
pyDAL Documentation

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web2py-developers

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1	Indices and tables	3
1.1	Subpackages	3
1.1.1	pydal.adapters package	3
	Submodules	3
	pydal.adapters.base module	3
	pydal.adapters.couchdb module	6
	pydal.adapters.cubrid module	6
	pydal.adapters.db2 module	6
	pydal.adapters.firebird module	6
	pydal.adapters.google_adapters module	7
	pydal.adapters.imap module	7
	pydal.adapters.informix module	7
	pydal.adapters.ingres module	7
	pydal.adapters.mongo module	8
	pydal.adapters.mssql module	9
	pydal.adapters.mysql module	10
	pydal.adapters.oracle module	11
	pydal.adapters.postgres module	12
	pydal.adapters.sapdb module	14
	pydal.adapters.sqlite module	14
	pydal.adapters.teradata module	14
	Module contents	14
1.1.2	pydal.helpers package	15
	Submodules	15
	pydal.helpers.classes module	15
	pydal.helpers.methods module	17
	pydal.helpers.regex module	19
	Module contents	19
1.2	Submodules	19
1.3	pydal.base module	19
1.4	pydal.connection module	26
1.5	pydal.objects module	27
1.6	Module contents	35
	Python Module Index	37

Contents:

Indices and tables

- [genindex](#)
- [modindex](#)
- [search](#)

1.1 Subpackages

1.1.1 pydal.adapters package

Submodules

pydal.adapters.base module

```
class pydal.adapters.base.BaseAdapter(db, uri, pool_size=0, folder=None, db_codec='UTF-8',
                                       credential_decoder=<function IDENTITY>,
                                       driver_args={}, adapter_args={}, do_connect=True,
                                       after_connection=None)
```

Bases: `pydal.connection.ConnectionPool`

adapt (value)

alias (table, alias)

close_connection (*args, **kwargs)

common_filter (query, tablename)

connector ()

dbengine = 'None'

drivers = ()

drop_table (table, mode='')

expand_all (fields, tablename)

find_driver ()

get_table (*queries)

iterparse (sql, fields, colnames, blob_decode=True, cacheable=False)

Iterator to parse one row at a time. It doesn't support the old style virtual fields

```
parse (rows, fields, colnames, blob_decode=True, cacheable=False)
parse_value (value, field_itype, field_type, blob_decode=True)
represent (obj, field_type)
rowslice (rows, minimum=0, maximum=None)
support_distributed_transaction = False
tables (*queries)
test_connection ()
types
uploads_in_blob = False
class pydal.adapters.base.DebugHandler (adapter)
    Bases: pydal.helpers.classes.ExecutionHandler
    before_execute (command)
class pydal.adapters.base.NoSQLAdapter (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, after_connection=None)
    Bases: pydal.adapters.base.BaseAdapter
    can_select_for_update = False
    commit ()
    commit_prepared (key)
    create_table (table, migrate=True, fake_migrate=False, polymodel=None)
    drop (*args, **kwargs)
    drop_table (table, mode='')
    id_query (table)
    prepare ()
    rollback ()
    rollback_prepared (key)
    sqlsafe_field (fieldname)
    sqlsafe_table (tablename, original_tablename=None)
class pydal.adapters.base.NullAdapter (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, after_connection=None)
    Bases: pydal.adapters.base.BaseAdapter
    connector ()
    find_driver ()
class pydal.adapters.base.SQLAdapter (*args, **kwargs)
    Bases: pydal.adapters.base.BaseAdapter
    adapt (obj)
    bulk_insert (table, items)
```

```
can_select_for_update = True
commit (*args, **kwargs)
commit_on_alter_table = False
commit_prepared (*args, **kwargs)
count (query, distinct=None)
create_index (table, index_name, *fields, **kwargs)
create_sequence_and_triggers (query, table, **args)
create_table (*args, **kwargs)
delete (tablename, query)
distributed_transaction_begin (key)
drop (*args, **kwargs)
drop_index (table, index_name)
drop_table (table, mode='')
execute (*args, **kwargs)
execution_handlers = []
fetchall ()
fetchone ()
filter_sql_command (command)
id_query (table)
index_expander (*args, **kws)
insert (table, fields)
iterselect (query, fields, attributes)
lastrowid (table)
prepare (*args, **kwargs)
represent (obj, field_type)
rollback (*args, **kwargs)
rollback_prepared (*args, **kwargs)
select (query, fields, attributes)
smart_adapt (obj)
sqlsafe_field (fieldname)
sqlsafe_table (tablename, original_tablename=None)
table_alias (tbl)
test_connection ()
truncate (table, mode='')
update (tablename, query, fields)
```

pydal.adapters.couchdb module

```
class pydal.adapters.couchdb.CouchDB(db, uri, pool_size=0, folder=None, db_codec='UTF-8',
                                     credential_decoder=<function IDENTITY>,
                                     driver_args={}, adapter_args={}, do_connect=True,
                                     after_connection=None)
    Bases: pydal.adapters.base.NoSQLAdapter
    connector ()
    count (query, distinct=None)
    create_table (table, migrate=True, fake_migrate=False, polymodel=None)
    dbengine = 'couchdb'
    delete (tablename, query)
    drivers = ('couchdb',)
    insert (table, fields)
    select (query, fields, attributes)
    update (tablename, query, fields)
    uploads_in_blob = True
```

pydal.adapters.cubrid module

pydal.adapters.db2 module

```
class pydal.adapters.db2.DB2(*args, **kwargs)
    Bases: pydal.adapters.base.SQLAdapter
    dbengine = 'db2'
    execute (*args, **kwargs)
    lastrowid (table)
    rowslice (rows, minimum=0, maximum=None)
class pydal.adapters.db2.DB2IBM(*args, **kwargs)
    Bases: pydal.adapters.db2.DB2
    connector ()
    drivers = ('ibm_db_dbi',)
class pydal.adapters.db2.DB2Pyodbc(*args, **kwargs)
    Bases: pydal.adapters.db2.DB2
    connector ()
    drivers = ('pyodbc',)
```

pydal.adapters.firebird module

```
class pydal.adapters.firebird.FireBird(*args, **kwargs)
    Bases: pydal.adapters.base.SQLAdapter
    REGEX_URI = <_sre.SRE_Pattern object at 0x2a959e0>
```

```

    commit_on_alter_table = True
    connector ()
    create_sequence_and_triggers (query, table, **args)
    dbengine = 'firebird'
    drivers = ('kinterbasdb', 'firebirdsql', 'fdb', 'pyodbc')
    lastrowid (table)
    support_distributed_transaction = True
class pydal.adapters.firebird.FireBirdEmbedded (*args, **kwargs)
    Bases: pydal.adapters.firebird.FireBird
    REGEX_URI = <_sre.SRE_Pattern object at 0x2a6cd50>

```

pydal.adapters.google_adapters module

Adapter for GAE

pydal.adapters.imap module

pydal.adapters.informix module

```

class pydal.adapters.informix.Informix (*args, **kwargs)
    Bases: pydal.adapters.base.SQLAdapter
    after_connection ()
    connector ()
    dbengine = 'informix'
    drivers = ('informixdb',)
    execute (*args, **kwargs)
    lastrowid (table)
    test_connection ()
class pydal.adapters.informix.InformixSE (*args, **kwargs)
    Bases: pydal.adapters.informix.Informix
    rowslice (rows, minimum=0, maximum=None)

```

pydal.adapters.ingres module

```

class pydal.adapters.ingres.Ingres (*args, **kwargs)
    Bases: pydal.adapters.base.SQLAdapter
    connector ()
    create_sequence_and_triggers (query, table, **args)
    dbengine = 'ingres'
    drivers = ('pyodbc',)

```

```
class pydal.adapters.ingres.IngresUnicode(*args, **kwargs)
    Bases: pydal.adapters.ingres.Ingres
```

pydal.adapters.mongo module

```
class pydal.adapters.mongo.Binary
    Bases: object
```

```
class pydal.adapters.mongo.Expansion(adapter, crud, query, fields=(), tablename=None,
    groupby=None, distinct=False, having=None)
    Bases: object
```

Class to encapsulate a pydal expression and track the parse expansion and its results.

Two different MongoDB mechanisms are targeted here. If the query is sufficiently simple, then simple queries are generated. The bulk of the complexity here is however to support more complex queries that are targeted to the MongoDB Aggregation Pipeline.

This class supports four operations: 'count', 'select', 'update' and 'delete'.

Behavior varies somewhat for each operation type. However building each pipeline stage is shared where the behavior is the same (or similar) for the different operations.

In general an attempt is made to build the query without using the pipeline, and if that fails then the query is rebuilt with the pipeline.

QUERY constructed in `_build_pipeline_query()`: \$project : used to calculate expressions if needed \$match: filters out records

FIELDS constructed in `_expand_fields()`:

FIELDS:COUNT \$group : filter for distinct if needed \$group: count the records remaining

FIELDS:SELECT \$group : implement aggregations if needed \$project: implement expressions (etc) for select

FIELDS:UPDATE \$project: implement expressions (etc) for update

HAVING constructed in `_add_having()`: \$project : used to calculate expressions \$match: filters out records \$project : used to filter out previous expression fields

annotate_expression (*expression*)

dialect

get_collection (*safe=None*)

```
class pydal.adapters.mongo.Mongo(db, uri, pool_size=0, folder=None, db_codec='UTF-8', cre-
    dential_decoder=<function IDENTITY>, driver_args={},
    adapter_args={}, do_connect=True, after_connection=None)
    Bases: pydal.adapters.base.NoSQLAdapter
```

after_connection ()

bulk_insert (*table, items*)

check_notnull (*table, values*)

check_unique (*table, values*)

connector ()

count (*query, distinct=None, snapshot=True*)

dbengine = 'mongodb'

```

delete (tablename, query, safe=None)
drivers = ('pymongo',)
find_driver ()
insert (table, fields, safe=None)
    Safe determines whether a asynchronous request is done or a synchronous action is done For safety, we
    use by default synchronous requests
object_id (arg=None)
    Convert input to a valid Mongodb ObjectId instance
    self.object_id("<random>") -> ObjectId (not unique) instance
represent (obj, field_type)
select (query, fields, attributes, snapshot=False)
truncate (table, mode, safe=None)
update (tablename, query, fields, safe=None)
class pydal.adapters.mongo.MongoBlob
    Bases: pydal.adapters.mongo.Binary
MONGO_BLOB_BYTES = 0
MONGO_BLOB_NON_UTF8_STR = 1
static decode (value)

```

pydal.adapters.mssql module

```

class pydal.adapters.mssql.MSSQL (db, uri, pool_size=0, folder=None, db_codec='UTF-8', cre-
    credential_decoder=<function IDENTITY>, driver_args={},
    adapter_args={}, do_connect=True, srid=4326, af-
    ter_connection=None)
    Bases: pydal.adapters.base.SQLAdapter
REGEX_ARGPATTERN = <_sre.SRE_Pattern object>
REGEX_DSN = <_sre.SRE_Pattern object>
REGEX_URI = <_sre.SRE_Pattern object at 0x2a68820>
connector ()
dbengine = 'mssql'
drivers = ('pyodbc',)
lastrowid (table)
class pydal.adapters.mssql.MSSQL1 (db, uri, pool_size=0, folder=None, db_codec='UTF-8', cre-
    credential_decoder=<function IDENTITY>, driver_args={},
    adapter_args={}, do_connect=True, srid=4326, af-
    ter_connection=None)
    Bases: pydal.adapters.mssql.MSSQL, pydal.adapters.mssql.Slicer
class pydal.adapters.mssql.MSSQLLN (db, uri, pool_size=0, folder=None, db_codec='UTF-8',
    credential_decoder=<function IDENTITY>, driver_args={},
    adapter_args={}, do_connect=True, srid=4326, af-
    ter_connection=None)
    Bases: pydal.adapters.mssql.MSSQLLN, pydal.adapters.mssql.Slicer

