE (built-in variable), 17
DRIZZLE_COLUMN_TYPE_NEWDECIMAL (built-in variable), 17
DRIZZLE_COLUMN_TYPE_NULL (built-in variable), 17
DRIZZLE_COLUMN_TYPE_SET (built-in variable), 17
DRIZZLE_COLUMN_TYPE_SHORT (built-in variable), 17
DRIZZLE_COLUMN_TYPE_STRING (built-in variable), 17
drizzle_column_type_t (C type), 16
DRIZZLE_COLUMN_TYPE_TIME (built-in variable), 17
DRIZZLE_COLUMN_TYPE_TIMESTAMP (built-in variable), 17
DRIZZLE_COLUMN_TYPE_TINY (built-in variable), 17
DRIZZLE_COLUMN_TYPE_TINY_BLOB (built-in variable), 17
DRIZZLE_COLUMN_TYPE_VAR_STRING (built-in variable), 17
DRIZZLE_COLUMN_TYPE_VARCHAR (built-in variable), 17
DRIZZLE_COLUMN_TYPE_YEAR (built-in variable), 17
DRIZZLE_CON_STATUS_AUTOCOMMIT (built-in variable), 15
DRIZZLE_CON_STATUS_CURSOR_EXISTS (built-in variable), 15
DRIZZLE_CON_STATUS_DB_DROPPED (built-in variable), 15
DRIZZLE_CON_STATUS_IN_TRANS (built-in variable), 15
DRIZZLE_CON_STATUS_LAST_ROW_SENT (built-in variable), 15
DRIZZLE_CON_STATUS_MORE_RESULTS_EXISTS (built-in variable), 15
DRIZZLE_CON_STATUS_NO_BACKSLASH_ESCAPES (built-in variable), 15
DRIZZLE_CON_STATUS_NONE (built-in variable), 15
DRIZZLE_CON_STATUS_QUERY_NO_GOOD_INDEX_USED (built-in variable), 15
DRIZZLE_CON_STATUS_QUERY_NO_INDEX_USED (built-in variable), 15
DRIZZLE_CON_STATUS_QUERY_WAS_SLOW (built-in variable), 15
drizzle_connect (C function), 26
drizzle_create (C function), 22
drizzle_datetime_st (C type), 36

drizzle_db (C function), 25
drizzle_errno (C function), 23
drizzle_error (C function), 23
drizzle_error_code (C function), 23
drizzle_escape_string (C function), 29
DRIZZLE_EVENT_TYPE_ANONYMOUS_GTID (built-in variable), 21
DRIZZLE_EVENT_TYPE_APPEND_BLOCK (built-in variable), 19
DRIZZLE_EVENT_TYPE_BEGIN_LOAD_QUERY (built-in variable), 20
DRIZZLE_EVENT_TYPE_CREATE_FILE (built-in variable), 19
DRIZZLE_EVENT_TYPE_DELETE_FILE (built-in variable), 20
DRIZZLE_EVENT_TYPE_EXEC_LOAD (built-in variable), 20
DRIZZLE_EVENT_TYPE_EXECUTE_LOAD_QUERY (built-in variable), 20
DRIZZLE_EVENT_TYPE_FORMAT_DESCRIPTION (built-in variable), 20
DRIZZLE_EVENT_TYPE_GTID (built-in variable), 21
DRIZZLE_EVENT_TYPE_HEARTBEAT (built-in variable), 20
DRIZZLE_EVENT_TYPE_IGNORABLE (built-in variable), 20
DRIZZLE_EVENT_TYPE_INCIDENT (built-in variable), 20
DRIZZLE_EVENT_TYPE_INTVAR (built-in variable), 19
DRIZZLE_EVENT_TYPE_LOAD (built-in variable), 19
DRIZZLE_EVENT_TYPE_NEW_LOAD (built-in variable), 20
DRIZZLE_EVENT_TYPE_OBSOLETE_DELETE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_OBSOLETE_UPDATE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_OBSOLETE_WRITE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_PREVIOUS_GTIDS (built-in variable), 21
DRIZZLE_EVENT_TYPE_QUERY (built-in variable), 19
DRIZZLE_EVENT_TYPE_RAND (built-in variable), 20
DRIZZLE_EVENT_TYPE_ROTATE (built-in variable), 19
DRIZZLE_EVENT_TYPE_ROWS_QUERY (built-in variable), 20
DRIZZLE_EVENT_TYPE_START (built-in variable), 19
DRIZZLE_EVENT_TYPE_STOP (built-in variable), 19
DRIZZLE_EVENT_TYPE_TABLE_MAP (built-in variable), 20
DRIZZLE_EVENT_TYPE_UNKNOWN (built-in variable), 19
DRIZZLE_EVENT_TYPE_USER_VAR (built-in variable), 20
DRIZZLE_EVENT_TYPE_V1_DELETE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_V1_UPDATE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_V1_WRITE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_V2_DELETE_ROWS (built-in variable), 21
