Django Evolution Documentation

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CONTENTS

Django Evolution tracks all the apps in your Django project, recording information on the structure of models, their fields, indexes, and so on.

When you make any change to a model that would need to be reflected in the database, Django Evolution will tell you that you'll need an evolution file to apply those changes, and will suggest one for you.

Evolution files describe one or more changes made to models in an app. They can:

- Add fields
- Change the attributes on fields
- Rename fields
- Delete fields
- Change the indexes or constraints on a model
- Rename models
- Delete models
- Rename apps
- Delete apps
- Transition an app to Django's migrations
- Run arbitrary SQL

Django Evolution looks at the last-recorded state of your apps, the current state, and the evolution files. If those evolution files are enough to update the database to the current state, then Django Evolution will process them, turning them into an optimized list of SQL statements, and apply them to the database.

This can be done for the entire database as a whole, or for specific apps in the database.

Since some apps (particularly Django's own apps) make use of migrations (on Django 1.7 and higher), Django Evolution will also handle applying those migrations. It will do this in cooperation with the evolution files that it also needs to apply. However, it's worth pointing out that migrations are never optimized the way evolutions are (this is currently a limitation in Django).

CHAPTER

ONE

FREQUENTLY ASKED QUESTIONS

1.1 Who maintains Django Evolution?

Originally, Django Evolution was built by two guys in Perth, Australia: Ben Khoo and Russell Keith-Magee (a core developer on Django).

Since then, Django Evolution has been taken over by Beanbag, Inc.. We have a vested interest in keeping this alive, well-maintained, and open source for Review Board and other products.

1.2 Where do I go for support?

We have a really old mailing list over at Google Groups, where you can ask questions. Truthfully, this group is basically empty these days, but you can still ask there and we'll answer!

We also provide commercial support. You can reach out to us if you're using Django Evolution in production and want the assurance of someone you can reach 24/7 if something goes wrong.

1.3 What about bug reports?

You can report bugs on our bug tracker, hosted on Splat.

When you file a bug, please be as thorough as possible. Ideally, we'd like to see the contents of your `django_project_version` and `django_evolution` tables before and after the upgrade, along with any evolution files, models, and error logs.

1.4 How do I contribute patches/pull requests?

We'd love to work with you on your contributions to Django Evolution! It'll make our lives easier, for sure :)

While we don't work with pull requests, we do accept patches on reviews.reviewboard.org, our Review Board server. You can get started by cloning our GitHub repository, and install RBTools (the Review Board command line tools).

To post new changes from your feature branch for review, run:

```
$ rbt post
```

To update an existing review request:

```
$ rbt post -u
```

See the RBTools documentation for more usage info.

1.5 Why evolutions and not migrations?

While most new projects would opt for Django's own *migrations*, there are a few advantages to using evolutions:

1. Evolutions are faster to apply than migrations when upgrading between arbitrary versions of the schema.

   Migrations are applied one at a time. If you have 10 migrations modifying one table, then you'll trigger a table rebuild 10 times, which is slow – particularly if there's a lot of data in that table.

   Evolutions going through an optimization process before they're applied, determining the smallest amount of changes needed. 10 evolutions for a table will generally only trigger a single table rebuild.

   When you fully own the databases you're upgrading, this may not matter, as you're probably applying new migrations as you write them. However, if you are distributing self-installed web services (such as Review Board), administrators may not upgrade often. Evolutions help keep these large upgrades from taking forever.

2. There's a wide range of Django support.

   If you are still maintaining legacy applications on Django 1.6, it may be hard to transition to newer versions. By switching to Django Evolution, there's a transition path. You can use evolutions for the apps you control without conflicting with migrations, and begin the upgrade path to modern versions of Django.

   At any time, you can easily switch some or all of your apps from evolutions to migrations, and Django Evolution will take care of it automatically.

3. Django Evolution is easier for some development processes.

   During development, you may make numerous changes to your database, necessitating schema changes that you wouldn't want to apply in production. With migrations, you'd need to squash those development-only migration files, which doesn't play as well if some beta users have only a subset of those migrations applied.

1.6 Can I switch apps from evolutions to migrations?

Yes, you can! The *MoveToDjangoMigrations* mutation will instruct Django Evolution to use *migrations* instead of evolutions for any future changes. Before it hands your app off entirely, it will apply any unapplied evolutions, ensuring a sane starting point for your new migrations.

1.7 Can I switch apps from migrations to evolutions?

No, it's one way for now. We might add this if anyone wants it in the future. For now, we assume that people using migrations are satisfied with that, and aren't looking to move to evolutions.

1.8 Why do my syncdb/migrate commands act differently?

Starting in Django Evolution 2.0, the *evolve* command has taken over all responsibilities for creating and updating the database, replacing `syncdb` and `migrate`.

For compatibility, those two commands have been replaced, wrapping *evolve* instead. Some functionality had to be stripped away from the original commands, though.

Our `syncdb` and `migrate` commands don't support loading `initial_data` fixtures. This feature was deprecated in Django 1.7 and removed in 1.9, and keeping support between Django versions is tricky. We've opted not to include it (at least for now).

Our `migrate` command doesn't support specifying explicit migration names to apply, or using `--fake` to pretend migrations were applied.

It's possible we'll add compatibility in the future, but only if demand is strong.

CHAPTER

TWO

INSTALLING DJANGO EVOLUTION

To install Django Evolution, simply run:

```
$ pip install django_evolution
```

You'll probably want to add that as a package dependency to your project.

Then add `django_evolution` to your project's `INSTALLED_APPS`.

CHAPTER

THREE

WRITING EVOLUTIONS

Evolution files describe a set of changes made to an app or its models. These are Python files that live in the *appdir*/evolutions/ directory. The name of the file (minus the .py extension) is called an *evolution label*, and can be whatever you want, so long as it's unique for the app. These files look something like:

Listing 1: myapp/evolutions/my_evolution.py

```
from __future__ import unicode_literals

from django_evolution.mutations import AddField


MUTATIONS = [
    AddField('MyModel', 'my_field', models.CharField, max_length=100,
             null=True),
]
```

Evolution files can make use of any supported *App and Model Mutations* (classes like AddField above) to describe the changes made to your app or models.

Once you've written an evolution file, you'll need to place its label in the app's *appdir*/evolutions/__init__.py in a list called SEQUENCE. This specifies the order in which evolutions should be processed. These look something like:

Listing 2: myapp/evolutions/__init__.py

```
from __future__ import unicode_literals

SEQUENCE = [
    'my_evolution',
]
```

3.1 Example

Let's go through an example, starting with a model.

Listing 3: blogs/models.py

```
class Author(models.Model):
    name = models.CharField(max_length=50)
    email = models.EmailField()
    date_of_birth = models.DateField()
```

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```
class Entry(models.Model):
    headline = models.CharField(max_length=255)
    body_text = models.TextField()
    pub_date = models.DateTimeField()
    author = models.ForeignKey(Author)
```

At this point, we'll assume that the project has been previously synced to the database using something like `./manage.py syncdb` or `./manage.py migrate --run-syncdb`. We will also assume that it does *not* make use of *migrations*.

3.1.1 Modifying Our Model

Perhaps we decide we don't actually need the birthdate of the author. It's just extra data we're doing nothing with, and increases the maintenance burden. Let's get rid of it.

```
 class Author(models.Model):
     name = models.CharField(max_length=50)
     email = models.EmailField()
-    date_of_birth = models.DateField()
```

The field is gone, but it's still in the database. We need to generate an evolution to get rid of it.

We can get a good idea of what this should look like by running:

```
$ ./manage.py evolve --hint
```

Which gives us:

```
#----- Evolution for blogs
from __future__ import unicode_literals

from django_evolution.mutations import DeleteField


MUTATIONS = [
    DeleteField('Author', 'date_of_birth'),
]
#----------------------

Trial upgrade successful!
```

As you can see, we got some output showing us what the evolution file might look like to delete this field. We're also told that this worked – this evolution was enough to update the database based on our changes. If we had something more complex (like adding a non-null field, requiring some sort of initial value), then we'd be told we still have changes to make.

Let's dump this sample file in `blogs/evolutions/remove_date_of_birth.py`:

Listing 4: blogs/evolutions/remove_date_of_birth.py

```
from __future__ import unicode_literals

from django_evolution.mutations import DeleteField
```

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```
MUTATIONS = [
    DeleteField('Author', 'date_of_birth'),
]
```

(Alternatively, we could have run `./manage.py evolve -w remove_date_of_birth`, which would create this file for us, but let's start off this way.)