```

```
class pydal.adapters.mssql.MSSQL3 (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQL`

```
class pydal.adapters.mssql.MSSQL3N (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQLN`

```
class pydal.adapters.mssql.MSSQL4 (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQL`

```
class pydal.adapters.mssql.MSSQL4N (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQLN`

```
class pydal.adapters.mssql.MSSQLN (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQL`

execute (*args, **kwargs)

represent (obj, field_type)

```
class pydal.adapters.mssql.Slicer
```

Bases: object

rowslice (rows, minimum=0, maximum=None)

```
class pydal.adapters.mssql.Sybase (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQL1`

connector ()

dbengine = 'sybase'

```
class pydal.adapters.mssql.Vertica (db, uri, pool_size=0, folder=None, db_codec='UTF-8', credential_decoder=<function IDENTITY>, driver_args={}, adapter_args={}, do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.mssql.MSSQL1`

lastrowid (table)

pydal.adapters.mysql module

```
class pydal.adapters.mysql.Cubrid (*args, **kwargs)
```

Bases: `pydal.adapters.mysql.MySQL`

```

    dbengine = 'cubrid'
    drivers = ('cubridb',)
class pydal.adapters.mysql.MySQL(*args, **kwargs)
    Bases: pydal.adapters.base.SQLAdapter
    REGEX_URI = <_sre.SRE_Pattern object at 0x2a7af80>
    after_connection()
    commit_on_alter_table = True
    commit_prepared(*args, **kwargs)
    connector()
    dbengine = 'mysql'
    distributed_transaction_begin(key)
    drivers = ('MySQLdb', 'pymysql', 'mysqlconnector')
    prepare(*args, **kwargs)
    rollback_prepared(*args, **kwargs)
    support_distributed_transaction = True

```

pydal.adapters.oracle module

```

class pydal.adapters.oracle.Oracle(*args, **kwargs)
    Bases: pydal.adapters.base.SQLAdapter
    after_connection()
    cmd_fix = <_sre.SRE_Pattern object>
    connector()
    create_sequence_and_triggers(query, table, **args)
    dbengine = 'oracle'
    drivers = ('cx_Oracle',)
    execute(*args, **kwargs)
    fetchall()
    insert(table, fields)
    lastrowid(table)
    sqlsafe_table(tablename, original_tablename=None)
    test_connection()

```

pydal.adapters.postgres module

```
class pydal.adapters.postgres.JDBCPostgre (db, uri, pool_size=0, folder=None,
      db_codec='UTF-8', credential_decoder=<function IDENTITY>,
      driver_args={}, adapter_args={},
      do_connect=True, srid=4326, after_connection=None)
```

Bases: *pydal.adapters.postgres.Postgre*

REGEX_URI = <_sre.SRE_Pattern object at 0x2a80f40>

after_connection ()

connector ()

drivers = ('zxJDBC',)

```
class pydal.adapters.postgres.Postgre (db, uri, pool_size=0, folder=None, db_codec='UTF-8',
      credential_decoder=<function IDENTITY>,
      driver_args={}, adapter_args={}, do_connect=True,
      srid=4326, after_connection=None)
```

Bases: *pydal.adapters.base.SQLAdapter*

REGEX_URI = <_sre.SRE_Pattern object at 0x2a82f30>

after_connection ()

commit_prepared (*args, **kwargs)

connector ()

dbengine = 'postgres'

drivers = ('psycpg2', 'pg8000')

lastrowid (table=None)

prepare (*args, **kwargs)

rollback_prepared (*args, **kwargs)

support_distributed_transaction = True

```
class pydal.adapters.postgres.PostgreBoolean (db, uri, pool_size=0, folder=None,
      db_codec='UTF-8', credential_decoder=<function IDENTITY>,
      driver_args={}, adapter_args={},
      do_connect=True, srid=4326, after_connection=None)
```

Bases: *pydal.adapters.postgres.PostgreNew*

```
class pydal.adapters.postgres.PostgreMeta
```

Bases: *pydal.adapters.AdapterMeta*

```
class pydal.adapters.postgres.PostgreNew (db, uri, pool_size=0, folder=None, db_codec='UTF-8',
      credential_decoder=<function IDENTITY>,
      driver_args={}, adapter_args={},
      do_connect=True, srid=4326, after_connection=None)
```

Bases: *pydal.adapters.postgres.Postgre*


```
class pydal.adapters.postgres.PostgrePG8000(db, uri, pool_size=0, folder=None,
                                             db_codec='UTF-8', credential_decoder=<function IDENTITY>,
                                             driver_args={}, adapter_args={},
                                             do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.postgres.Postgre`

adapt (*obj*)

drivers = ('pg8000',)

execute (*args, **kwargs)

```
class pydal.adapters.postgres.PostgrePG8000Boolean(db, uri, pool_size=0, folder=None,
                                                    db_codec='UTF-8', credential_decoder=<function IDENTITY>,
                                                    driver_args={}, adapter_args={},
                                                    do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.postgres.PostgrePG8000New`

```
class pydal.adapters.postgres.PostgrePG8000New(db, uri, pool_size=0, folder=None,
                                                db_codec='UTF-8', credential_decoder=<function IDENTITY>,
                                                driver_args={}, adapter_args={},
                                                do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.postgres.PostgrePG8000`

```
class pydal.adapters.postgres.PostgrePsyco(db, uri, pool_size=0, folder=None,
                                             db_codec='UTF-8', credential_decoder=<function IDENTITY>,
                                             driver_args={}, adapter_args={},
                                             do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.postgres.Postgre`

adapt (*obj*)

drivers = ('psycopg2',)

```
class pydal.adapters.postgres.PostgrePsycoBoolean(db, uri, pool_size=0, folder=None,
                                                    db_codec='UTF-8', credential_decoder=<function IDENTITY>,
                                                    driver_args={}, adapter_args={},
                                                    do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.postgres.PostgrePsycoNew`

```
class pydal.adapters.postgres.PostgrePsycoNew(db, uri, pool_size=0, folder=None,
                                                db_codec='UTF-8', credential_decoder=<function IDENTITY>,
                                                driver_args={}, adapter_args={},
                                                do_connect=True, srid=4326, after_connection=None)
```

Bases: `pydal.adapters.postgres.PostgrePsyco`

pydal.adapters.sapdb module

pydal.adapters.sqlite module

```
class pydal.adapters.sqlite.JDBCSQLite(*args, **kwargs)
    Bases: pydal.adapters.sqlite.SQLite
```

```
    after_connection()
```

```
    connector()
```

```
    drivers = ('zxJDBC_sqlite',)
```

```
class pydal.adapters.sqlite.SQLite(*args, **kwargs)
    Bases: pydal.adapters.base.SQLiteAdapter
```

```
    after_connection()
```

```
    connector()
```

```
    dbengine = 'sqlite'
```

```
    delete (tablename, query)
```

```
    drivers = ('sqlite2', 'sqlite3')
```

```
    select (query, fields, attributes)
```

```
    static web2py_extract (lookup, s)
```

```
    static web2py_regexp (expression, item)
```

```
class pydal.adapters.sqlite.Spatialite(*args, **kwargs)
    Bases: pydal.adapters.sqlite.SQLite
```

```
    SPATIALLIBS = {'Windows': 'mod_spatialite.dll', 'Darwin': 'libspatialite.dylib', 'Linux': 'libspatialite.so'}
```

```
    after_connections()
```

```
    dbengine = 'spatialite'
```

pydal.adapters.teradata module

```
class pydal.adapters.teradata.Teradata(*args, **kwargs)
    Bases: pydal.adapters.base.SQLiteAdapter
```

```
    close()
```

```
    connector()
```

```
    dbengine = ''
```

```
    drivers = ('pyodbc',)
```

```
    lastrowid (table)
```

Module contents

```
class pydal.adapters.AdapterMeta
```

```
    Bases: type
```

```
    Metaclass to support manipulation of adapter classes.
```

```
    At the moment is used to intercept entity_quoting argument passed to DAL.
```

```

class pydal.adapters.Adapters (namespace=None)
    Bases: pydal.helpers._internals.Dispatcher

    get_for (uri)

    register_for (*uris)

pydal.adapters.with_connection (f)
pydal.adapters.with_connection_or_raise (f)

```

1.1.2 pydal.helpers package

Submodules

pydal.helpers.classes module

```

class pydal.helpers.classes.BasicStorage (*args, **kwargs)
    Bases: object

    clear (*args, **kwargs)

    copy (*args, **kwargs)

    get (key, default=None)

    has_key (key)

    items ()

    iteritems ()

    iterkeys ()

    itervalues ()

    keys ()

    pop (*args, **kwargs)

    update (*args, **kwargs)

    values ()

class pydal.helpers.classes.DatabaseStoredFile (db, filename, mode)

    close ()

    close_connection ()

    escape (obj)

    static exists (db, filename)

    static is_operational_error (db, error)

    static is_programming_error (db, error)

    read (bytes=None)

    readline ()

    static try_create_web2py_filesystem (db)

    web2py_filesystems = set([])

```

write (*data*)

class `pydal.helpers.classes.ExecutionHandler` (*adapter*)
Bases: `object`

after_execute (*command*)

before_execute (*command*)

class `pydal.helpers.classes.FakeCursor`
Bases: `object`

The Python Database API Specification has a `cursor()` method, which NoSql drivers generally don't support. If the exception in this function is taken then it likely means that some piece of functionality has not yet been implemented in the driver. And something is using the cursor.

<https://www.python.org/dev/peps/pep-0249/>

warn_bad_usage (*attr*)

class `pydal.helpers.classes.FakeDriver` (**args, **kwargs*)
Bases: `pydal.helpers.classes.BasicStorage`

close ()

commit ()

cursor ()

class `pydal.helpers.classes.MethodAdder` (*table*)
Bases: `object`

register (*method_name=None*)

class `pydal.helpers.classes.NullCursor`
Bases: `pydal.helpers.classes.FakeCursor`

lastrowid = 1

class `pydal.helpers.classes.NullDriver` (**args, **kwargs*)
Bases: `pydal.helpers.classes.FakeDriver`

class `pydal.helpers.classes.RecordDeleter` (*colset, table, id*)
Bases: `pydal.helpers.classes.RecordOperator`

class `pydal.helpers.classes.RecordOperator` (*colset, table, id*)
Bases: `object`

class `pydal.helpers.classes.RecordUpdater` (*colset, table, id*)
Bases: `pydal.helpers.classes.RecordOperator`

class `pydal.helpers.classes.Reference`
Bases: `long`

get (*key, default=None*)

`pydal.helpers.classes.Reference_pickler` (*data*)

`pydal.helpers.classes.Reference_unpickler` (*data*)

class `pydal.helpers.classes.SQLALL` (*table*)
Bases: `object`

Helper class providing a comma-separated string having all the field names (prefixed by table name and '.') normally only called from within `gluon.dal`

```
class pydal.helpers.classes.SQLCallableList
```

```
Bases: list
```

```
class pydal.helpers.classes.SQLCustomType (type='string', native=None, encoder=None, decoder=None, validator=None, _class=None, widget=None, represent=None)
```

```
Bases: object
```

```
Allows defining of custom SQL types
```

Parameters

- **type** – the web2py type (default = 'string')
- **native** – the backend type
- **encoder** – how to encode the value to store it in the backend
- **decoder** – how to decode the value retrieved from the backend
- **validator** – what validators to use (default = None, will use the default validator for type)