DRIZZLE_EVENT_TYPE_V2_UPDATE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_V2_WRITE_ROWS (built-in variable), 20
DRIZZLE_EVENT_TYPE_XID (built-in variable), 20
drizzle_field_buffer (C function), 35
drizzle_field_free (C function), 35
drizzle_field_read (C function), 35
drizzle_field_t (C type), 16
drizzle_host (C function), 25
drizzle_kill (C function), 27
drizzle_library_deinit (C function), 21
drizzle_library_init (C function), 21
drizzle_log_fn (C function), 28
drizzle_max_packet_size (C function), 26
drizzle_options_create (C function), 23
drizzle_options_destroy (C function), 23
drizzle_options_get_auth_plugin (C function), 25
drizzle_options_get_found_rows (C function), 24
drizzle_options_get_interactive (C function), 24
drizzle_options_get_multi_statements (C function), 25
drizzle_options_get_non_blocking (C function), 23
drizzle_options_get_raw_scramble (C function), 24
drizzle_options_set_auth_plugin (C function), 25
drizzle_options_set_found_rows (C function), 24
drizzle_options_set_interactive (C function), 24
drizzle_options_set_multi_statements (C function), 24
drizzle_options_set_non_blocking (C function), 23
drizzle_options_set_raw_scramble (C function), 24
drizzle_options_st (C type), 21
drizzle_ping (C function), 27
drizzle_port (C function), 25
drizzle_protocol_version (C function), 25
drizzle_query (C function), 28
drizzle_query_st (C type), 28
drizzle_quit (C function), 27
drizzle_result_affected_rows (C function), 30
drizzle_result_buffer (C function), 31
drizzle_result_column_count (C function), 30
drizzle_result_drizzle_con (C function), 29
drizzle_result_eof (C function), 29
drizzle_result_error_code (C function), 29
drizzle_result_free (C function), 29

drizzle_result_free_all (C function), 29
drizzle_result_insert_id (C function), 30
drizzle_result_message (C function), 29
drizzle_result_read (C function), 30
drizzle_result_row_count (C function), 30
drizzle_result_sqlstate (C function), 30
drizzle_result_st (C type), 28
drizzle_result_warning_count (C function), 30
DRIZZLE_RETURN_AUTH_FAILED (built-in variable), 8
DRIZZLE_RETURN_BAD_HANDSHAKE_PACKET (built-in variable), 8
DRIZZLE_RETURN_BAD_PACKET (built-in variable), 8
DRIZZLE_RETURN_BAD_PACKET_NUMBER (built-in variable), 8
DRIZZLE_RETURN_BINLOG_CRC (built-in variable), 9
DRIZZLE_RETURN_COULD_NOT_CONNECT (built-in variable), 8
DRIZZLE_RETURN_EOF (built-in variable), 9
DRIZZLE_RETURN_ERRNO (built-in variable), 8
DRIZZLE_RETURN_ERROR_CODE (built-in variable), 8
DRIZZLE_RETURN_GETADDRINFO (built-in variable), 8
DRIZZLE_RETURN_HANDSHAKE_FAILED (built-in variable), 8
DRIZZLE_RETURN_INTERNAL_ERROR (built-in variable), 8
DRIZZLE_RETURN_INVALID_ARGUMENT (built-in variable), 9
DRIZZLE_RETURN_INVALID_CONVERSION (built-in variable), 9
DRIZZLE_RETURN_IO_WAIT (built-in variable), 7
DRIZZLE_RETURN_LOST_CONNECTION (built-in variable), 8
DRIZZLE_RETURN_MEMORY (built-in variable), 8
DRIZZLE_RETURN_NO_ACTIVE_CONNECTIONS (built-in variable), 8
DRIZZLE_RETURN_NO_SCRAMBLE (built-in variable), 8
DRIZZLE_RETURN_NOT_FOUND (built-in variable), 9
DRIZZLE_RETURN_NOT_READY (built-in variable), 8
DRIZZLE_RETURN_NULL_SIZE (built-in variable), 8
DRIZZLE_RETURN_OK (built-in variable), 7