Now we need to tell Django Evolution we want this in our evolution sequence:

Listing 5: blogs/evolutions/remove_date_of_birth.py

```
from __future__ import unicode_literals

SEQUENCE = [
    'remove_date_of_birth',
]
```

We're done with the hard work! Time to apply the evolution:

```
$ ./manage.py evolve --execute

You have requested a database upgrade. This will alter tables and data
currently in the "default" database, and may result in IRREVERSABLE
DATA LOSS. Upgrades should be *thoroughly* reviewed and tested prior
to execution.

MAKE A BACKUP OF YOUR DATABASE BEFORE YOU CONTINUE!

Are you sure you want to execute the database upgrade?

Type "yes" to continue, or "no" to cancel: yes

This may take a while. Please be patient, and DO NOT cancel the
upgrade!

Applying database evolution for blogs...
The database upgrade was successful!
```

Tada! Now if you look at the columns for your `blogs_author` table, you'll find that `date_of_birth` is gone.

You can make changes to your models as often as you need to. Add and delete the same field a dozen times across dozens of evolutions, if you like. Evolutions are automatically optimized before applied, resulting in the smallest set of changes needed to get your database updated.

CHAPTER

FOUR

APP AND MODEL MUTATIONS

Evolutions are composed of one or more mutations, which mutate the state of the app or models. There are several mutations included with Django Evolution, which we'll take a look at here.

4.1 Field Mutations

4.1.1 AddField

`AddField` is used to add new fields to a table. It takes the following parameters:

class AddField(*model_name*, *field_name*, *field_type*, *initial=None*, ***field_attrs*)

Parameters

- **model_name** (*str*) – The name of the model the field was added to.
- **field_name** (*str*) – The name of the new field.
- **field_type** (*type*) – The field class.
- **initial** – The initial value to set for the field. Each row in the table will have this value set once the field is added. It's required if the field is non-null.
- **field_attrs** (*dict*) – Attributes to pass to the field constructor. Only those that impact the schema of the table are considered (for instance, `null=...` or `max_length=...`, but not `help_text=...`.

For example:

```
from django.db import models
from django_evolution.mutations import AddField


MUTATIONS = [
    AddField('Book', 'publish_date', models.DateTimeField, null=True),
]
```

4.1.2 ChangeField

`ChangeField` can make changes to existing fields, altering the attributes (for instance, increasing the maximum length of a `CharField`).

Note: This cannot be used to change the field type.

It takes the following parameters:

class ChangeField(*model_name*, *field_name*, *initial=None*, ***field_attrs*)

Parameters

- **model_name** (*str*) – The name of the model containing the field.
- **field_name** (*str*) – The name of the field to change.
- **initial** – The new initial value to set for the field. If the field previously allowed null values, but `null=False` is being passed, then this will update all existing rows in the table to have this initial value.
- **field_attrs** (*dict*) – The field attributes to change. Only those that impact the schema of the table are considered (for instance, `null=...` or `max_length=...`, but not `help_text=...`.

For example:

```
from django.db import models
from django_evolution.mutations import ChangeField


MUTATIONS = [
    ChangeField('Book', 'name', max_length=100, null=False),
]
```

4.1.3 DeleteField

`DeleteField` will delete a field from the table, erasing its data from all rows. It takes the following parameters:

class DeleteField(*model_name*, *field_name*)

Parameters

- **model_name** (*str*) – The name of the model containing the field to delete.
- **field_name** (*str*) – The name of the field to delete.

For example:

```
from django.db import models
from django_evolution.mutations import ChangeField


MUTATIONS = [
    ChangeField('Book', 'name', max_length=100, null=False),
]
```

4.1.4 RenameField

`RenameField` will rename a field in the table, preserving all stored data. It can also set an explicit column name (in case the name is only changing in the model) or a `ManyToManyField` table name.

If working with a `ManyToManyField`, then the parent table won't actually have a real column backing it. Instead, the relationships are all maintained using the "through" table created by the field. In this case, the `db_column` value will be ignored, but `db_table` can be set.

It takes the following parameters:

class RenameField(*model_name*, *old_field_name*, *new_field_name*, *db_column=None*, *db_table=None*)

Parameters

- **model_name** (*str*) – The name of the model containing the field to delete.
- **old_field_name** (*str*) – The old name of the field on the model.
- **new_field_name** (*str*) – The new name of the field on the model.
- **db_column** (*str*) – The explicit name of the column on the table to use. This may be the original column name, if the name is only being changed on the model (which means no database changes may be made).
- **db_table** (*str*) – The explicit name of the "through" table to use for a `ManyToManyField`. If changed, then that table will be renamed. This is ignored for any other types of fields.

  If the table name hasn't actually changed, then this may not make any changes to the database.

For example:

```
from django_evolution.mutations import RenameField


MUTATIONS = [
    RenameField('Book', 'isbn_number', 'isbn', column_name='isbn_number'),
    RenameField('Book', 'critics', 'reviewers',
                db_table='book_critics')
]
```

4.2 Model Mutators

4.2.1 ChangeMeta

`ChangeMeta` can change certain bits of metadata about a model. For example, the indexes or unique-together constraints. It takes the following parameters:

class ChangeMeta(*model_name*, *prop_name*, *new_value*)

Parameters

- **model_name** (*str*) – The name of the model containing the field to delete.
- **prop_name** (*str*) – The name of the property to change, as documented below.
- **new_value** – The new value for the property.

The properties that can be changed depend on the version of Django. They include:

index_together: Groups of fields that should be indexed together in the database.

This is represented by a list of tuples, each of which groups together multiple field names that should be indexed together in the database.

`index_together` support requires Django 1.5 or higher. The last versions of Django Evolution to support Django 1.5 was the 0.7.x series.

indexes: Explicit indexes to create for the model, optionally grouping multiple fields together and optionally naming the index.

This is represented by a list of dictionaries, each of which contain a `fields` key and an optional `name` key. Both of these correspond to the matching fields in Django's `Index` class.

`indexes` support requires Django 1.11 or higher.

unique_together: Groups of fields that together form a unique constraint. Rows in the database cannot repeat the same values for those groups of fields.

This is represented by a list of tuples, each of which groups together multiple field names that should be unique together in the database.

`unique_together` support is available in all supported versions of Django.

For example:

```
from django_evolution.mutations import ChangeMeta


MUTATIONS = [
    ChangeMeta('Book', 'index_together', [('name', 'author')]),
]
```

Changed in version 2.0: Added support for `indexes`.

4.2.2 DeleteModel

`DeleteModel` removes a model from the database. It will also remove any "through" models for any of its `ManyToManyFields`. It takes the following parameters:

class DeleteModel(*model_name*)

Parameters **model_name** (*str*) – The name of the model to delete.

For example:

```
from django_evolution.mutations import DeleteModel


MUTATIONS = [
    DeleteModel('Book'),
]
```

4.2.3 RenameModel

`RenameModel` will rename a model and update all relations pointing to that model. It requires an explicit underlying table name, which can be set to the original table name if only the Python-side model name is changing. It takes the following parameters:

class RenameModel(*old_model_name*, *new_model_name*, *db_table*)

Parameters

- **old_model_name** (*str*) – The old name of the model.
- **new_model_name** (*str*) – The new name of the model.
- **db_table** (*str*) – The explicit name of the underlying table.

For example:

```
from django_evolution.mutations import RenameModel


MUTATIONS = [
    RenameModel('Critic', 'Reviewer', db_table='books_reviewer'),
]
```

4.3 App Mutators

4.3.1 DeleteApplication

`DeleteApplication` will remove all the models for an app from the database, erasing all associated data. This mutation takes no parameters.