Example:: Define as:

```
decimal = SQLCustomType( type = 'double', native = 'integer', encoder =(lambda x:
    int(float(x) * 100)), decoder = (lambda x: Decimal("0.00") + Decimal(str(float(x)/100)) )
)
```

```
db.define_table( 'example', Field('value', type=decimal) )
```

```
endswith (text=None)
```

```
startswith (text=None)
```

```
class pydal.helpers.classes.Serializable
```

```
Bases: object
```

```
as_dict (flat=False, sanitize=True)
```

```
as_json (sanitize=True)
```

```
as_xml (sanitize=True)
```

```
as_yaml (sanitize=True)
```

```
class pydal.helpers.classes.TimingHandler (adapter)
```

```
Bases: pydal.helpers.classes.ExecutionHandler
```

```
MAXSTORAGE = 100
```

```
after_execute (command)
```

```
before_execute (command)
```

```
timings
```

```
pydal.helpers.classes.pickle_basicstorage (s)
```

pydal.helpers.methods module

```
pydal.helpers.methods.archive_record (qset, fs, archive_table, current_record)
```

```
pydal.helpers.methods.auto_represent (field)
```

```
pydal.helpers.methods.auto_validators (field)
pydal.helpers.methods.bar_decode_integer (value)
pydal.helpers.methods.bar_decode_string (value)
pydal.helpers.methods.bar_encode (items)
pydal.helpers.methods.bar_escape (item)
pydal.helpers.methods.cleanup (text)
    Validates that the given text is clean: only contains [0-9a-zA-Z_]
pydal.helpers.methods.geoLine (*line)
pydal.helpers.methods.geoPoint (x, y)
pydal.helpers.methods.geoPolygon (*line)
pydal.helpers.methods.hide_password (uri)
pydal.helpers.methods.int2uuid (n)
pydal.helpers.methods.list_represent (values, row=None)
pydal.helpers.methods.pluralize (singular, rules=[(<_sre.SRE_Pattern object at
0x7f2b77369e00>, <_sre.SRE_Pattern object at
0x7f2b77369e00>, 'children'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b772993a0>, <_sre.SRE_Pattern object
at 0x7f2b772993a0>, 'et'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b7733e6f0>, <_sre.SRE_Pattern object
at 0x7f2b7733e6f0>, 'eth'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b7733e7b0>, <_sre.SRE_Pattern object at
0x7f2b77369ed0>, '\Naves'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b77299450>, <_sre.SRE_Pattern object
at 0x7f2b77299450>, 'ses'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b77299500>, <_sre.SRE_Pattern object
at 0x7f2b77299500>, 'men'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b772995b0>, <_sre.SRE_Pattern object
at 0x7f2b772995b0>, 'ives'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b77299660>, <_sre.SRE_Pattern object
at 0x7f2b77299660>, 'eaux'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b772e0ad0>, <_sre.SRE_Pattern object
at 0x7f2b772e0ad0>, 'lves'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b7723b030>, <_sre.SRE_Pattern object
at 0x7f2b785268b8>, 'es'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b77308490>, <_sre.SRE_Pattern object
at 0x7f2b785268b8>, 'es'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b773536f8>, <_sre.SRE_Pattern object
at 0x7f2b772241e0>, 'ies'), (<_sre.SRE_Pattern ob-
ject at 0x7f2b785268b8>, <_sre.SRE_Pattern object at
0x7f2b785268b8>, 's')]])
pydal.helpers.methods.smart_query (fields, text)
pydal.helpers.methods.use_common_filters (query)
pydal.helpers.methods.uuid2int (uuidv)
pydal.helpers.methods.varquote_aux (name, quotestr='%s')
pydal.helpers.methods.xorify (orderby)
```

pydal.helpers.regex module

Module contents

1.2 Submodules

1.3 pydal.base module

This file is part of the web2py Web Framework
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This file contains the DAL support for many relational databases, including:

- SQLite & SpatiaLite
- MySQL
- Postgres
- Firebird
- Oracle
- MS SQL
- DB2
- Interbase
- Ingres
- Informix (9+ and SE)
- SapDB (experimental)
- Cubrid (experimental)
- CouchDB (experimental)
- MongoDB (in progress)
- Google:nosql
- Google:sql
- Teradata
- IMAP (experimental)

Example of usage:

```
>>> # from dal import DAL, Field

### create DAL connection (and create DB if it doesn't exist)
>>> db = DAL(('sqlite://storage.sqlite', 'mysql://a:b@localhost/x'),
... folder=None)

### define a table 'person' (create/alter as necessary)
>>> person = db.define_table('person', Field('name', 'string'))
```

```
### insert a record
>>> id = person.insert(name='James')

### retrieve it by id
>>> james = person(id)

### retrieve it by name
>>> james = person(name='James')

### retrieve it by arbitrary query
>>> query = (person.name=='James') & (person.name.startswith('J'))
>>> james = db(query).select(person.ALL)[0]

### update one record
>>> james.update_record(name='Jim')
<Row {'id': 1, 'name': 'Jim'}>

### update multiple records by query
>>> db(person.name.like('J%')).update(name='James')
1

### delete records by query
>>> db(person.name.lower() == 'jim').delete()
0

### retrieve multiple records (rows)
>>> people = db(person).select(orderby=person.name,
... groupby=person.name, limitby=(0,100))

### further filter them
>>> james = people.find(lambda row: row.name == 'James').first()
>>> print james.id, james.name
1 James

### check aggregates
>>> counter = person.id.count()
>>> print db(person).select(counter).first() (counter)
1

### delete one record
>>> james.delete_record()
1

### delete (drop) entire database table
>>> person.drop()
```

Supported DAL URI strings:

```
'sqlite://test.db'
'spatialite://test.db'
'sqlite:memory'
'spatialite:memory'
'jdbc:sqlite://test.db'
'mysql://root:none@localhost/test'
'postgres://mdipierro:password@localhost/test'
'postgres:psycopg2://mdipierro:password@localhost/test'
'postgres:pg8000://mdipierro:password@localhost/test'
'jdbc:postgres://mdipierro:none@localhost/test'
```



```
'mssql://web2py:none@A64X2/web2py_test'
'mssql2://web2py:none@A64X2/web2py_test' # alternate mappings
'mssql3://web2py:none@A64X2/web2py_test' # better pagination (requires >= 2005)
'mssql4://web2py:none@A64X2/web2py_test' # best pagination (requires >= 2012)
'oracle://username:password@database'
'firebird://user:password@server:3050/database'
'db2:ibm_db_dbi://DSN=dsn;UID=user;PWD=pass'
'db2:pyodbc://driver=DB2;hostname=host;database=database;uid=user;pwd=password;port=port'
'firebird://username:password@hostname/database'
'firebird_embedded://username:password@c://path'
'informix://user:password@server:3050/database'
'informixu://user:password@server:3050/database' # unicode informix
'ingres://database' # or use an ODBC connection string, e.g. 'ingres://dsn=dsn_name'
'google:datastore' # for google app engine datastore (uses ndb by default)
'google:sql' # for google app engine with sql (mysql compatible)
'teradata://DSN=dsn;UID=user;PWD=pass; DATABASE=database' # experimental
'imap://user:password@server:port' # experimental
'mongodb://user:password@server:port/database' # experimental
```

For more info:

```
help(DAL)
help(Field)
```

```
class pydal.base.DAL(uri='sqlite://dummy.db', pool_size=0, folder=None, db_codec='UTF-8',
                    check_reserved=None, migrate=True, fake_migrate=False, migrate_enabled=True,
                    fake_migrate_all=False, decode_credentials=False, driver_args=None,
                    adapter_args=None, attempts=5, auto_import=False, bigint_id=False,
                    debug=False, lazy_tables=False, db_uid=None, do_connect=True,
                    after_connection=None, tables=None, ignore_field_case=True,
                    entity_quoting=True, table_hash=None)
```

Bases: `pydal.helpers.classes.Serializable`, `pydal.helpers.classes.BasicStorage`

An instance of this class represents a database connection

Parameters

- **uri** (*str*) – contains information for connecting to a database. Defaults to `'sqlite://dummy.db'`

Note: experimental: you can specify a dictionary as uri parameter i.e. with:

```
db = DAL({"uri": "sqlite://storage.sqlite",
         "tables": {...}, ...})
```

for an example of dict input you can check the output of the scaffolding db model with

```
db.as_dict()
```

Note that for compatibility with Python older than version 2.6.5 you should cast your dict input keys to str due to a syntax limitation on kwargs names. for proper DAL dictionary input you can use one of:

```
obj = serializers.cast_keys(dict, [encoding="utf-8"])
#or else (for parsing json input)
obj = serializers.loads_json(data, unicode_keys=False)
```

- **pool_size** – How many open connections to make to the database object.

- **folder** – where .table files will be created. Automatically set within web2py. Use an explicit path when using DAL outside web2py
- **db_codec** – string encoding of the database (default: ‘UTF-8’)
- **table_hash** – database identifier with .tables. If your connection hash change you can still using old .tables if they have db_hash as prefix
- **check_reserved** – list of adapters to check tablename and column names against sql/nosql reserved keywords. Defaults to *None*
 - ‘common’ List of sql keywords that are common to all database types such as “SELECT, INSERT”. (recommended)
 - ‘all’ Checks against all known SQL keywords
 - ‘<adaptername>’ Checks against the specific adapters list of keywords
 - ‘<adaptername>_nonreserved’ Checks against the specific adapters list of nonreserved keywords. (if available)
- **migrate** – sets default migrate behavior for all tables
- **fake_migrate** – sets default fake_migrate behavior for all tables
- **migrate_enabled** – If set to False disables ALL migrations
- **fake_migrate_all** – If set to True fake migrates ALL tables
- **attempts** – Number of times to attempt connecting
- **auto_import** – If set to True, tries import automatically table definitions from the databases folder (works only for simple models)
- **bigint_id** – If set, turn on bigint instead of int for id and reference fields
- **lazy_tables** – delays table definition until table access
- **after_connection** – can a callable that will be executed after the connection

Example

Use as:

```
db = DAL('sqlite://test.db')
```

or:

```
db = DAL(**{"uri": ..., "tables": [...]...}) # experimental

db.define_table('tablename', Field('fieldname1'),
                Field('fieldname2'))
```

class Row (*args, **kwargs)

Bases: [pydal.helpers.classes.BasicStorage](#)

A dictionary that lets you do d['a'] as well as d.a this is only used to store a *Row*

as_dict (datetime_to_str=False, custom_types=None)

as_json (mode='object', default=None, colnames=None, serialize=True, **kwargs)

serializes the row to a JSON object kwargs are passed to .as_dict method only “object” mode supported

serialize = False used by Rows.as_json

TODO: return array mode with query column order

mode and colnames are not implemented

as_xml (*row_name='row', colnames=None, indent=' '*)

get (*key, default=None*)

class DAL.Rows (*db=None, records=[], colnames=[], compact=True, rawrows=None*)

Bases: *pydal.objects.BasicRows*

A wrapper for the return value of a select. It basically represents a table. It has an iterator and each row is represented as a *Row* dictionary.

append (*row*)

column (*column=None*)

exclude (*f*)

Removes elements from the calling Rows object, filtered by the function *f*, and returns a new Rows object containing the removed elements

find (*f, limitby=None*)

Returns a new Rows object, a subset of the original object, filtered by the function *f*

first ()

group_by_value (**fields, **args*)

Regroups the rows, by one of the fields

insert (*position, row*)

last ()

render (*i=None, fields=None*)

Takes an index and returns a copy of the indexed row with values transformed via the “represent” attributes of the associated fields.

