
pyDAL Documentation

Release 17.3

web2py-developers

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Subpackages

[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)
```

```
close_connection (*args, **kwargs)
```

```
common_filter (query, tablist)
```

```
connector ()
```

```
dbengine = 'None'
```

```
drivers = ()
```

```
drop_table (table, mode='')
```

```
expand_all (fields, tabledict)
```

```
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)  
sqlsafe_field (fieldname)  
sqlsafe_table (tablename, original_tablename=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)  
    nested_select (*args, **kwargs)  
    prepare ()  
    rollback ()  
    rollback_prepared (key)  
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 (table, 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)
    itersselect (query, fields, attributes)
    lastrowid (table)
    nested_select (query, fields, attributes)
    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, current_scope=[])
test_connection ()
truncate (table, mode='')
update (table, 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 (table, query)
    drivers = ('couchdb',)
    insert (table, fields)
    select (query, fields, attributes)
    update (table, 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.SQLiteAdapter
```

```
REGEX_URI = <_sre.SRE_Pattern object at 0x1d0def0>
```

```
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 0x1ac5cf0>
```

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.helpers.classes.ConnectionConfigurationMixin, pydal.adapters.base.SQLiteAdapter
```

```
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.helpers.classes.ConnectionConfigurationMixin, pydal.adapters.
    base.NoSQLAdapter
    bulk_insert(table, items)
    check_notnull(table, values)
    check_unique(table, values)
    connector()
    count(query, distinct=None, snapshot=True)
    dbengine = 'mongodb'
    delete(table, 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 Mongoddb 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(table, 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-
    dential_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 0x1d08900>
    connector()

```

```
dbengine = 'mssql'  
drivers = ('pyodbc',)  
lastrowid (table)  
class pydal.adapters.mssql.MSSQL1 (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, pydal.adapters.mssql.Slicer  
class pydal.adapters.mssql.MSSQL1N (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, 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, af-
ter_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 0x1abf480>
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 0x1c7a3d0>
```

```
after_connection ()
connector ()
drivers = ('zJDBC',)
```

```
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.helpers.classes.ConnectionConfigurationMixin*, *pydal.adapters.base.SQLAdapter*

```
REGEX_URI = <_sre.SRE_Pattern object at 0x1abff70>
```

```
after_connection ()
commit_prepared (*args, **kwargs)
connector ()
dbengine = 'postgres'
drivers = ('psycopg2', 'pg8000')
lastrowid (table)
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, pydal.adapters.postgres.PostgreBoolean

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, pydal.adapters.postgres.PostgreNew

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`, `pydal.adapters.postgres.PostgreBoolean`

```
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.postgres.PostgreNew`

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(table, 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)

```

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.ConnectionConfigurationMixin
    Bases: object

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.OpRow (table)
    Bases: object
    del_value (key)
    get (key, default=None)
    items ()
```

```

    iteritems ()
    iterkeys ()
    itervalues ()
    keys ()
    op_values ()
    set_value (key, value, field=None)
    values ()
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
class pydal.helpers.classes.cachedprop (fget, doc=None)
    Bases: object
pydal.helpers.classes.pickle_basicstorage (s)
```

pydal.helpers.methods module

```
pydal.helpers.methods.archive_record (qset, fs, archive_table, current_record)
pydal.helpers.methods.attempt_upload (table, fields)
pydal.helpers.methods.attempt_upload_on_insert (table)
pydal.helpers.methods.attempt_upload_on_update (table)
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.delete_uploaded_files (dbset, upload_fields=None)
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.merge_tablemaps(*maplist)`

Merge arguments into a single dict, check for name collisions. Arguments may be modified in the process.

`pydal.helpers.methods.pluralize(singular, rules=[(<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'children'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'eet'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'eeth'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, '\\aves'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'ses'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'men'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'ives'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'eaux'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'lves'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'es'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'es'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, 'ies'), (<_sre.SRE_Pattern object>, <_sre.SRE_Pattern object>, '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

Submodules

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 & SpatialLite
- 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 kwarg 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, fields=[])

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)

join (field, name=None, constraint=None, fields=[], orderby=None)

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 (csyfile, 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)
query_name (*args, **kwargs)
sql_fullref
sql_shortref
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.DeleteRecord'>}
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

```

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*)

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.SQLTABLE (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*)

bind (*table*)

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

count (*distinct=None*)

formatter (*value*)

longname

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()

    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.Serializableable

    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, fields=[]*)

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*)

join (*field, name=None, constraint=None, fields=[], orderby=None*)

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.Select` (db, query, fields, attributes)

Bases: `pydal.helpers.classes.BasicStorage`

fields

on (query)

query_name (outer_scoped=[])

sql_shortref

update (*args, **kwargs)

with_alias (alias)

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 ()
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)
query_name (*args, **kwargs)
sql_fullref
sql_shortref
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)
```

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