Note: Make sure that any relation fields from other models to this app's models have been removed before deleting an app.

In many cases, you may just want to remove the app from your project's `INSTALLED_APPS`, and leave the data alone.

For example:

```
from django_evolution.mutations import DeleteApplication


MUTATIONS = [
    DeleteApplication(),
]
```

4.3.2 MoveToDjangoMigrations

`MoveToDjangoMigrations` will tell Django Evolution that any future changes to the app or its models should be handled by Django's *migrations* instead evolutions. Any unapplied evolutions will be applied before applying any migrations.

This is a one-way operation. Once an app moves from evolutions to migrations, it cannot move back.

Since an app may have had both evolutions and migrations defined in the tree (in order to work with both systems), this takes a `mark_applied=` parameter that lists the migrations that should be considered applied by the time this mutation is run. Those migrations will be recorded as applied and skipped.

class MoveToDjangoMigrations(*mark_applied=['0001_initial']*)

Parameters **mark_applied** (*list*) – The list of migrations that should be considered applied when running this mutation. This defaults to the `0001_initial` migration.

For example:

```
from django_evolution.mutations import MoveToDjangoMigrations


MUTATIONS = [
    MoveToDjangoMigrations(mark_applied=['0001_initial',
                                         '0002_book_add_isbn']),
]
```

New in version 2.0.

4.3.3 RenameAppLabel

`RenameAppLabel` will rename the stored app label for the app, updating all references made in other models. It won't change indexes or any database state, however.

Django 1.7 moved to an improved concept of app labels that could be customized and were guaranteed to be unique within a project (we'll call these *modern app labels*). Django 1.6 and earlier generated app labels based on the app's module name (*legacy app labels*).

Because of this, older stored *project signatures* may have grouped together models from two different apps (both with the same app labels) together. Django Evolution will *try* to untangle this, but in complicated cases, you may need to supply a list of model names for the app (current and possibly older ones that have been removed). Whether you need to do this is entirely dependent on the structure of your project. Test it in your upgrades.

This takes the following parameters:

class RenameAppLabel(*old_app_label*, *new_app_label*, *legacy_app_label=None*, *model_names=None*)

Parameters

- **old_app_label** (*str*) – The old app label that's being renamed.
- **new_app_label** (*str*) – The new modern app label to rename to.
- **legacy_app_label** (*str*) – The legacy app label for the new app name. This provides compatibility with older versions of Django and helps with transition apps and models.
- **model_names** (*list*) – The list of model names to move out of the old signature and into the new one.

For example:

```
from django_evolution.mutations import RenameAppLabel


MUTATIONS = [
    RenameAppLabel('admin', 'my_admin', legacy_app_label='admin',
                   model_names=['Report', 'Config']),
]
```

New in version 2.0.

4.4 Other Mutators

4.4.1 SQLMutation

`SQLMutation` is an advanced mutation used to make arbitrary changes to a database and to the stored project signature. It may be used to make changes that cannot be made by other mutators, such as altering tables not managed by Django, changing a table engine, making metadata changes to the table or database, or modifying the content of rows.

SQL from this mutation cannot be optimized alongside other mutations.

This takes the following parameters:

class SQLMutation(*tag*, *sql*, *update_func=None*)

Parameters

- **tag** (*str*) – A unique identifier for this SQL mutation within the app.
- **sql** (*list/str*) – A list of SQL statements, or a single SQL statement as a string, to execute. Note that this will be database-dependent.
- **update_func** (*callable*) – A function to call to perform additional operations or update the *project signature*.

Note: There's some caveats with providing an `update_func`.

Django Evolution 2.0 introduced a new form for this function that takes in a *django_evolution.mutations.Simulation* object, which can be used to access and modify the stored *project signature*. This is safe to use (well, relatively – try not to blow anything up).

Prior versions supported a function that took two arguments: The app label of the app that's being evolved, and a serialized dictionary representing the project signature.

If using the legacy style, it's *possible* that you can mess up the signature data, since we have to serialize to an older version of the signature and then load from that. Older versions of the signature don't support all the data that newer versions do, so how well this works is really determined by the types of evolutions that are going to be run.

We **strongly** recommend updating *any* `SQLMutation` calls to use the new-style function format, for safety and future compatibility.

For example:

```
from django_evolution.mutations import SQLMutation
```

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```
def _update_signature(simulation):
    pass


MUTATIONS = [
    SQLMutation('set_innodb_engine',
                'ALTER TABLE my_table ENGINE = MYISAM;',
                update_func=_update_signature),
]
```

Changed in version 2.0: Added the new-style `update_func`.

CHAPTER

FIVE

MANAGEMENT COMMANDS

5.1 evolve

The **evolve** command is responsible for setting up databases and applying any evolutions or *migrations*.

This is a replacement for both the **syncdb** and **migrate** commands in Django. Running either of this will wrap **evolve** (though not all of the command's arguments will be supported when Django Evolution is enabled).

5.1.1 Creating/Updating Databases

To construct a new database or apply updates, you will generally just run:

```
$ ./manage.py evolve --execute
```

This is the most common usage for **evolve**. It will create any missing models and apply any unapplied evolutions or *migrations*.

Changed in version 2.0: **evolve** now replaces both **syncdb** and **migrate**. In previous versions, it had to be run after **syncdb**.

5.1.2 Generating Hinted Evolutions

When making changes to a model, it helps to see how the evolution should look before writing it. Sometimes the evolution will be usable as-is, but sometimes you'll need to tweak it first.

To generate a hinted evolution, run:

```
$ ./manage.py evolve --hint
```

Hinted evolutions can be automatically written by using *--write*, saving you a little bit of work:

```
$ ./manage.py evolve --hint --write my_new_evolution
```

This will take any app with a hinted evolution and write a *appdir*/evolutions/my_new_evolution.py file. You will still need to add your new evolution to the SEQUENCE list in *appdir*/evolutions/__init__.py.

If you only want to write hints for a specific app, pass the app labels on the command line, like so:

```
$ ./manage.py evolve --hint --write my_new_evolution my_app
```

5.1.3 Arguments

<APP_LABEL...>
Zero or more specific app labels to evolve. If provided, only these apps will have evolutions or *migrations* applied. If not provided, all apps will be considered for evolution.

--database <DATABASE>
The name of the configured database to perform the evolution against.

--hint
Display sample evolutions that fulfill any database changes for apps and models managed by evolutions. This won't include any apps or models managed by *migrations*.

--noinput
Perform evolutions automatically without any input.

--purge
Remove information on any non-existent applications from the stored project signature. This won't remove the models themselves. For that, see *DeleteModel* or *DeleteApplication*.

--sql
Display the generated SQL that would be run if applying evolutions. This won't include any apps or models managed by *migrations*.

-w <EVOLUTION_NAME>, **--write** <EVOLUTION_NAME>
Write any hinted evolutions to a file named *appdir*/evolutions/*EVOLUTION_NAME*. This will *not* include the evolution in *appdir*/evolutions/__init__.py.

-x, --execute
Execute the evolution process, applying any evolutions and *migrations* to the database.

> **Warning:** This can be used in combination with *--hint* to apply hinted evolutions, but this is generally a **bad idea**, as the execution is not properly repeatable or trackable.

5.2 list-evolutions

The **list-evolutions** command lists all the evolutions that have so far been applied to the database. It can be useful for debugging, or determining if a specific evolution has yet been applied.

5.2.1 Example

```
$ ./manage.py list-evolutions my_app
Applied evolutions for 'my_app':
    add_special_fields
    update_app_label
    change_name_max_length
```

5.2.2 Arguments

<APP_LABEL...>
Zero or more specific app labels to list. If provided, only evolutions on these apps will be shown.

5.3 wipe-evolution

The **wipe-evolution** command is used to remove evolutions from the list of applied evolutions.

This is really only useful if you're working to recover from a bad state where you've undone the changes made by an evolution and need to re-apply it. It should never be used under normal use, especially on a production database.

By default, this command will confirm before wiping the evolution from the history. You can use *--noinput* to avoid the confirmation step.

To see the list of evolutions that can be wiped, run **list-evolutions**.

5.3.1 Example