Parameters

- **i** – index. If not specified, a generator is returned for iteration over all the rows.
- **fields** – a list of fields to transform (if None, all fields with “represent” attributes will be transformed)

setvirtualfields (***keyed_virtualfields*)

For reference:

```
db.define_table('x', Field('number', 'integer'))
if db(db.x).isempty(): [db.x.insert(number=i) for i in range(10)]

from gluon.dal import lazy_virtualfield

class MyVirtualFields(object):
    # normal virtual field (backward compatible, discouraged)
    def normal_shift(self): return self.x.number+1
    # lazy virtual field (because of @staticmethod)
    @lazy_virtualfield
    def lazy_shift(instance, row, delta=4): return row.x.number+delta
db.x.virtualfields.append(MyVirtualFields())

for row in db(db.x).select():
    print row.number, row.normal_shift, row.lazy_shift(delta=7)
```

sort (*f*, *reverse=False*)

Returns a list of sorted elements (not sorted in place)

class DAL.**Table** (*db*, *tablename*, **fields*, ***args*)

Bases: *pydal.helpers.classes.Serializable*, *pydal.helpers.classes.BasicStorage*

Represents a database table

Example::

You can create a table as:: `db = DAL(...)` `db.define_table('users', Field('name'))`

And then:

```
db.users.insert(name='me') # print db.users._insert(...) to see SQL
db.users.drop()
```

as_dict (*flat=False*, *sanitize=True*)

bulk_insert (*items*)

here items is a list of dictionaries

create_index (*name*, **fields*, ***kwargs*)

drop (*mode=''*)

drop_index (*name*)

fields

import_from_csv_file (*csvfile*, *id_map=None*, *null='<NULL>'*, *unique='uuid'*,
id_offset=None, *transform=None*, **args*, ***kwargs*)

Import records from csv file. Column headers must have same names as table fields. Field 'id' is ignored. If column names read 'table.file' the 'table.' prefix is ignored.

- 'unique' argument is a field which must be unique (typically a uuid field)
- 'restore' argument is default False; if set True will remove old values in table first.
- 'id_map' if set to None will not map ids

The import will keep the id numbers in the restored table. This assumes that there is an field of type id that is integer and in incrementing order. Will keep the id numbers in restored table.

insert (***fields*)

on (*query*)

sqlsafe

sqlsafe_alias

truncate (*mode=''*)

update (**args*, ***kwargs*)

update_or_insert (*_key=<function <lambda>>*, ***values*)

validate_and_insert (***fields*)

validate_and_update (*_key=<function <lambda>>*, ***fields*)

validate_and_update_or_insert (*_key=<function <lambda>>*, ***fields*)

with_alias (*alias*)

DAL.**as_dict** (*flat=False*, *sanitize=True*)

DAL.**can_join** ()

`DAL.check_reserved_keyword` (*name*)
Validates *name* against SQL keywords Uses `self.check_reserve` which is a list of operators to use.

`DAL.close` ()

`DAL.commit` ()

`DAL.define_table` (*tablename*, **fields*, ***args*)

static `DAL.distributed_transaction_begin` (**instances*)

static `DAL.distributed_transaction_commit` (**instances*)

`DAL.executesql` (*query*, *placeholders=None*, *as_dict=False*, *fields=None*, *colnames=None*, *as_ordered_dict=False*)
Executes an arbitrary query

Parameters

- **query** (*str*) – the query to submit to the backend
- **placeholders** – is optional and will always be None. If using raw SQL with placeholders, placeholders may be a sequence of values to be substituted in or, (if supported by the DB driver), a dictionary with keys matching named placeholders in your SQL.
- **as_dict** – will always be None when using DAL. If using raw SQL can be set to True and the results cursor returned by the DB driver will be converted to a sequence of dictionaries keyed with the db field names. Results returned with `as_dict=True` are the same as those returned when applying `.to_list()` to a DAL query. If `“as_ordered_dict”=True` the behaviour is the same as when `“as_dict”=True` with the keys (field names) guaranteed to be in the same order as returned by the select name executed on the database.
- **fields** – list of DAL Fields that match the fields returned from the DB. The Field objects should be part of one or more Table objects defined on the DAL object. The “fields” list can include one or more DAL Table objects in addition to or instead of including Field objects, or it can be just a single table (not in a list). In that case, the Field objects will be extracted from the table(s).

Note: if either *fields* or *colnames* is provided, the results will be converted to a DAL *Rows* object using the `db._adapter.parse()` method

- **colnames** – list of field names in `tablename.fieldname` format

Note: It is also possible to specify both “fields” and the associated “colnames”. In that case, “fields” can also include DAL Expression objects in addition to Field objects. For Field objects in “fields”, the associated “colnames” must still be in `tablename.fieldname` format. For Expression objects in “fields”, the associated “colnames” can be any arbitrary labels.

DAL Table objects referred to by “fields” or “colnames” can be dummy tables and do not have to represent any real tables in the database. Also, note that the “fields” and “colnames” must be in the same order as the fields in the results cursor returned from the DB.

`DAL.execution_handlers` = [`<class ‘pydal.helpers.classes.TimingHandler’>`]

`DAL.export_to_csv_file` (*ofile*, **args*, ***kwargs*)

static `DAL.get_instances` ()
Returns a dictionary with uri as key with timings and defined tables:

```
{'sqlite://storage.sqlite': {
    'dbstats': [(select auth_user.email from auth_user, 0.02009)],
    'dbtables': {
        'defined': ['auth_cas', 'auth_event', 'auth_group',
                    'auth_membership', 'auth_permission', 'auth_user'],
        'lazy': '[]'
    }
}
```

DAL.has_representer (*name*)

DAL.import_from_csv_file (*ifile*, *id_map=None*, *null='<NULL>'*, *unique='uuid'*,
map_tablenames=None, *ignore_missing_tables=False*, **args*,
***kwargs*)

DAL.import_table_definitions (*path*, *migrate=False*, *fake_migrate=False*, *tables=None*)

DAL.lazy_define_table (*tablename*, **fields*, ***args*)

DAL.logger = <logging.Logger object>

DAL.parse_as_rest (*patterns*, *args*, *vars*, *queries=None*, *nested_select=True*)

DAL.record_operators = {'update_record': <class 'pydal.helpers.classes.RecordUpdater'>, 'delete_record': <class 'pydal.helpers.classes.RecordUpdater'>}

DAL.represent (*name*, **args*, ***kwargs*)

DAL.representers = {}

DAL.rollback ()

DAL.serializers = None

static DAL.set_folder (*folder*)

DAL.smart_query (*fields*, *text*)

DAL.tables

DAL.uuid (*x*)

DAL.validators = None

DAL.validators_method = None

DAL.where (*query=None*, *ignore_common_filters=None*)

pydal.base.DAL_pickler (*db*)

pydal.base.DAL_unpickler (*db_uid*)

class pydal.base.MetaDAL

Bases: type

1.4 pydal.connection module

class pydal.connection.ConnectionPool

Bases: object

POOLS = {}

after_connection ()

after_connection_hook ()
Hook for the after_connection parameter

check_active_connection = True

close (action='commit', really=True)

static close_all_instances (action)
to close cleanly databases in a multithreaded environment

close_cursor (cursor)

connection

cursor

cursors

lock_cursor (cursor)

reconnect ()
Defines: *self.connection* and *self.cursor* if *self.pool_size>0* it will try pull the connection from the pool if the connection is not active (closed by db server) it will loop if not *self.pool_size* or no active connections in pool makes a new one

release_cursor (cursor)

static set_folder (folder)

1.5 pydal.objects module

class pydal.objects.**BasicRows**

Bases: object

Abstract class for Rows and IterRows

as_csv ()
Serializes the table into a csv file

as_dict (key='id', compact=True, storage_to_dict=True, datetime_to_str=False, custom_types=None)
Returns the data as a dictionary of dictionaries (storage_to_dict=True) or records (False)

Parameters

- **key** – the name of the field to be used as dict key, normally the id
- **compact** – ? (default True)
- **storage_to_dict** – when True returns a dict, otherwise a list (default True)
- **datetime_to_str** – convert datetime fields as strings (default False)

as_json (mode='object', default=None)
Serializes the rows to a JSON list or object with objects mode='object' is not implemented (should return a nested object structure)

as_list (compact=True, storage_to_dict=True, datetime_to_str=False, custom_types=None)
Returns the data as a list or dictionary.

Parameters

- **storage_to_dict** – when True returns a dict, otherwise a list

- **datetime_to_str** – convert datetime fields as strings

as_trees (*parent_name='parent_id', children_name='children', render=False*)
 returns the data as list of trees.

Parameters

- **parent_name** – the name of the field holding the reference to the parent (default parent_id).
- **children_name** – the name where the children of each row will be stored as a list (default children).
- **render** – whether we will render the fields using their represent (default False) can be a list of fields to render or True to render all.

as_xml (*row_name='row', rows_name='rows'*)

export_to_csv_file (*ofile, null='<NULL>', *args, **kwargs*)
 Exports data to csv, the first line contains the column names

Parameters

- **ofile** – where the csv must be exported to
- **null** – how null values must be represented (default '<NULL>')
- **delimiter** – delimiter to separate values (default ',')
- **quotechar** – character to use to quote string values (default '"')
- **quoting** – quote system, use csv.QUOTE_*** (default csv.QUOTE_MINIMAL)
- **represent** – use the fields .represent value (default False)
- **colnames** – list of column names to use (default self.colnames)

This will only work when exporting rows objects!!!! DO NOT use this with db.export_to_csv()

json (*mode='object', default=None*)

Serializes the rows to a JSON list or object with objects mode='object' is not implemented (should return a nested object structure)

xml (*strict=False, row_name='row', rows_name='rows'*)

Serializes the table using sqlhtml.SQTABLE (if present)

class pydal.objects.**Expression** (*db, op, first=None, second=None, type=None, **optional_args*)

Bases: object

abs ()

avg ()

belongs (**value, **kwattr*)

Accepts the following inputs:

```

field.belongs(1, 2)
field.belongs((1, 2))
field.belongs(query)
```

Does NOT accept:

field.belongs(1)

If the set you want back includes *None* values, you can do:


```
field.belongs((1, None), null=True)
```

```
coalesce (*others)
coalesce_zero ()
contains (value, all=False, case_sensitive=False)
    For GAE contains() is always case sensitive
day ()
endswith (value)
epoch ()
hour ()
ilike (value, escape=None)
len ()
like (value, case_sensitive=True, escape=None)
lower ()
max ()
min ()
minutes ()
month ()
regexp (value)
replace (a, b)
seconds ()
st_asgeojson (precision=15, options=0, version=1)
st_astext ()
st_contains (value)
st_distance (other)
st_dwithin (value, distance)
st_equals (value)
st_intersects (value)
st_overlaps (value)
st_simplify (value)
st_simplifypreservetopology (value)
st_touches (value)
st_within (value)
st_x ()
st_y ()
startswith (value)
sum ()
```

upper ()

with_alias (*alias*)

year ()

```
class pydal.objects.Field(fieldname, type='string', length=None, default=<function <lambda>>,
                          required=False, requires=<function <lambda>>, ondelete='CASCADE',
                          notnull=False, unique=False, uploadfield=True, widget=None, label=None,
                          comment=None, writable=True, readable=True, update=None,
                          authorize=None, autodelete=False, represent=None,
                          uploadfolder=None, uploadseparate=False, uploadfs=None,
                          compute=None, custom_store=None, custom_retrieve=None,
                          custom_retrieve_file_properties=None, custom_delete=None,
                          filter_in=None, filter_out=None, custom_qualifier=None,
                          map_none=None, rname=None)
```