DRIZZLE_RETURN_PAUSE (built-in variable), 7
DRIZZLE_RETURN_PROTOCOL_NOT_SUPPORTED (built-in variable), 8
DRIZZLE_RETURN_ROW_BREAK (built-in variable), 8
DRIZZLE_RETURN_ROW_END (built-in variable), 8
DRIZZLE_RETURN_SSL_ERROR (built-in variable), 9
DRIZZLE_RETURN_STMT_ERROR (built-in variable), 9
drizzle_return_t (C type), 7
DRIZZLE_RETURN_TIMEOUT (built-in variable), 8
DRIZZLE_RETURN_TOO_MANY_COLUMNS (built-in variable), 8
DRIZZLE_RETURN_TRUNCATED (built-in variable), 9
DRIZZLE_RETURN_UNEXPECTED_DATA (built-in variable), 8
drizzle_row_buffer (C function), 34
drizzle_row_current (C function), 35
drizzle_row_field_sizes (C function), 34
drizzle_row_free (C function), 34
drizzle_row_index (C function), 35
drizzle_row_next (C function), 34
drizzle_row_prev (C function), 34
drizzle_row_read (C function), 34
drizzle_row_seek (C function), 35
drizzle_row_t (C type), 16
drizzle_select_db (C function), 27
drizzle_server_version (C function), 26
drizzle_server_version_number (C function), 26
drizzle_set_log_fn (C function), 23
drizzle_set_ssl (C function), 28
drizzle_set_timeout (C function), 22
drizzle_set_verbose (C function), 22
drizzle_shutdown (C function), 27
drizzle_sqlstate (C function), 23
drizzle_st (C type), 21
drizzle_status (C function), 26
drizzle_status_t (C type), 14
drizzle_stmt_affected_rows (C function), 42
drizzle_stmt_buffer (C function), 39
drizzle_stmt_close (C function), 42
drizzle_stmt_column_count (C function), 42
drizzle_stmt_execute (C function), 39
drizzle_stmt_fetch (C function), 39
drizzle_stmt_get_bigint (C function), 41
drizzle_stmt_get_bigint_from_name (C function), 41
drizzle_stmt_get_double (C function), 42
drizzle_stmt_get_double_from_name (C function), 42
drizzle_stmt_get_int (C function), 41
drizzle_stmt_get_int_from_name (C function), 41
drizzle_stmt_get_is_null (C function), 39
drizzle_stmt_get_is_null_from_name (C function), 40
drizzle_stmt_get_is_unsigned (C function), 40
drizzle_stmt_get_is_unsigned_from_name (C function), 40
drizzle_stmt_get_string (C function), 40
drizzle_stmt_get_string_from_name (C function), 40
drizzle_stmt_insert_id (C function), 42
drizzle_stmt_param_count (C function), 43

drizzle_stmt_prepare (C function), 36
drizzle_stmt_reset (C function), 39
drizzle_stmt_row_count (C function), 43
drizzle_stmt_send_long_data (C function), 39
drizzle_stmt_set_bigint (C function), 37
drizzle_stmt_set_double (C function), 37
drizzle_stmt_set_float (C function), 37
drizzle_stmt_set_int (C function), 37
drizzle_stmt_set_null (C function), 38
drizzle_stmt_set_short (C function), 36
drizzle_stmt_set_string (C function), 37
drizzle_stmt_set_time (C function), 38
drizzle_stmt_set_timestamp (C function), 38
drizzle_stmt_set_tiny (C function), 36
drizzle_stmt_st (C type), 36
drizzle_stmt_state_t (C type), 19
drizzle_thread_id (C function), 26
drizzle_timeout (C function), 22
drizzle_user (C function), 25
drizzle_verbose (C function), 22
DRIZZLE_VERBOSE_CRAZY (built-in variable), 7
DRIZZLE_VERBOSE_DEBUG (built-in variable), 7
DRIZZLE_VERBOSE_ERROR (built-in variable), 7
DRIZZLE_VERBOSE_FATAL (built-in variable), 7
DRIZZLE_VERBOSE_INFO (built-in variable), 7
drizzle_verbose_name (C function), 21
DRIZZLE_VERBOSE_NEVER (built-in variable), 7
drizzle_verbose_t (C type), 7
drizzle_version (C function), 21