```
$ ./manage.py wipe-evolution --app-label my_app change_name_max_length
```

5.3.2 Arguments

EVOLUTION_LABEL ...
One or more specific evolution labels to remove from the database. If the same evolution names exist for multiple apps, they'll all be removed. To isolate them to a specific app, use *--app-label*.

--app-label <APP_LABEL>
An app label to limit evolution labels to. Only evolutions on this app will be wiped.

--noinput
Perform the wiping procedure automatically without any input.

CHAPTER

SIX

GLOSSARY

evolution label The name of a particular evolution for an app. These must be unique within an app, but do not have to be unique within a project.

legacy app label

legacy app labels The form of app label used in Django 1.6 and earlier. Legacy app labels are generated solely from the app's module name.

migrations Django 1.7+'s built-in method of managing changes to the database schema. See the migrations documentation.

modern app label

modern app labels The form of app label used in Django 1.7 and later. Modern app labels default to being generated from the app's module name, but can be customized.

project signature

project signatures A stored representation of all the apps and models in your project. This is stored in the `django_project_version` table, and is a critical part in determining how the database has evolved and what changes need to be made.

In Django Evolution 2.0 and higher, this is stored as JSON data. In prior versions, this was stored as Pickle protocol 0 data.

CHAPTER

SEVEN

RELEASE NOTES

7.1 2.0 Releases

7.1.1 Django Evolution 2.0

Release date: August 13, 2020

New Features

All-New Documentation

We have new documentation for Django Evolution, covering installation, usage, a FAQ, and all release notes.

Support for Python 3

Django Evolution is now fully compatible with Python 2.7 and 3.5 through 3.8, allowing it to work across all supported versions of Django.

Speaking of that...

Support for Django 1.6 through 3.1

Django Evolution 2.0 supports Django 1.6 through 3.1. Going forward, it will continue to support newer versions of Django as they come out.

This includes modern features, like `Meta.indexes` and `Meta.conditions`.

We can offer this due to the new cooperative support for Django's schema migrations.

Compatibility with Django Migrations

Historically, Django Evolution has been a standalone schema migration framework, and was stuck with supporting versions of Django prior to 1.7, since evolutions and migrations could not co-exist.

That's been resolved. Django Evolution now controls the entire process, applying both migrations and evolutions together, ensuring a smooth upgrade. Projects get the best of both worlds:

- The ability to use apps that use migrations (most everything, including Django itself)
- Optimized upgrades for the project's own evolution-based models (especially when applying large numbers of evolutions to the same table)

New Evolve Command

In Django Evolution 2.0, the `evolve` command becomes the sole way of applying both evolutions and migrations, replacing the `migrate`/`syncdb` commands.

To set up or upgrade a database (using both evolutions and migrations), you'll simply run `evolve --execute`. This will work across all versions of Django.

The old `migrate` and `syncdb` commands will still technically work, but they'll wrap `evolve --execute`.

This can all be disabled by setting `DJANGO_EVOLUTION_ENABLED = False` in `settings.py`.

Note: `initial_data` fixtures will no longer be loaded. These have already been deprecated in Django, but it's worth mentioning for users of older versions of Django.

Also, the `migrate` command will no longer allow individual migrations to be applied.

Moving Apps to Migrations

Projects can transition some or all of their apps to migrations once the last of the evolutions are applied, allowing them to move entirely onto migrations if needed. This is done with the new `MoveToMigrations` mutation.

Simply add one last evolution for an app:

```
from django_evolution.mutations import MoveToDjangoMigrations


MUTATIONS = [
    MoveToDjangoMigrations(),
]
```

This will apply after the last evolution is applied, and from then on all changes to the models will be controlled via migrations.

Note: Once an app has been moved to migrations, it cannot be moved back to evolutions.

Improved Database Compatibility

- Support for constraints on modern versions of MySQL/MariaDB.

  Modern versions of MySQL and MariaDB are now explicitly supported, allowing projects using Django 2.2+ to take advantage of `CHECK` constraints. This requires MySQL 8.0.16+ or MariaDB 10.2.1+ on Django 3.0+.

- Faster and safer SQLite table rebuilds.

  Changes to SQLite databases are now optimized, resulting in far fewer table rebuilds when changes are made to a model.

- Support for SQLite 3.25+ column renaming.

  SQLite 3.25 introduced `ALTER TABLE ... RENAME COLUMN` syntax, which is faster than a table rebuild and avoids a lot of issues with preserving column references.

- We use Django 1.7's schema rewriting for more of the SQL generation.

  This helps ensure future compatibility with new releases of Django, and allows for leveraging more of Django's work toward database compatibility.

Project-Defined Custom Evolutions

Projects can provide a new `settings.CUSTOM_EVOLUTIONS` setting to define custom evolution modules for apps that don't otherwise make use of evolutions or migrations. The value is a mapping of app module names (same ones you'd see in `settings.INSTALLED_APPS` to an evolutions module path.

This looks like:

```
CUSTOM_EVOLUTIONS = {
    'other_project.contrib.foo': 'my_project.compat.foo.evolutions',
}
```

Evolver API

The entire evolution/migration process can now be controlled programmatically through the *Evolver* class. This allows an entire database, or just select apps, to be evolved without calling out to a management command.

While most projects will not have a need for this, it's available to those that might want some form of specialized control over the evolution process (for automation, selectively evolving models from an extension/plug-in, or providing an alternative management/upgrade experience).

During an evolution, new signals are emitted, allowing apps to hook into the process and perform any updates they might need:

- *evolved*
- *evolving*
- *evolving_failed*
- *applying_evolution*
- *applied_evolution*
- *applying_migration*
- *applied_migration*
- *created_models*

- *creating_models*

New Database Signature Format

Django Evolution stores a representation of the database in the *Version* table, in order to track what's been applied and what changes have been made since.

Historically, this has used some older structured data schema serialized in Pickle Protocol 0 format. As of Django Evolution 2.0, it's now using a new schema stored in JSON format, which is designed for future extensibility.

Internally, this is represented by a *set of classes* with a solid API that's independent of the storage format. This eases the addition of new features, and makes it easier to diagnose problems or write custom tools.

Warning: This will impact any *SQLMutations* that modify a signature. These will need to be updated to use the new classes, instead of modifying the older schema dictionaries.

Bug Fixes

SQLite

- Fixed constraint references from other tables when renaming primary key columns.
- Fixed restoring all table indexes after rebuilding a table.

Contributors

- Christian Hammond

7.2 0.7 Releases

7.2.1 Django Evolution 0.7.8

Release date: June 14, 2018

Packaging

- Eggs and wheels are now built only for Python 2.7.

  Older versions of Python are no longer packaged. Source tarballs may work, but we recommend that anyone still on older versions of Python upgrade at their earliest convenience.

Bug Fixes

- Fixed an issue generating `unique_together` constraints on Postgres in some configurations.

  Depending on the table/index names, `unique_together` constraints could fail to generate on Posrgres, since the names weren't being escaped.

Contributors

- Christian Hammond

7.2.2 Django Evolution 0.7.7

Release date: May 25, 2017

New Features

- Added a note about backing up the database and not cancelling before executing an evolution.

  The confirmation prompt for executing an evolution now suggests backing up the database first. This is only shown in interactive mode.

  After the user has confirmed, they're told it may take time and to not cancel the upgrade.

- Added more output when performing evolutions for apps.

  When evolving the database, a message is now outputted to the console for each app being evolved. This gives a sense of progress for larger evolutions.

  If the evolution fails, an error message will be shown listing the app that failed evolution, the specific SQL statement that failed, and the database error. This can help when diagnosing and recovering from the problem.

- Added an option for writing hinted evolution files.

  There's now an *`evolve -w`*/*`--write`* option that can be used with *`evolve --hint`* that writes the hinted evolution to the appropriate directories in the tree. This takes the name that should be used for the evolution file.

  This will not update the `evolutions/__init__.py` file.

Bug Fixes

- Fixed issues with evolution optimizations when renaming models.

  Django Evolution's evolution optimization code had issues when applying a series of evolutions that add a `ForeignKey` field to a newly-introduced model that is then renamed in the same batch. The resulting field would still point to the original model, resulting in a `KeyError`.

Contributors

- Christian Hammond

7.2.3 Django Evolution 0.7.6

Release date: December 1, 2015

Bug Fixes

- Fixed a false positive with schema errors when applying evolutions on MySQL.

  When applying new evolutions along with baseline schemas for new models, two version history entries are created, one for the new baselines, and one for the new, final schema. On MySQL, this can happen so quickly that they'll end up with the same timestamp (as there isn't a lot of precision in these fields).

  Due to internal sort orders, the next evolution then finds the version entry for the baseline schema, and not the final evolved schema, causing it to fail saying that there are changes that couldn't be applied.

  This fixes this problem by improving the sorting order.

- Fixed issues evolving certain changes from old database schemas.

  Old database schemas didn't track certain information, like the `index_together` information. The code was previously assuming the existence of this information and failing if it wasn't there. Evolving from these older schemas now works.

Contributors

- Barret Rennie
- Christian Hammond

7.2.4 Django Evolution 0.7.5

Release date: April 13, 2015

Bug Fixes

- Mutations on fields with the same name across different models no longer results in conflicts.

  With the new optimizer in *Django Evolution 0.7*, it was possible for mutations to be incorrectly optimized out if, for example, a field was added in one model and then later changed in another model, if both fields had the same name. This was due to the way in which we mapped mutations, and would result in an error in the validation stage before attempting any database modifications. There are no longer any conflicts between same-named field.

- Indexes are no longer created/deleted unnecessarily.

  If setting an index for a field, and it already exists in the database, there's no longer an attempt at creating it. Likewise, there's no longer an attempt at deleting an index that does not exist.

Contributors

- Christian Hammond

7.2.5 Django Evolution 0.7.4

Release date: September 15, 2014

New Features

- Add a *RenameModel* mutation for handling model renames.

  The new *RenameModel* mutation allows an evolution to indicate that a model has been renamed. This handles updating the signature for any related `ForeignKey` or `ManyToManyField` fields and generating any SQL to perform the table rename (if needed).

Contributors

- Christian Hammond

7.2.6 Django Evolution 0.7.3

Release date: July 24, 2014

Bug Fixes

- Fixed issues evolving `unique_together` attributes on models.

  When adding `unique_together` constraints and then changing them within a single evolve operation, any constraints listed more than once would result in unnecessary duplicate SQL statements. These would cause errors that would prevent the transaction from completing.

- Adding and removing a `unique_together` constraint within an evolve operation no longer breaks on PostgreSQL.
- Errors importing a database backend on a modern Django no longer results in unrelated errors about `settings.DATABASE_ENGINE`.

Contributors

- Christian Hammond

7.2.7 Django Evolution 0.7.2

Release date: June 2, 2014

Bug Fixes

- Fixed a crash from no-op column renames on PostgreSQL.

  When attempting to rename a column on PostgreSQL and specifying a "new" name that was the same as the old name, the result would be a crash. This is similar to the bug fixed in *Django Evolution 0.7.1*.

Contributors

- Christian Hammond

7.2.8 Django Evolution 0.7.1

Release date: May 21, 2014

New Features

- Fixed a crash from no-op column renames on MySQL.

  When attempting to rename a column on MySQL and specifying a "new" name that was the same as the old name, the result would be a crash. Likewise, there were crashes when renaming a `ManyToManyField`.

Contributors

- Christian Hammond

7.2.9 Django Evolution 0.7

Release date: February 3, 2014

Packaging

- Fixed the unit tests module being accidentally bundled with the package. (Bug #134)
- Fixed the missing `NEWS` file in the releases. (Bug #130)

Compatibility Changes

- Added compatibility with Django 1.5 and 1.6 (Bug #136).
- Dropped compatibility for versions of Django prior to 1.4.10.

New Features

- Added better support for dealing with indexes in the database.

  Django changed how index names were generated over time, leading to issues when evolving old databases. We now scan the database prior to evolution, gather the indexes, and look them up based on field data dynamically, guaranteeing we find the correct index.

  It's also more resilient now when using custom indexes placed by an administrator.

- Added support for evolving `unique_together` and `index_together` fields.

  `unique_together` was previously stored, but ignored, meaning that changes to a `unique_together` would not ever apply to an existing database.

  `index_together`, on the other hand, is new in Django 1.5, and was never even stored.

  There's now a *ChangeMeta* mutation that allows for changing `unique_together` and `index_together`.

  Models making use of `unique_together` or `index_together` will have to supply evolutions defining the current, correct values. These will appear when running `evolve --hint`.

- Optimized the SQL before altering the database.

  Mutations are now pre-processed and their output post-processed in order to reduce the number of table-altering mutations. This should massively reduce the amount of time it takes to update a database, particularly when there are multiple *AddField*, *ChangeField*, or *DeleteField* mutations on a single table.