Bases: `pydal.objects.Expression`, `pydal.helpers.classes.Serializable`

Lazy

Represents a database field

Example

Usage:

```
a = Field(name, 'string', length=32, default=None, required=False,
          requires=IS_NOT_EMPTY(), ondelete='CASCADE',
          notnull=False, unique=False,
          uploadfield=True, widget=None, label=None, comment=None,
          uploadfield=True, # True means store on disk,
                           # 'a_field_name' means store in this field in db
                           # False means file content will be discarded.
          writable=True, readable=True, update=None, authorize=None,
          autodelete=False, represent=None, uploadfolder=None,
          uploadseparate=False # upload to separate directories by uuid_keys
                               # first 2 character and tablename.fieldname
                               # False - old behavior
                               # True - put uploaded file in
                               # <uploaddir>/<tablename>.<fieldname>/uuid_key[:2]
                               #     directory)
          uploadfs=None      # a pyfilesystem where to store upload
          )
```

to be used as argument of `DAL.define_table`

alias of `FieldMethod`

Method

alias of `FieldMethod`

Virtual

alias of `FieldVirtual`

as_dict (*flat*=False, *sanitize*=True)

clone (*point_self_references_to*=False, ***args*)

count (*distinct*=None)

formatter (*value*)

```

retrieve (name, path=None, nameonly=False)
    If nameonly==True return (filename, fullfilename) instead of (filename, stream)

retrieve_file_properties (name, path=None)

set_attributes (*args, **attributes)

sqlsafe

sqlsafe_name

store (file, filename=None, path=None)

validate (value)

class pydal.objects.FieldMethod (name, f=None, handler=None)
    Bases: object

class pydal.objects.FieldVirtual (name, f=None, ftype='string', label=None, table_name=None)
    Bases: object

class pydal.objects.IterRows (db, sql, fields, colnames, blob_decode, cacheable)
    Bases: pydal.objects.BasicRows

    first ()

    next ()

class pydal.objects.LazyReferenceGetter (table, id)
    Bases: object

class pydal.objects.LazySet (field, id)
    Bases: object

    count (distinct=None, cache=None)

    delete ()

    delete_uploaded_files (upload_fields=None)

    isempty ()

    nested_select (*fields, **attributes)

    select (*fields, **attributes)

    update (**update_fields)

    update_naive (**update_fields)

    validate_and_update (**update_fields)

    where (query, ignore_common_filters=False)

class pydal.objects.Query (db, op, first=None, second=None, ignore_common_filters=False, **optional_args)
    Bases: pydal.helpers.classes.Serializable

    Necessary to define a set. It can be stored or can be passed to DAL.__call__() to obtain a Set

```

Example

Use as:

```
query = db.users.name=='Max'  
set = db(query)  
records = set.select()
```

as_dict (*flat=False, sanitize=True*)
Experimental stuff

This allows to return a plain dictionary with the basic query representation. Can be used with json/xml services for client-side db I/O

Example

Usage:

```
q = db.auth_user.id != 0  
q.as_dict(flat=True)  
{  
  "op": "NE",  
  "first": {  
    "tablename": "auth_user",  
    "fieldname": "id"  
  },  
  "second": 0  
}
```

case (*t=1, f=0*)

class `pydal.objects.Row` (**args, **kwargs*)

Bases: `pydal.helpers.classes.BasicStorage`

A dictionary that lets you do `d['a']` as well as `d.a` this is only used to store a *Row*

as_dict (*datetime_to_str=False, custom_types=None*)

as_json (*mode='object', default=None, colnames=None, serialize=True, **kwargs*)

serializes the row to a JSON object `kwargs` are passed to `.as_dict` method only “object” mode supported

serialize = False used by `Rows.as_json`

TODO: return array mode with query column order

mode and `colnames` are not implemented

as_xml (*row_name='row', colnames=None, indent=' '*)

get (*key, default=None*)

class `pydal.objects.Rows` (*db=None, records=[], colnames=[], compact=True, rawrows=None*)

Bases: `pydal.objects.BasicRows`

A wrapper for the return value of a select. It basically represents a table. It has an iterator and each row is represented as a *Row* dictionary.

append (*row*)

column (*column=None*)

exclude (*f*)

Removes elements from the calling `Rows` object, filtered by the function *f*, and returns a new `Rows` object containing the removed elements

find (*f*, *limitby=None*)

Returns a new Rows object, a subset of the original object, filtered by the function *f*

first ()

group_by_value (**fields*, ***args*)

Regroups the rows, by one of the fields

insert (*position*, *row*)

last ()

render (*i=None*, *fields=None*)

Takes an index and returns a copy of the indexed row with values transformed via the “represent” attributes of the associated fields.

Parameters

- **i** – index. If not specified, a generator is returned for iteration over all the rows.
- **fields** – a list of fields to transform (if None, all fields with “represent” attributes will be transformed)

setvirtualfields (***keyed_virtualfields*)

For reference:

```
db.define_table('x', Field('number', 'integer'))
if db(db.x).isempty(): [db.x.insert(number=i) for i in range(10)]

from gluon.dal import lazy_virtualfield

class MyVirtualFields(object):
    # normal virtual field (backward compatible, discouraged)
    def normal_shift(self): return self.x.number+1
    # lazy virtual field (because of @staticmethod)
    @lazy_virtualfield
    def lazy_shift(instance, row, delta=4): return row.x.number+delta
db.x.virtualfields.append(MyVirtualFields())

for row in db(db.x).select():
    print row.number, row.normal_shift, row.lazy_shift(delta=7)
```

sort (*f*, *reverse=False*)

Returns a list of sorted elements (not sorted in place)

class `pydal.objects.Set` (*db*, *query*, *ignore_common_filters=None*)

Bases: `pydal.helpers.classes.Serializable`

Represents a set of records in the database. Records are identified by the *query=Query(...)* object. Normally the Set is generated by `DAL.__call__(Query(...))`

Given a set, for example:

```
myset = db(db.users.name=='Max')
```

you can:

```
myset.update(db.users.name='Massimo')
myset.delete() # all elements in the set
myset.select(orderby=db.users.id, groupby=db.users.name, limitby=(0, 10))
```

and take subsets:

```
subset = myset(db.users.id<5)
```

as_dict (*flat=False, sanitize=True*)

build (*d*)
Experimental: see `.parse()`

count (*distinct=None, cache=None*)

delete ()

delete_uploaded_files (*upload_fields=None*)

isempty ()

iterselect (**fields, **attributes*)

nested_select (**fields, **attributes*)

parse (*dquery*)
Experimental: Turn a dictionary into a Query object

select (**fields, **attributes*)

update (***update_fields*)

update_naive (***update_fields*)
Same as update but does not call `table._before_update` and `_after_update`

validate_and_update (***update_fields*)

where (*query, ignore_common_filters=False*)

class `pydal.objects.Table` (*db, tablename, *fields, **args*)
Bases: `pydal.helpers.classes.Serializable`, `pydal.helpers.classes.BasicStorage`

Represents a database table

Example::

You can create a table as:: `db = DAL(...) db.define_table('users', Field('name'))`

And then:

```
db.users.insert(name='me') # print db.users._insert(...) to see SQL
db.users.drop()
```

as_dict (*flat=False, sanitize=True*)

bulk_insert (*items*)
here items is a list of dictionaries

create_index (*name, *fields, **kwargs*)

drop (*mode=''*)

drop_index (*name*)

fields

import_from_csv_file (*csvfile, id_map=None, null='<NULL>', unique='uuid', id_offset=None, transform=None, *args, **kwargs*)
Import records from csv file. Column headers must have same names as table fields. Field 'id' is ignored. If column names read 'table.file' the 'table.' prefix is ignored.

- 'unique' argument is a field which must be unique (typically a uuid field)
- 'restore' argument is default False; if set True will remove old values in table first.
- 'id_map' if set to None will not map ids

The import will keep the id numbers in the restored table. This assumes that there is an field of type id that is integer and in incrementing order. Will keep the id numbers in restored table.

```
insert (**fields)
on (query)
sqlsafe
sqlsafe_alias
truncate (mode='')
update (*args, **kwargs)
update_or_insert (_key=<function <lambda>>, **values)
validate_and_insert (**fields)
validate_and_update (_key=<function <lambda>>, **fields)
validate_and_update_or_insert (_key=<function <lambda>>, **fields)
with_alias (alias)

class pydal.objects.VirtualCommand (method, row)
    Bases: object

pydal.objects.pickle_row (s)
```

1.6 Module contents

p

- pydal, 35
- pydal.adapters, 14
 - pydal.adapters.base, 3
 - pydal.adapters.couchdb, 6
 - pydal.adapters.db2, 6
 - pydal.adapters.firebird, 6
 - pydal.adapters.informix, 7
 - pydal.adapters.ingres, 7
 - pydal.adapters.mongo, 8
 - pydal.adapters.mssql, 9
 - pydal.adapters.mysql, 10
 - pydal.adapters.oracle, 11
 - pydal.adapters.postgres, 12
 - pydal.adapters.sqlite, 14
 - pydal.adapters.teradata, 14
- pydal.base, 19
- pydal.connection, 26
- pydal.helpers, 19
 - pydal.helpers.classes, 15
 - pydal.helpers.methods, 17
 - pydal.helpers.regex, 19
- pydal.objects, 27

A

abs() (pydal.objects.Expression method), 28
 adapt() (pydal.adapters.base.BaseAdapter method), 3
 adapt() (pydal.adapters.base.SQLAdapter method), 4
 adapt() (pydal.adapters.postgres.PostgrePG8000 method), 13
 adapt() (pydal.adapters.postgres.PostgrePsyco method), 13
 AdapterMeta (class in pydal.adapters), 14
 Adapters (class in pydal.adapters), 14
 after_connection() (pydal.adapters.informix.Informix method), 7
 after_connection() (pydal.adapters.mongo.Mongo method), 8
 after_connection() (pydal.adapters.mysql.MySQL method), 11
 after_connection() (pydal.adapters.oracle.Oracle method), 11
 after_connection() (pydal.adapters.postgres.JDBCPostgre method), 12
 after_connection() (pydal.adapters.postgres.Postgre method), 12
 after_connection() (pydal.adapters.sqlite.JDBCSQLite method), 14
 after_connection() (pydal.adapters.sqlite.SQLite method), 14
 after_connection() (pydal.connection.ConnectionPool method), 26
 after_connection_hook() (pydal.connection.ConnectionPool method), 26
 after_connections() (pydal.adapters.sqlite.Spatialite method), 14
 after_execute() (pydal.helpers.classes.ExecutionHandler method), 16
 after_execute() (pydal.helpers.classes.TimingHandler method), 17
 alias() (pydal.adapters.base.BaseAdapter method), 3
 annotate_expression() (pydal.adapters.mongo.Expansion method), 8

append() (pydal.base.DAL.Rows method), 23
 append() (pydal.objects.Rows method), 32
 archive_record() (in module pydal.helpers.methods), 17
 as_csv() (pydal.objects.BasicRows method), 27
 as_dict() (pydal.base.DAL method), 24
 as_dict() (pydal.base.DAL.Row method), 22
 as_dict() (pydal.base.DAL.Table method), 24
 as_dict() (pydal.helpers.classes.Serializable method), 17
 as_dict() (pydal.objects.BasicRows method), 27
 as_dict() (pydal.objects.Field method), 30
 as_dict() (pydal.objects.Query method), 32
 as_dict() (pydal.objects.Row method), 32
 as_dict() (pydal.objects.Set method), 34
 as_dict() (pydal.objects.Table method), 34
 as_json() (pydal.base.DAL.Row method), 22
 as_json() (pydal.helpers.classes.Serializable method), 17
 as_json() (pydal.objects.BasicRows method), 27
 as_json() (pydal.objects.Row method), 32
 as_list() (pydal.objects.BasicRows method), 27
 as_trees() (pydal.objects.BasicRows method), 28
 as_xml() (pydal.base.DAL.Row method), 23
 as_xml() (pydal.helpers.classes.Serializable method), 17
 as_xml() (pydal.objects.BasicRows method), 28
 as_xml() (pydal.objects.Row method), 32
 as_yaml() (pydal.helpers.classes.Serializable method), 17
 auto_represent() (in module pydal.helpers.methods), 17
 auto_validators() (in module pydal.helpers.methods), 17
 avg() (pydal.objects.Expression method), 28

B

bar_decode_integer() (in module pydal.helpers.methods), 18
 bar_decode_string() (in module pydal.helpers.methods), 18
 bar_encode() (in module pydal.helpers.methods), 18
 bar_escape() (in module pydal.helpers.methods), 18
 BaseAdapter (class in pydal.adapters.base), 3
 BasicRows (class in pydal.objects), 27
 BasicStorage (class in pydal.helpers.classes), 15
 before_execute() (pydal.adapters.base.DebugHandler method), 4

- before_execute() (pydal.helpers.classes.ExecutionHandler method), 16
 - before_execute() (pydal.helpers.classes.TimingHandler method), 17
 - belongs() (pydal.objects.Expression method), 28
 - Binary (class in pydal.adapters.mongo), 8
 - build() (pydal.objects.Set method), 34
 - bulk_insert() (pydal.adapters.base.SQLAdapter method), 4
 - bulk_insert() (pydal.adapters.mongo.Mongo method), 8
 - bulk_insert() (pydal.base.DAL.Table method), 24
 - bulk_insert() (pydal.objects.Table method), 34
- ## C
- can_join() (pydal.base.DAL method), 24
 - can_select_for_update (pydal.adapters.base.NoSQLAdapter attribute), 4
 - can_select_for_update (pydal.adapters.base.SQLAdapter attribute), 4
 - case() (pydal.objects.Query method), 32
 - check_active_connection (pydal.connection.ConnectionPool attribute), 27
 - check_notnull() (pydal.adapters.mongo.Mongo method), 8
 - check_reserved_keyword() (pydal.base.DAL method), 24
 - check_unique() (pydal.adapters.mongo.Mongo method), 8
 - cleanup() (in module pydal.helpers.methods), 18
 - clear() (pydal.helpers.classes.BasicStorage method), 15
 - clone() (pydal.objects.Field method), 30
 - close() (pydal.adapters.teradata.Teradata method), 14
 - close() (pydal.base.DAL method), 25
 - close() (pydal.connection.ConnectionPool method), 27
 - close() (pydal.helpers.classes.DatabaseStoredFile method), 15
 - close() (pydal.helpers.classes.FakeDriver method), 16
 - close_all_instances() (pydal.connection.ConnectionPool static method), 27
 - close_connection() (pydal.adapters.base.BaseAdapter method), 3
 - close_connection() (pydal.helpers.classes.DatabaseStoredFile method), 15
 - close_cursor() (pydal.connection.ConnectionPool method), 27
 - cmd_fix (pydal.adapters.oracle.Oracle attribute), 11
 - coalesce() (pydal.objects.Expression method), 29
 - coalesce_zero() (pydal.objects.Expression method), 29
 - column() (pydal.base.DAL.Rows method), 23
 - column() (pydal.objects.Rows method), 32
 - commit() (pydal.adapters.base.NoSQLAdapter method), 4
 - commit() (pydal.adapters.base.SQLAdapter method), 5
 - commit() (pydal.base.DAL method), 25
 - commit() (pydal.helpers.classes.FakeDriver method), 16
 - commit_on_alter_table (pydal.adapters.base.SQLAdapter attribute), 5
 - commit_on_alter_table (pydal.adapters.firebird.FireBird attribute), 6
 - commit_on_alter_table (pydal.adapters.mysql.MySQL attribute), 11
 - commit_prepared() (pydal.adapters.base.NoSQLAdapter method), 4
 - commit_prepared() (pydal.adapters.base.SQLAdapter method), 5
 - commit_prepared() (pydal.adapters.mysql.MySQL method), 11
 - commit_prepared() (pydal.adapters.postgres.Postgre method), 12
 - common_filter() (pydal.adapters.base.BaseAdapter method), 3
 - connection (pydal.connection.ConnectionPool attribute), 27
 - ConnectionPool (class in pydal.connection), 26
 - connector() (pydal.adapters.base.BaseAdapter method), 3
 - connector() (pydal.adapters.base.NullAdapter method), 4
 - connector() (pydal.adapters.couchdb.CouchDB method), 6
 - connector() (pydal.adapters.db2.DB2IBM method), 6
 - connector() (pydal.adapters.db2.DB2Pyodbc method), 6
 - connector() (pydal.adapters.firebird.FireBird method), 7
 - connector() (pydal.adapters.informix.Informix method), 7
 - connector() (pydal.adapters.ingres.Ingres method), 7
 - connector() (pydal.adapters.mongo.Mongo method), 8
 - connector() (pydal.adapters.mssql.MSSQL method), 9
 - connector() (pydal.adapters.mssql.Sybase method), 10
 - connector() (pydal.adapters.mysql.MySQL method), 11
 - connector() (pydal.adapters.oracle.Oracle method), 11
 - connector() (pydal.adapters.postgres.JDBCPostgre method), 12
 - connector() (pydal.adapters.postgres.Postgre method), 12
 - connector() (pydal.adapters.sqlite.JDBCSQLite method), 14
 - connector() (pydal.adapters.sqlite.SQLite method), 14
 - connector() (pydal.adapters.teradata.Teradata method), 14
 - contains() (pydal.objects.Expression method), 29
 - copy() (pydal.helpers.classes.BasicStorage method), 15
 - CouchDB (class in pydal.adapters.couchdb), 6
 - count() (pydal.adapters.base.SQLAdapter method), 5
 - count() (pydal.adapters.couchdb.CouchDB method), 6
 - count() (pydal.adapters.mongo.Mongo method), 8
 - count() (pydal.objects.Field method), 30
 - count() (pydal.objects.LazySet method), 31
 - count() (pydal.objects.Set method), 34

- [create_index\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[create_index\(\)](#) (pydal.base.DAL.Table method), 24
[create_index\(\)](#) (pydal.objects.Table method), 34
[create_sequence_and_triggers\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[create_sequence_and_triggers\(\)](#) (pydal.adapters.firebird.FireBird method), 7
[create_sequence_and_triggers\(\)](#) (pydal.adapters.ingres.Ingres method), 7
[create_sequence_and_triggers\(\)](#) (pydal.adapters.oracle.Oracle method), 11
[create_table\(\)](#) (pydal.adapters.base.NoSQLAdapter method), 4
[create_table\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[create_table\(\)](#) (pydal.adapters.couchdb.CouchDB method), 6
[Cubrid](#) (class in pydal.adapters.mysql), 10
[cursor](#) (pydal.connection.ConnectionPool attribute), 27
[cursor\(\)](#) (pydal.helpers.classes.FakeDriver method), 16
[cursors](#) (pydal.connection.ConnectionPool attribute), 27
- ## D
- [DAL](#) (class in pydal.base), 21
[DAL.Row](#) (class in pydal.base), 22
[DAL.Rows](#) (class in pydal.base), 23
[DAL.Table](#) (class in pydal.base), 24
[DAL_pickler\(\)](#) (in module pydal.base), 26
[DAL_unpickler\(\)](#) (in module pydal.base), 26
[DatabaseStoredFile](#) (class in pydal.helpers.classes), 15
[day\(\)](#) (pydal.objects.Expression method), 29
[DB2](#) (class in pydal.adapters.db2), 6
[DB2IBM](#) (class in pydal.adapters.db2), 6
[DB2Pyodbc](#) (class in pydal.adapters.db2), 6
[dbengine](#) (pydal.adapters.base.BaseAdapter attribute), 3
[dbengine](#) (pydal.adapters.couchdb.CouchDB attribute), 6
[dbengine](#) (pydal.adapters.db2.DB2 attribute), 6
[dbengine](#) (pydal.adapters.firebird.FireBird attribute), 7
[dbengine](#) (pydal.adapters.informix.Informix attribute), 7
[dbengine](#) (pydal.adapters.ingres.Ingres attribute), 7
[dbengine](#) (pydal.adapters.mongo.Mongo attribute), 8
[dbengine](#) (pydal.adapters.mssql.MSSQL attribute), 9
[dbengine](#) (pydal.adapters.mssql.Sybase attribute), 10
[dbengine](#) (pydal.adapters.mysql.Cubrid attribute), 10
[dbengine](#) (pydal.adapters.mysql.MySQL attribute), 11
[dbengine](#) (pydal.adapters.oracle.Oracle attribute), 11
[dbengine](#) (pydal.adapters.postgres.Postgre attribute), 12
[dbengine](#) (pydal.adapters.sqlite.Spatialite attribute), 14
[dbengine](#) (pydal.adapters.sqlite.SQLite attribute), 14
[dbengine](#) (pydal.adapters.teradata.Teradata attribute), 14
[DebugHandler](#) (class in pydal.adapters.base), 4
[decode\(\)](#) (pydal.adapters.mongo.MongoBlob static method), 9
[define_table\(\)](#) (pydal.base.DAL method), 25
[delete\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[delete\(\)](#) (pydal.adapters.couchdb.CouchDB method), 6
[delete\(\)](#) (pydal.adapters.mongo.Mongo method), 8
[delete\(\)](#) (pydal.adapters.sqlite.SQLite method), 14
[delete\(\)](#) (pydal.objects.LazySet method), 31
[delete\(\)](#) (pydal.objects.Set method), 34
[delete_uploaded_files\(\)](#) (pydal.objects.LazySet method), 31
[delete_uploaded_files\(\)](#) (pydal.objects.Set method), 34
[dialect](#) (pydal.adapters.mongo.Expansion attribute), 8
[distributed_transaction_begin\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[distributed_transaction_begin\(\)](#) (pydal.adapters.mysql.MySQL method), 11
[distributed_transaction_begin\(\)](#) (pydal.base.DAL static method), 25
[distributed_transaction_commit\(\)](#) (pydal.base.DAL static method), 25
[drivers](#) (pydal.adapters.base.BaseAdapter attribute), 3
[drivers](#) (pydal.adapters.couchdb.CouchDB attribute), 6
[drivers](#) (pydal.adapters.db2.DB2IBM attribute), 6
[drivers](#) (pydal.adapters.db2.DB2Pyodbc attribute), 6
[drivers](#) (pydal.adapters.firebird.FireBird attribute), 7
[drivers](#) (pydal.adapters.informix.Informix attribute), 7
[drivers](#) (pydal.adapters.ingres.Ingres attribute), 7
[drivers](#) (pydal.adapters.mongo.Mongo attribute), 9
[drivers](#) (pydal.adapters.mssql.MSSQL attribute), 9
[drivers](#) (pydal.adapters.mysql.Cubrid attribute), 11
[drivers](#) (pydal.adapters.mysql.MySQL attribute), 11
[drivers](#) (pydal.adapters.oracle.Oracle attribute), 11
[drivers](#) (pydal.adapters.postgres.JDBCPostgre attribute), 12
[drivers](#) (pydal.adapters.postgres.Postgre attribute), 12
[drivers](#) (pydal.adapters.postgres.PostgrePG8000 attribute), 13
[drivers](#) (pydal.adapters.postgres.PostgrePsyco attribute), 13
[drivers](#) (pydal.adapters.sqlite.JDBCSQLite attribute), 14
[drivers](#) (pydal.adapters.sqlite.SQLite attribute), 14
[drivers](#) (pydal.adapters.teradata.Teradata attribute), 14
[drop\(\)](#) (pydal.adapters.base.NoSQLAdapter method), 4
[drop\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[drop\(\)](#) (pydal.base.DAL.Table method), 24
[drop\(\)](#) (pydal.objects.Table method), 34
[drop_index\(\)](#) (pydal.adapters.base.SQLAdapter method), 5
[drop_index\(\)](#) (pydal.base.DAL.Table method), 24
[drop_index\(\)](#) (pydal.objects.Table method), 34
[drop_table\(\)](#) (pydal.adapters.base.BaseAdapter method), 3