  This is the biggest change in this release, and while it's been tested on some large sets of mutations, there may be regressions. Please report any issues you find.

  Custom field mutation classes will need to be updated to work with these changes.

Bug Fixes

- Fixed a number of issues with constraints on different databases. (Bug #127)
- Fixed an invalid variable reference when loading SQL evolution files. (Bug #121)
- SQL evolution files no longer break if there are blank lines. (Bug #111)
- Booleans are now normalized correctly when saving in the database. (Bug #125)

  Previously, invalid boolean values would be used, causing what should have been a "false" value to be "true".

Usage

- The evolve command no longer recommends running `evolve --hint --execute`, which can easily cause unwanted problems.

Testing

- Added easier unit testing for multiple database types.

  The `./tests/runtests.py` script now takes a database type as an argument. The tests will be run against that type of database.

  To make use of this, copy `test_db_settings.py.tmpl` to `test_db_settings.py` and fill in the necessary data.
- Fixed all the known unit test failures.
- Rewrote the test suite for better reporting and maintainability.

Contributors

- Christian Hammond

7.2.10 Django Evolution 0.7 Beta 1

Release date: January 14, 2014

Packaging

- Fixed the unit tests module being accidentally bundled with the package. (Bug #134)
- Fixed the missing `NEWS` file in the releases. (Bug #130)

Compatibility Changes

- Added compatibility with Django 1.5 (Bug #136).
- Dropped compatibility for versions of Django prior to 1.4.10.

New Features

- Added better support for dealing with indexes in the database.

  Django changed how index names were generated over time, leading to issues when evolving old databases. We now scan the database prior to evolution, gather the indexes, and look them up based on field data dynamically, guaranteeing we find the correct index.

  It's also more resilient now when using custom indexes placed by an administrator.
- Added support for evolving `unique_together` and `index_together` fields.

  `unique_together` was previously stored, but ignored, meaning that changes to a `unique_together` would not ever apply to an existing database.

  `index_together`, on the other hand, is new in Django 1.5, and was never even stored.

There's now a *ChangeMeta* mutation that allows for changing `unique_together` and `index_together`.

Models making use of `unique_together` or `index_together` will have to supply evolutions defining the current, correct values. These will appear when running `evolve --hint`.

- Optimized the SQL before altering the database.

  Mutations are now pre-processed and their output post-processed in order to reduce the number of table-altering mutations. This should massively reduce the amount of time it takes to update a database, particularly when there are multiple *AddField*, *ChangeField*, or *DeleteField* mutations on a single table.

  This is the biggest change in this release, and while it's been tested on some large sets of mutations, there may be regressions. Please report any issues you find.

  Custom field mutation classes will need to be updated to work with these changes.

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- Booleans are now normalized correctly when saving in the database. (Bug #125)

  Previously, invalid boolean values would be used, causing what should have been a "false" value to be "true".

Usage

- The evolve command no longer recommends running `evolve --hint --execute`, which can easily cause unwanted problems.

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  To make use of this, copy `test_db_settings.py.tmpl` to `test_db_settings.py` and fill in the necessary data.
- Fixed all the known unit test failures.
- Rewrote the test suite for better reporting and maintainability.

Contributors

- Christian Hammond

7.3 0.6 Releases

7.3.1 Django Evolution 0.6.9

Release date: March 13, 2013

Bug Fixes

- Django Evolution no longer applies upgrades that match the current state.

  When upgrading an old database, where a new model has been introduced and evolutions were added on that model, Django Evolution would try to apply the mutations after creating that baseline, resulting in confusing errors.

  Now we only apply mutations for parts of the database that differ between the last stored signature and the new signature. It should fix a number of problems people have hit when upgrading extremely old databases.

Contributors

- Christian Hammond

7.3.2 Django Evolution 0.6.8

Release date: February 8, 2013

New Features

- Added two new management commands: *list-evolutions* and *wipe-evolution*.

  list-evolutions lists all applied evolutions. It can take one or more app labels, and will restrict the output to those apps.

  wipe-evolution will wipe one or more evolutions from the database. This should only be used if absolutely necessary, and can cause problems. It is useful if there's some previously applied evolutions getting in the way, which can happen if a person is uncareful with downgrading and upgrading again.

Contributors

- Christian Hammond

7.3.3 Django Evolution 0.6.7

Release date: April 12, 2012

Bug Fixes

- Don't fail when an app doesn't contain any models.

  Installing a baseline for apps without models was failing. The code to install a baseline evolution assumed that all installed apps would have models defined, but this wasn't always true. We now handle this case and just skip over such apps.

Contributors

- Christian Hammond

7.3.4 Django Evolution 0.6.6

Release date: April 1, 2012

New Features

- Generate more accurate sample evolutions.

  The sample evolutions generated with *evolve --hint* should now properly take into account import paths for third-party database modules. Prior to this, such an evolution had to be modified by hand to work.

- Generate PEP-8-compliant sample evolutions.

  The evolutions are now generated according to the standards of PEP-8. This mainly influences blank lines around imports and the grouping of imports.

- Support Django 1.4's timezone awareness in the *Version* model.

  The *Version* model was generating runtime warnings when creating an instance of the model under Django 1.4, due to using a naive (non-timezone-aware) datetime. We now try to use Django's functionality for this, and fall back on the older methods for older versions of Django.

Contributors

- Christian Hammond

7.3.5 Django Evolution 0.6.5

Release date: August 15, 2011

New Features

- Added a built-in evolution to remove the Message model in Django 1.4 SVN.

  Django 1.4 SVN removes the `Message` model from `django.contrib.auth`. This would break evolutions, since there wasn't an evolution for this. We now install one if we detect that the `Message` model is gone.

Bug Fixes

- Fixed the version association for baseline evolutions for apps.

  The new code for installing a baseline evolution for new apps in *Django Evolution 0.6.4* was associating the wrong `Version` model with the `Evolution`. This doesn't appear to cause any real-world problems, but it does make it harder to see the proper evolution history in the database.

Contributors

- Christian Hammond

7.3.6 Django Evolution 0.6.4

Release date: June 22, 2011

New Features

- Install a baseline evolution history for any new apps.

  When upgrading an older database using Django Evolution when a new model has been added and subsequent evolutions were made on that model, the upgrade would fail. It would attempt to apply those evolutions on that model, which, being newly created, would already have those new field changes.

  Now, like with an initial database, we install a baseline evolution history for any new apps. This will ensure that those evolutions aren't applied to the models in that app.

Bug Fixes

- Fixed compatibility with Django SVN in the unit tests.

  In Django SVN r16053, `get_model()` and `get_models()` only return installed modules by default. This is calculated in part by a new `AppCache.app_labels` dictionary, along with an existing `AppCache.app_store`, neither of which we properly populated.

  We now set both of these (though, `app_labels` only on versions of Django that have it). This allows the unit tests to pass, both with older versions of Django and Django SVN.

Contributors

- Christian Hammond

7.3.7 Django Evolution 0.6.3

Release date: May 9, 2011

Bug Fixes

- Fixed multi-database support with different database backends.

  The multi-database support only worked when the database backends matched. Now it should work with different types. The unit tests have been verified to work now with different types of databases.

- Fixed a breaking with PostgreSQL when adding non-null columns with default values. (Bugs #58 and #74)

  Adding new columns that are non-null and have a default value would break with PostgreSQL when the table otherwise had data in it. The SQL for adding a column is an `ALTER TABLE` followed by an `UPDATE` to set all existing records to have the new default value. PostgreSQL, however, doesn't allow this within the same transaction.

  Now we use two `ALTER TABLEs`. The first adds the column with a default value, which should affect existing records. The second drops the default. This should ensure that the tables have the data we expect while at the same time keeping the field attributes the same as what Django would generate.

Contributors

- Christian Hammond

7.3.8 Django Evolution 0.6.2

Release date: November 19, 2010

New Features

- Add compatibility with Django 1.3.

  Django 1.3 introduced a change to the `Session.expire_date` field's schema, setting `db_index` to `True`. This caused Django Evolution to fail during evolution, with no way to provide an evolution file to work around the problem. Django Evolution now handles this by providing the evolution when running with Django 1.3 or higher.