- drop_table() (pydal.adapters.base.NoSQLAdapter method), 4
- drop_table() (pydal.adapters.base.SQLAdapter method), 5
- ## E
- endswith() (pydal.helpers.classes.SQLCustomType method), 17
- endswith() (pydal.objects.Expression method), 29
- epoch() (pydal.objects.Expression method), 29
- escape() (pydal.helpers.classes.DatabaseStoredFile method), 15
- exclude() (pydal.base.DAL.Rows method), 23
- exclude() (pydal.objects.Rows method), 32
- execute() (pydal.adapters.base.SQLAdapter method), 5
- execute() (pydal.adapters.db2.DB2 method), 6
- execute() (pydal.adapters.informix.Informix method), 7
- execute() (pydal.adapters.mssql.MSSQLN method), 10
- execute() (pydal.adapters.oracle.Oracle method), 11
- execute() (pydal.adapters.postgres.PostgrePG8000 method), 13
- executesql() (pydal.base.DAL method), 25
- execution_handlers (pydal.adapters.base.SQLAdapter attribute), 5
- execution_handlers (pydal.base.DAL attribute), 25
- ExecutionHandler (class in pydal.helpers.classes), 16
- exists() (pydal.helpers.classes.DatabaseStoredFile static method), 15
- expand_all() (pydal.adapters.base.BaseAdapter method), 3
- Expansion (class in pydal.adapters.mongo), 8
- export_to_csv_file() (pydal.base.DAL method), 25
- export_to_csv_file() (pydal.objects.BasicRows method), 28
- Expression (class in pydal.objects), 28
- ## F
- FakeCursor (class in pydal.helpers.classes), 16
- FakeDriver (class in pydal.helpers.classes), 16
- fetchall() (pydal.adapters.base.SQLAdapter method), 5
- fetchall() (pydal.adapters.oracle.Oracle method), 11
- fetchone() (pydal.adapters.base.SQLAdapter method), 5
- Field (class in pydal.objects), 30
- FieldMethod (class in pydal.objects), 31
- fields (pydal.base.DAL.Table attribute), 24
- fields (pydal.objects.Table attribute), 34
- FieldVirtual (class in pydal.objects), 31
- filter_sql_command() (pydal.adapters.base.SQLAdapter method), 5
- find() (pydal.base.DAL.Rows method), 23
- find() (pydal.objects.Rows method), 32
- find_driver() (pydal.adapters.base.BaseAdapter method), 3
- find_driver() (pydal.adapters.base.NullAdapter method), 4
- find_driver() (pydal.adapters.mongo.Mongo method), 9
- FireBird (class in pydal.adapters.firebird), 6
- FireBirdEmbedded (class in pydal.adapters.firebird), 7
- first() (pydal.base.DAL.Rows method), 23
- first() (pydal.objects.IterRows method), 31
- first() (pydal.objects.Rows method), 33
- formatter() (pydal.objects.Field method), 30
- ## G
- geoLine() (in module pydal.helpers.methods), 18
- geoPoint() (in module pydal.helpers.methods), 18
- geoPolygon() (in module pydal.helpers.methods), 18
- get() (pydal.base.DAL.Row method), 23
- get() (pydal.helpers.classes.BasicStorage method), 15
- get() (pydal.helpers.classes.Reference method), 16
- get() (pydal.objects.Row method), 32
- get_collection() (pydal.adapters.mongo.Expansion method), 8
- get_for() (pydal.adapters.Adapters method), 15
- get_instances() (pydal.base.DAL static method), 25
- get_table() (pydal.adapters.base.BaseAdapter method), 3
- group_by_value() (pydal.base.DAL.Rows method), 23
- group_by_value() (pydal.objects.Rows method), 33
- ## H
- has_key() (pydal.helpers.classes.BasicStorage method), 15
- has_representer() (pydal.base.DAL method), 26
- hide_password() (in module pydal.helpers.methods), 18
- hour() (pydal.objects.Expression method), 29
- ## I
- id_query() (pydal.adapters.base.NoSQLAdapter method), 4
- id_query() (pydal.adapters.base.SQLAdapter method), 5
- ilike() (pydal.objects.Expression method), 29
- import_from_csv_file() (pydal.base.DAL method), 26
- import_from_csv_file() (pydal.base.DAL.Table method), 24
- import_from_csv_file() (pydal.objects.Table method), 34
- import_table_definitions() (pydal.base.DAL method), 26
- index_expander() (pydal.adapters.base.SQLAdapter method), 5
- Informix (class in pydal.adapters.informix), 7
- InformixSE (class in pydal.adapters.informix), 7
- Ingres (class in pydal.adapters.ingres), 7
- IngresUnicode (class in pydal.adapters.ingres), 7
- insert() (pydal.adapters.base.SQLAdapter method), 5
- insert() (pydal.adapters.couchdb.CouchDB method), 6
- insert() (pydal.adapters.mongo.Mongo method), 9
- insert() (pydal.adapters.oracle.Oracle method), 11
- insert() (pydal.base.DAL.Rows method), 23

insert() (pydal.base.DAL.Table method), 24
 insert() (pydal.objects.Rows method), 33
 insert() (pydal.objects.Table method), 35
 int2uuid() (in module pydal.helpers.methods), 18
 is_operational_error() (pydal.helpers.classes.DatabaseStoredFile method), 15
 is_programming_error() (pydal.helpers.classes.DatabaseStoredFile method), 15
 isempty() (pydal.objects.LazySet method), 31
 isempty() (pydal.objects.Set method), 34
 items() (pydal.helpers.classes.BasicStorage method), 15
 iteritems() (pydal.helpers.classes.BasicStorage method), 15
 iterkeys() (pydal.helpers.classes.BasicStorage method), 15
 iterparse() (pydal.adapters.base.BaseAdapter method), 3
 IterRows (class in pydal.objects), 31
 iterselct() (pydal.adapters.base.SQLAdapter method), 5
 iterselct() (pydal.objects.Set method), 34
 ivalues() (pydal.helpers.classes.BasicStorage method), 15

J

JDBCPostgre (class in pydal.adapters.postgres), 12
 JDBCSQLite (class in pydal.adapters.sqlite), 14
 json() (pydal.objects.BasicRows method), 28

K

keys() (pydal.helpers.classes.BasicStorage method), 15

L

last() (pydal.base.DAL.Rows method), 23
 last() (pydal.objects.Rows method), 33
 lastrowid (pydal.helpers.classes.NullCursor attribute), 16
 lastrowid() (pydal.adapters.base.SQLAdapter method), 5
 lastrowid() (pydal.adapters.db2.DB2 method), 6
 lastrowid() (pydal.adapters.firebird.FireBird method), 7
 lastrowid() (pydal.adapters.informix.Informix method), 7
 lastrowid() (pydal.adapters.mssql.MSSQL method), 9
 lastrowid() (pydal.adapters.mssql.Vertica method), 10
 lastrowid() (pydal.adapters.oracle.Oracle method), 11
 lastrowid() (pydal.adapters.postgres.Postgre method), 12
 lastrowid() (pydal.adapters.teradata.Teradata method), 14
 Lazy (pydal.objects.Field attribute), 30
 lazy_define_table() (pydal.base.DAL method), 26
 LazyReferenceGetter (class in pydal.objects), 31
 LazySet (class in pydal.objects), 31
 len() (pydal.objects.Expression method), 29
 like() (pydal.objects.Expression method), 29
 list_represent() (in module pydal.helpers.methods), 18
 lock_cursor() (pydal.connection.ConnectionPool method), 27

logger (pydal.base.DAL attribute), 26
 lower() (pydal.objects.Expression method), 29

M

max() (pydal.objects.Expression method), 29
 MAXSTORAGE (pydal.helpers.classes.TimingHandler attribute), 17
 MetaDAL (class in pydal.base), 26
 Method (pydal.objects.Field attribute), 30
 MethodAdder (class in pydal.helpers.classes), 16
 min() (pydal.objects.Expression method), 29
 minutes() (pydal.objects.Expression method), 29
 Mongo (class in pydal.adapters.mongo), 8
 MONGO_BLOB_BYTES (pydal.adapters.mongo.MongoBlob attribute), 9
 MONGO_BLOB_NON_UTF8_STR (pydal.adapters.mongo.MongoBlob attribute), 9
 MongoBlob (class in pydal.adapters.mongo), 9
 month() (pydal.objects.Expression method), 29
 MSSQL (class in pydal.adapters.mssql), 9
 MSSQL1 (class in pydal.adapters.mssql), 9
 MSSQL1N (class in pydal.adapters.mssql), 9
 MSSQL3 (class in pydal.adapters.mssql), 9
 MSSQL3N (class in pydal.adapters.mssql), 10
 MSSQL4 (class in pydal.adapters.mssql), 10
 MSSQL4N (class in pydal.adapters.mssql), 10
 MSSQLN (class in pydal.adapters.mssql), 10
 MySQL (class in pydal.adapters.mysql), 11

N

nested_select() (pydal.objects.LazySet method), 31
 nested_select() (pydal.objects.Set method), 34
 next() (pydal.objects.IterRows method), 31
 NoSQLAdapter (class in pydal.adapters.base), 4
 NullAdapter (class in pydal.adapters.base), 4
 NullCursor (class in pydal.helpers.classes), 16
 NullDriver (class in pydal.helpers.classes), 16

O

object_id() (pydal.adapters.mongo.Mongo method), 9
 on() (pydal.base.DAL.Table method), 24
 on() (pydal.objects.Table method), 35
 Oracle (class in pydal.adapters.oracle), 11

P

parse() (pydal.adapters.base.BaseAdapter method), 3
 parse() (pydal.objects.Set method), 34
 parse_as_rest() (pydal.base.DAL method), 26
 parse_value() (pydal.adapters.base.BaseAdapter method), 4
 pickle_basicstorage() (in module pydal.helpers.classes), 17

[pickle_row\(\)](#) (in module `pydal.objects`), 35
[pluralize\(\)](#) (in module `pydal.helpers.methods`), 18
[POOLS](#) (`pydal.connection.ConnectionPool` attribute), 26
[pop\(\)](#) (`pydal.helpers.classes.BasicStorage` method), 15
[Postgre](#) (class in `pydal.adapters.postgres`), 12
[PostgreBoolean](#) (class in `pydal.adapters.postgres`), 12
[PostgreMeta](#) (class in `pydal.adapters.postgres`), 12
[PostgreNew](#) (class in `pydal.adapters.postgres`), 12
[PostgrePG8000](#) (class in `pydal.adapters.postgres`), 12
[PostgrePG8000Boolean](#) (class in `pydal.adapters.postgres`), 13
[PostgrePG8000New](#) (class in `pydal.adapters.postgres`), 13
[PostgrePsyco](#) (class in `pydal.adapters.postgres`), 13
[PostgrePsycoBoolean](#) (class in `pydal.adapters.postgres`), 13
[PostgrePsycoNew](#) (class in `pydal.adapters.postgres`), 13
[prepare\(\)](#) (`pydal.adapters.base.NoSQLAdapter` method), 4
[prepare\(\)](#) (`pydal.adapters.base.SQLAdapter` method), 5
[prepare\(\)](#) (`pydal.adapters.mysql.MySQL` method), 11
[prepare\(\)](#) (`pydal.adapters.postgres.Postgre` method), 12
[pydal](#) (module), 35
[pydal.adapters](#) (module), 14
[pydal.adapters.base](#) (module), 3
[pydal.adapters.couchdb](#) (module), 6
[pydal.adapters.db2](#) (module), 6
[pydal.adapters.firebird](#) (module), 6
[pydal.adapters.informix](#) (module), 7
[pydal.adapters.ingres](#) (module), 7
[pydal.adapters.mongo](#) (module), 8
[pydal.adapters.mssql](#) (module), 9
[pydal.adapters.mysql](#) (module), 10
[pydal.adapters.oracle](#) (module), 11
[pydal.adapters.postgres](#) (module), 12
[pydal.adapters.sqlite](#) (module), 14
[pydal.adapters.teradata](#) (module), 14
[pydal.base](#) (module), 19
[pydal.connection](#) (module), 26
[pydal.helpers](#) (module), 19
[pydal.helpers.classes](#) (module), 15
[pydal.helpers.methods](#) (module), 17
[pydal.helpers.regex](#) (module), 19
[pydal.objects](#) (module), 27

Q

[Query](#) (class in `pydal.objects`), 31

R

[read\(\)](#) (`pydal.helpers.classes.DatabaseStoredFile` method), 15
[readline\(\)](#) (`pydal.helpers.classes.DatabaseStoredFile` method), 15
[reconnect\(\)](#) (`pydal.connection.ConnectionPool` method), 27

[record_operators](#) (`pydal.base.DAL` attribute), 26
[RecordDeleter](#) (class in `pydal.helpers.classes`), 16
[RecordOperator](#) (class in `pydal.helpers.classes`), 16
[RecordUpdater](#) (class in `pydal.helpers.classes`), 16
[Reference](#) (class in `pydal.helpers.classes`), 16
[Reference_pickler\(\)](#) (in module `pydal.helpers.classes`), 16
[Reference_unpickler\(\)](#) (in module `pydal.helpers.classes`), 16
[REGEX_ARGPATTERN](#) (`pydal.adapters.mssql.MSSQL` attribute), 9
[REGEX_DSN](#) (`pydal.adapters.mssql.MSSQL` attribute), 9
[REGEX_URI](#) (`pydal.adapters.firebird.FireBird` attribute), 6
[REGEX_URI](#) (`pydal.adapters.firebird.FireBirdEmbedded` attribute), 7
[REGEX_URI](#) (`pydal.adapters.mssql.MSSQL` attribute), 9
[REGEX_URI](#) (`pydal.adapters.mysql.MySQL` attribute), 11
[REGEX_URI](#) (`pydal.adapters.postgres.JDBCPostgre` attribute), 12
[REGEX_URI](#) (`pydal.adapters.postgres.Postgre` attribute), 12
[regexp\(\)](#) (`pydal.objects.Expression` method), 29
[register\(\)](#) (`pydal.helpers.classes.MethodAdder` method), 16
[register_for\(\)](#) (`pydal.adapters.Adapters` method), 15
[release_cursor\(\)](#) (`pydal.connection.ConnectionPool` method), 27
[render\(\)](#) (`pydal.base.DAL.Rows` method), 23
[render\(\)](#) (`pydal.objects.Rows` method), 33
[replace\(\)](#) (`pydal.objects.Expression` method), 29
[represent\(\)](#) (`pydal.adapters.base.BaseAdapter` method), 4
[represent\(\)](#) (`pydal.adapters.base.SQLAdapter` method), 5
[represent\(\)](#) (`pydal.adapters.mongo.Mongo` method), 9
[represent\(\)](#) (`pydal.adapters.mssql.MSSQLN` method), 10
[represent\(\)](#) (`pydal.base.DAL` method), 26
[representers](#) (`pydal.base.DAL` attribute), 26
[retrieve\(\)](#) (`pydal.objects.Field` method), 30
[retrieve_file_properties\(\)](#) (`pydal.objects.Field` method), 31
[rollback\(\)](#) (`pydal.adapters.base.NoSQLAdapter` method), 4
[rollback\(\)](#) (`pydal.adapters.base.SQLAdapter` method), 5
[rollback\(\)](#) (`pydal.base.DAL` method), 26
[rollback_prepared\(\)](#) (`pydal.adapters.base.NoSQLAdapter` method), 4
[rollback_prepared\(\)](#) (`pydal.adapters.base.SQLAdapter` method), 5
[rollback_prepared\(\)](#) (`pydal.adapters.mysql.MySQL` method), 11
[rollback_prepared\(\)](#) (`pydal.adapters.postgres.Postgre` method), 12
[Row](#) (class in `pydal.objects`), 32

Rows (class in pydal.objects), 32
 rowslice() (pydal.adapters.base.BaseAdapter method), 4
 rowslice() (pydal.adapters.db2.DB2 method), 6
 rowslice() (pydal.adapters.informix.InformixSE method), 7
 rowslice() (pydal.adapters.mssql.Slicer method), 10

S

seconds() (pydal.objects.Expression method), 29
 select() (pydal.adapters.base.SQLAdapter method), 5
 select() (pydal.adapters.couchdb.CouchDB method), 6
 select() (pydal.adapters.mongo.Mongo method), 9
 select() (pydal.adapters.sqlite.SQLite method), 14
 select() (pydal.objects.LazySet method), 31
 select() (pydal.objects.Set method), 34
 Serializable (class in pydal.helpers.classes), 17
 serializers (pydal.base.DAL attribute), 26
 Set (class in pydal.objects), 33
 set_attributes() (pydal.objects.Field method), 31
 set_folder() (pydal.base.DAL static method), 26
 set_folder() (pydal.connection.ConnectionPool static method), 27
 setvirtualfields() (pydal.base.DAL.Rows method), 23
 setvirtualfields() (pydal.objects.Rows method), 33
 Slicer (class in pydal.adapters.mssql), 10
 smart_adapt() (pydal.adapters.base.SQLAdapter method), 5
 smart_query() (in module pydal.helpers.methods), 18
 smart_query() (pydal.base.DAL method), 26
 sort() (pydal.base.DAL.Rows method), 23
 sort() (pydal.objects.Rows method), 33
 Spatialite (class in pydal.adapters.sqlite), 14
 SPATIALLIBS (pydal.adapters.sqlite.Spatialite attribute), 14
 SQLAdapter (class in pydal.adapters.base), 4
 SQLALL (class in pydal.helpers.classes), 16
 SQLCallableList (class in pydal.helpers.classes), 16
 SQLCustomType (class in pydal.helpers.classes), 17
 SQLite (class in pydal.adapters.sqlite), 14
 sqlsafe (pydal.base.DAL.Table attribute), 24
 sqlsafe (pydal.objects.Field attribute), 31
 sqlsafe (pydal.objects.Table attribute), 35
 sqlsafe_alias (pydal.base.DAL.Table attribute), 24
 sqlsafe_alias (pydal.objects.Table attribute), 35
 sqlsafe_field() (pydal.adapters.base.NoSQLAdapter method), 4
 sqlsafe_field() (pydal.adapters.base.SQLAdapter method), 5
 sqlsafe_name (pydal.objects.Field attribute), 31
 sqlsafe_table() (pydal.adapters.base.NoSQLAdapter method), 4
 sqlsafe_table() (pydal.adapters.base.SQLAdapter method), 5
 sqlsafe_table() (pydal.adapters.oracle.Oracle method), 11

st_asgeojson() (pydal.objects.Expression method), 29
 st_astext() (pydal.objects.Expression method), 29
 st_contains() (pydal.objects.Expression method), 29
 st_distance() (pydal.objects.Expression method), 29
 st_dwithin() (pydal.objects.Expression method), 29
 st_equals() (pydal.objects.Expression method), 29
 st_intersects() (pydal.objects.Expression method), 29
 st_overlaps() (pydal.objects.Expression method), 29
 st_simplify() (pydal.objects.Expression method), 29
 st_simplifypreservetopology() (pydal.objects.Expression method), 29
 st_touches() (pydal.objects.Expression method), 29
 st_within() (pydal.objects.Expression method), 29
 st_x() (pydal.objects.Expression method), 29
 st_y() (pydal.objects.Expression method), 29
 startswith() (pydal.helpers.classes.SQLCustomType method), 17
 startswith() (pydal.objects.Expression method), 29
 store() (pydal.objects.Field method), 31
 sum() (pydal.objects.Expression method), 29
 support_distributed_transaction (pydal.adapters.base.BaseAdapter attribute), 4
 support_distributed_transaction (pydal.adapters.firebird.FireBird attribute), 7
 support_distributed_transaction (pydal.adapters.mysql.MySQL attribute), 11
 support_distributed_transaction (pydal.adapters.postgres.Postgre attribute), 12
 Sybase (class in pydal.adapters.mssql), 10

T

Table (class in pydal.objects), 34
 table_alias() (pydal.adapters.base.SQLAdapter method), 5
 tables (pydal.base.DAL attribute), 26
 tables() (pydal.adapters.base.BaseAdapter method), 4
 Teradata (class in pydal.adapters.teradata), 14
 test_connection() (pydal.adapters.base.BaseAdapter method), 4
 test_connection() (pydal.adapters.base.SQLAdapter method), 5
 test_connection() (pydal.adapters.informix.Informix method), 7
 test_connection() (pydal.adapters.oracle.Oracle method), 11
 TimingHandler (class in pydal.helpers.classes), 17
 timings (pydal.helpers.classes.TimingHandler attribute), 17
 truncate() (pydal.adapters.base.SQLAdapter method), 5
 truncate() (pydal.adapters.mongo.Mongo method), 9
 truncate() (pydal.base.DAL.Table method), 24
 truncate() (pydal.objects.Table method), 35

try_create_web2py_filesystem() (pydal.helpers.classes.DatabaseStoredFile static method), 15

types (pydal.adapters.base.BaseAdapter attribute), 4

U

update() (pydal.adapters.base.SQLiteAdapter method), 5

update() (pydal.adapters.couchdb.CouchDB method), 6

update() (pydal.adapters.mongo.Mongo method), 9

update() (pydal.base.DAL.Table method), 24

update() (pydal.helpers.classes.BasicStorage method), 15

update() (pydal.objects.LazySet method), 31

update() (pydal.objects.Set method), 34

update() (pydal.objects.Table method), 35

update_naive() (pydal.objects.LazySet method), 31

update_naive() (pydal.objects.Set method), 34

update_or_insert() (pydal.base.DAL.Table method), 24

update_or_insert() (pydal.objects.Table method), 35

uploads_in_blob (pydal.adapters.base.BaseAdapter attribute), 4

uploads_in_blob (pydal.adapters.couchdb.CouchDB attribute), 6

upper() (pydal.objects.Expression method), 29

use_common_filters() (in module pydal.helpers.methods), 18

uuid() (pydal.base.DAL method), 26

uuid2int() (in module pydal.helpers.methods), 18

V

validate() (pydal.objects.Field method), 31

validate_and_insert() (pydal.base.DAL.Table method), 24

validate_and_insert() (pydal.objects.Table method), 35

validate_and_update() (pydal.base.DAL.Table method), 24

validate_and_update() (pydal.objects.LazySet method), 31

validate_and_update() (pydal.objects.Set method), 34

validate_and_update() (pydal.objects.Table method), 35

validate_and_update_or_insert() (pydal.base.DAL.Table method), 24

validate_and_update_or_insert() (pydal.objects.Table method), 35

validators (pydal.base.DAL attribute), 26

validators_method (pydal.base.DAL attribute), 26

values() (pydal.helpers.classes.BasicStorage method), 15

varquote_aux() (in module pydal.helpers.methods), 18

Vertica (class in pydal.adapters.mssql), 10

Virtual (pydal.objects.Field attribute), 30

VirtualCommand (class in pydal.objects), 35

W

warn_bad_usage() (pydal.helpers.classes.FakeCursor method), 16

web2py_extract() (pydal.adapters.sqlite.SQLite static method), 14

web2py_filesystems (pydal.helpers.classes.DatabaseStoredFile attribute), 15

web2py_regexp() (pydal.adapters.sqlite.SQLite static method), 14

where() (pydal.base.DAL method), 26

where() (pydal.objects.LazySet method), 31

where() (pydal.objects.Set method), 34

with_alias() (pydal.base.DAL.Table method), 24

with_alias() (pydal.objects.Expression method), 30

with_alias() (pydal.objects.Table method), 35

with_connection() (in module pydal.adapters), 15

with_connection_or_raise() (in module pydal.adapters), 15

write() (pydal.helpers.classes.DatabaseStoredFile method), 15

X

xml() (pydal.objects.BasicRows method), 28

xorify() (in module pydal.helpers.methods), 18

Y

year() (pydal.objects.Expression method), 30