Contributors

- Christian Hammond

7.3.9 Django Evolution 0.6.1

Release date: October 25, 2010

Bug Fixes

- Fixed compatibility problems with both Django 1.1 and Python 2.4.

Contributors

- Christian Hammond

7.3.10 Django Evolution 0.6

Release date: October 24, 2010

New Features

- Added support for Django 1.2's ability to use multiple databases.

  This should use the existing routers used in your project. By default, operations will happen on the 'default' database. This can be overridden during evolution by passing `--database=<dbname>` to the *evolve* command.

  Patch by Marc Bee and myself.

Contributors

- Christian Hammond
- Marc Bee

7.4 0.5 Releases

7.4.1 Django Evolution 0.5.1

Release date: October 13, 2010

New Features

- Made the *evolve* management command raise `CommandError` instead of `sys.exit()` on failure. This makes it callable from third party software.

  Patch by Mike Conley.

- Made the *evolve* functionality available through an `evolve()` function in the management command, allowing the rest of the command-specific logic to be skipped (such as console output and prompting).

  Patch by Mike Conley.

Bug Fixes

- Fixed incorrect defaults on SQLite when adding null fields. (Bug #49)

  On SQLite, adding a null field without a default value would cause the field name to be the default. This was due to attempting to select the field name from the temporary table, but since the table didn't exist, the field name itself was being used as the value.

  We are now more explicit about the fields being selected and populated. We have two lists, and no longer assume both are identical. We also use NULL columns for temporary table fields unconditionally.

  Patch by myself and Chris Beaven.

Contributors

- Chris Beaven
- Christian Hammond
- Mike Conley

7.4.2 Django Evolution 0.5

Release date: May 18, 2010

Initial public release.

CHAPTER

EIGHT

DJANGO EVOLUTION DOCUMENTATION

Django Evolution is a database schema migration tool for projects using the Django web framework. Its job is to help projects make changes to a database's schema – the structure of the tables and columns and indexes – in the fastest way possible (incurring minimum downtime) and in a way that works across all Django-supported databases.

This is very similar in concept to the built-in *migrations* support in Django 1.7 and higher. Django Evolution predates both Django's own migrations, and works alongside it to transition databases taking advantage of the strengths of both migrations and evolutions.

While most will be fine with *migrations*, there's a couple reasons why you might find Django Evolution a worthwhile addition to your project:

1. You're still stuck on Django 1.6 or earlier and need to make changes to your database.

   Django 1.6 is the last version without built-in support for migrations, and there are still codebases out there using it. Django Evolution can help keep upgrades manageable, and make it easier to transition all or part of your codebase to migrations when you finally upgrade.

2. You're distributing a self-installable web application, possibly used in large enterprises, where you have no control over when people are going to upgrade.

   Django's migrations assume some level of planning around when changes are made to the schema and when they're applied to a database. The more changes you make, and the more versions in-between what the user is running and what they upgrade to, the longer the upgrade time.

   If a customer is in control of when they upgrade, they might end up with *years* of migrations that need to be applied.

   Migrations apply one-by-one, possibly triggering the rebuild of a table many times during an upgrade. Django Evolution, on the other hand, can apply years worth of evolutions at once, optimized to perform as few table changes as possible. This can take days, hours or even *seconds* off the upgrade time.

Django Evolution officially supports Django 1.6 through 3.1.

8.1 Questions So Far?

- *How Does It Work?*

8.2 Let's Get Started

- *Install Django Evolution*
- *Writing Your First Evolution*
- *Exploring App and Model Mutations*
- *Apply evolutions with `evolve –execute`*

8.3 Reference

8.3.1 Module and Class References

Note: Most of the codebase should not be considered stable API, as many parts will change.

The code documented here is a subset of the codebase. Backend database implementations and some internal modules are not included.

`django_evolution`	Django Evolution version and package information.
`django_evolution.consts`	Constants used throughout Django Evolution.
`django_evolution.diff`	Support for diffing project signatures.
`django_evolution.errors`	Standard exceptions for Django Evolution.
`django_evolution.evolve`	Main interface for evolving applications.
`django_evolution.mock_models`	Utilities for building mock database models and fields.
`django_evolution.models`	Database models for tracking project schema history.
`django_evolution.mutations`	Support for schema mutation operations and hint output.
`django_evolution.mutators`	Classes that optimize mutations and generate SQL to apply.
`django_evolution.signals`	Signals for monitoring the evolution process.
`django_evolution.signature`	Classes for working with stored evolution state signatures.
`django_evolution.support`	Constants indicating available Django features.
`django_evolution.compat.apps`	Compatibility functions for the application registration.
`django_evolution.compat.commands`	Compatibility module for management commands.
`django_evolution.compat.datastructures`	Compatibility imports for data structures.
`django_evolution.compat.db`	Compatibility functions for database-related operations.
`django_evolution.compat.models`	Compatibility functions for model-related operations.
`django_evolution.compat.picklers`	Picklers for working with serialized data.
`django_evolution.compat.py23`	Compatibility functions for Python 2 and 3.
`django_evolution.db.common`	Common evolution operations backend for databases.
`django_evolution.db.mysql`	Evolution operations backend for MySQL/MariaDB.
`django_evolution.db.postgresql`	Evolution operations backend for Postgres.
`django_evolution.db.sql_result`	Classes for storing SQL statements and Alter Table operations.
`django_evolution.db.sqlite3`	Evolution operations backend for SQLite.
`django_evolution.db.state`	Database state tracking for in-progress evolutions.
`django_evolution.utils.apps`	Utilities for working with apps.

continues on next page

Table 1 – continued from previous page

django_evolution.utils.evolutions	Utilities for working with evolutions and mutations.
django_evolution.utils.migrations	Utility functions for working with Django Migrations.
django_evolution.utils.models	Utilities for working with models.
django_evolution.utils.sql	Utilities for working with SQL statements.

django_evolution

Django Evolution version and package information.

These variables and functions can be used to identify the version of Review Board. They're largely used for packaging purposes.

Functions

get_package_version()	
get_version_string()	
is_release()	

django_evolution.**get_version_string**()

django_evolution.**get_package_version**()

django_evolution.**is_release**()

django_evolution.consts

Constants used throughout Django Evolution.

Classes

EvolutionsSource()	The source for an app's evolutions.
UpgradeMethod()	Upgrade methods available for an application.

class django_evolution.consts.**UpgradeMethod**

Bases: object

Upgrade methods available for an application.

EVOLUTIONS = 'evolutions'

The app is upgraded through Django Evolution.

MIGRATIONS = 'migrations'

The app is upgraded through Django Migrations.

class django_evolution.consts.**EvolutionsSource**

Bases: object

The source for an app's evolutions.

APP = 'app'

The evolutions are provided by the app.

BUILTIN = 'builtin'
The evolutions are built-in to Django Evolution.

PROJECT = 'project'
The evolutions are provided custom by the project.

django_evolution.diff

Support for diffing project signatures.

Classes

Diff(original_project_sig, target_project_sig)	Generates diffs between project signatures.
NullFieldInitialCallback(app_label, ...)	A placeholder for an initial value for a field.

class django_evolution.diff.**NullFieldInitialCallback**(*app_label*, *model_name*, *field_name*)

Bases: object

A placeholder for an initial value for a field.

This is used in place of an initial value in mutations for fields that don't allow NULL values and don't have an explicit initial value set. It will show up in hinted evolutions as <<USER VALUE REQUIRED>> and will fail to evolve.

__init__(*app_label*, *model_name*, *field_name*)
Initialize the object.

Parameters

- **app_label** (*unicode*) – The label of the application owning the model.
- **model_name** (*unicode*) – The name of the model owning the field.
- **field_name** (*unicode*) – The name of the field to return an initial value for.

__repr__()
Return a string representation of the object.

This is used when outputting the value in a hinted evolution.

Returns <<USER VALUE REQUIRED>>

Return type unicode

__call__()
Handle calls on this object.

This will raise an exception stating that the evolution cannot be performed.

Raises ***django_evolution.errors.EvolutionException*** – An error stating that an explicit initial value must be provided in place of this object.

class django_evolution.diff.**Diff**(*original_project_sig*, *target_project_sig*)

Bases: object

Generates diffs between project signatures.

The resulting diff is contained in two attributes:

```
self.changed = {
    app_label: {
        'changed': {
            model_name : {
                'added': [ list of added field names ]
                'deleted': [ list of deleted field names ]
                'changed': {
                    field: [ list of modified property names ]
                },
                'meta_changed': {
                    'constraints': new value
                    'indexes': new value
                    'index_together': new value
                    'unique_together': new value
                }
            }
        'deleted': [ list of deleted model names ]
    }
}
self.deleted = {
    app_label: [ list of models in deleted app ]
}
```

__init__(*original_project_sig*, *target_project_sig*)
Initialize the object.

Parameters

- **original_project_sig** (django_evolution.signature.ProjectSignature) – The original project signature for the diff.
- **target_project_sig** (django_evolution.signature.ProjectSignature) – The target project signature for the diff.

is_empty(*ignore_apps=True*)
Return whether the diff is empty.

This is used to determine if both signatures are effectively equal. If `ignore_apps` is set, this will ignore changes caused by deleted applications.

Parameters **ignore_apps** (*bool, optional*) – Whether to ignore changes to the applications list.

Returns `True` if the diff is empty and signatures are equal. `False` if there are changes between the signatures.

Return type bool

__str__()
Return a string description of the diff.

This will describe the changes found in the diff, for human consumption.

Returns The string representation of the diff.

Return type unicode

evolution()
Return the mutations needed for resolving the diff.

This will attempt to return a hinted evolution, consisting of a series of mutations for each affected application. These mutations will convert the database from the original to the target signatures.

Returns An ordered dictionary of mutations. Each key is an application label, and each value is a list of mutations for the application.

Return type collections.OrderedDict

django_evolution.errors

Standard exceptions for Django Evolution.

Exceptions

BaseMigrationError(msg)	Base class for migration errors.
CannotSimulate(msg)	A mutation cannot be simulated.
DatabaseStateError(msg)	There was an issue working with database state.
DjangoEvolutionSupportError(msg)	A feature isn't supported by the current version of Django.
EvolutionBaselineMissingError(msg)	An evolution baseline is missing.
EvolutionException(msg)	Base class for a Django Evolution exception.
EvolutionExecutionError(msg[, app_label, ...])	Execution of an evolution failed.
EvolutionNotImplementedError(msg)	An operation is not supported by the mutation or database backend.
EvolutionTaskAlreadyQueuedError(msg)	The task has already been queued on the evolver.
InvalidSignatureVersion(version)	An invalid signature version was provided or found.
MigrationConflictsError(conflicts)	There are conflicts between migrations.
MigrationHistoryError(msg)	An error with the stored history of migrations.
MissingSignatureError(msg)	A requested signature could not be found.
QueueEvolverTaskError(msg)	Error queueing an evolver task.
SimulationFailure(msg)	A mutation simulation has failed.

exception django_evolution.errors.**EvolutionException**(*msg*)

Bases: Exception

Base class for a Django Evolution exception.

__init__(*msg*)

Initialize self. See help(type(self)) for accurate signature.

__str__()

Return str(self).

exception django_evolution.errors.**EvolutionExecutionError**(*msg*, *app_label=None*, *detailed_error=None*, *last_sql_statement=None*)

Bases: *django_evolution.errors.EvolutionException*

Execution of an evolution failed.

Details about the failure, including the app that failed and the last SQL statement executed, are available in the exception as attributes.

app_label

The label of the app that failed evolution. This may be None.

Type unicode

detailed_error
Detailed error information from the failure that triggered this exception. This might be another exception's error message, or it may be `None`.

Type unicode

last_sql_statement
The last SQL statement that was executed. This may be `None`.

Type unicode

__init__(*msg*, *app_label=None*, *detailed_error=None*, *last_sql_statement=None*)
Initialize the error.

Parameters

- **msg** (*unicode*) – The error message.
- **app_label** (*unicode, optional*) – The label of the app that failed evolution.
- **detailed_error** (*unicode, optional*) – Detailed error information from the failure that triggered this exception. This might be another exception's error message.
- **last_sql_statement** (*unicode, optional*) – The last SQL statement that was executed.

exception django_evolution.errors.**CannotSimulate**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

A mutation cannot be simulated.

exception django_evolution.errors.**SimulationFailure**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

A mutation simulation has failed.

exception django_evolution.errors.**EvolutionNotImplementedError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*, NotImplementedError

An operation is not supported by the mutation or database backend.

exception django_evolution.errors.**DatabaseStateError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

There was an issue working with database state.

exception django_evolution.errors.**MissingSignatureError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

A requested signature could not be found.

exception django_evolution.errors.**QueueEvolverTaskError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

Error queueing an evolver task.

exception django_evolution.errors.**EvolutionTaskAlreadyQueuedError**(*msg*)
Bases: *django_evolution.errors.QueueEvolverTaskError*

The task has already been queued on the evolver.

exception django_evolution.errors.**EvolutionBaselineMissingError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

An evolution baseline is missing.

exception django_evolution.errors.**InvalidSignatureVersion**(*version*)
Bases: *django_evolution.errors.EvolutionException*

An invalid signature version was provided or found.

__init__(*version*)
Initialize the exception.

Parameters **version** (*int*) – The invalid signature version.

exception django_evolution.errors.**BaseMigrationError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

Base class for migration errors.

exception django_evolution.errors.**MigrationHistoryError**(*msg*)
Bases: *django_evolution.errors.BaseMigrationError*

An error with the stored history of migrations.

This is raised if any applied migrations have unapplied dependencies.

exception django_evolution.errors.**MigrationConflictsError**(*conflicts*)
Bases: *django_evolution.errors.BaseMigrationError*

There are conflicts between migrations.

__init__(*conflicts*)
Initialize the error.

Parameters **conflicts** (*dict*) – A dictionary of conflicts, provided by the migrations system.

exception django_evolution.errors.**DjangoEvolutionSupportError**(*msg*)
Bases: *django_evolution.errors.EvolutionException*

A feature isn't supported by the current version of Django.

django_evolution.evolve

Main interface for evolving applications.

Classes

BaseEvolutionTask(task_id, evolver)	Base class for a task to perform during evolution.
EvolveAppTask(evolver, app[, evolutions, ...])	A task for evolving models in an application.
Evolver([hinted, verbosity, interactive, ...])	The main class for managing database evolutions.
PurgeAppTask(evolver, app_label)	A task for purging an application's tables from the database.

class django_evolution.evolve.**BaseEvolutionTask**(*task_id*, *evolver*)
Bases: object

Base class for a task to perform during evolution.

can_simulate
Whether the task can be simulated without requiring additional information.

This is set after calling *prepare()*.

Type bool

evolution_required
Whether an evolution is required by this task.

This is set after calling *prepare()*.

Type bool

evolver
The evolver that will execute the task.

Type *Evolver*

id
The unique ID for the task.

Type unicode

new_evolutions
A list of evolution model entries this task would create.

This is set after calling *prepare()*.

Type list of django_evolution.models.Evolution

sql
A list of SQL statements to perform for the task. Each entry can be a string or tuple accepted by `execute_sql()`.

Type list

classmethod prepare_tasks(*evolver*, *tasks*, ***kwargs*)
Prepare a list of tasks.

This is responsible for calling *prepare()* on each of the provided tasks. It can augment this by calculating any other state needed in order to influence the tasks or react to them.

If this applies state to the class, it should always be careful to completely reset the state on each run, in case there are multiple *Evolver* instances at work within a process.

Parameters

- **evolver** (*Evolver*) – The evolver that's handling the tasks.
- **tasks** (*list of BaseEvolutionTask*) – The list of tasks to prepare. These will match the current class.
- ****kwargs** (*dict*) – Keyword arguments to pass to the tasks' *:py:meth:`prepare* methods.

classmethod execute_tasks(*evolver*, *tasks*, ***kwargs*)
Execute a list of tasks.

This is responsible for calling *execute()* on each of the provided tasks. It can augment this by executing any steps before or after the tasks.

If this applies state to the class, it should always be careful to completely reset the state on each run, in case there are multiple *Evolver* instances at work within a process.

This may depend on state from *prepare_tasks()*.

Parameters

- **evolver** (*Evolver*) – The evolver that's handling the tasks.

- **tasks** (*list of BaseEvolutionTask*) – The list of tasks to execute. These will match the current class.
- ****kwargs** (*dict*) – Keyword arguments to pass to the tasks' *:py:meth:`execute* methods.

__init__(*task_id*, *evolver*)
Initialize the task.

Parameters

- **task_id** (*unicode*) – The unique ID for the task.
- **evolver** (Evolver) – The evolver that will execute the task.

is_mutation_mutable(*mutation*, ***kwargs*)
Return whether a mutation is mutable.

This is a handy wrapper around *BaseMutation.is_mutable* that passes standard arguments based on evolver state. Callers should pass any additional arguments that are required as keyword arguments.

Parameters

- **mutation** (django_evolution.mutations.BaseMutation) – The mutation to check.
- ****kwargs** (*dict*) – Additional keyword arguments to pass to *BaseMutation.is_mutable*.

Returns True if the mutation is mutable. False if it is not.

Return type bool

prepare(*hinted*, ***kwargs*)
Prepare state for this task.

This is responsible for determining whether the task applies to the database. It must set *evolution_required*, *new_evolutions*, and *sql*.

This must be called before *execute()* or *get_evolution_content()*.

Parameters

- **hinted** (*bool*) – Whether to prepare the task for hinted evolutions.
- ****kwargs** (*dict, unused*) – Additional keyword arguments passed for task preparation. This is provide for future expansion purposes.

execute(*cursor*)
Execute the task.

This will make any changes necessary to the database.

Parameters **cursor** (*django.db.backends.util.CursorWrapper*) – The database cursor used to execute queries.

Raises ***django_evolution.errors.EvolutionExecutionError*** – The evolution task failed. Details are in the error.

get_evolution_content()
Return the content for an evolution file for this task.

Returns The evolution content.

Return type unicode

__str__()
Return a string description of the task.

Returns The string description.

Return type unicode

class django_evolution.evolve.**PurgeAppTask**(*evolver*, *app_label*)
Bases: *django_evolution.evolve.BaseEvolutionTask*

A task for purging an application's tables from the database.

app_label
The app label for the app to purge.

Type unicode

__init__(*evolver*, *app_label*)
Initialize the task.

Parameters

- **evolver** (*Evolver*) – The evolver that will execute the task.
- **app_label** (*unicode*) – The app label for the app to purge.

prepare(***kwargs*)
Prepare state for this task.

This will determine if the app's tables need to be deleted from the database, and prepare the SQL for doing so.

Parameters ****kwargs** (*dict, unused*) – Keyword arguments passed for task preparation.

execute(*cursor*)
Execute the task.

This will delete any tables owned by the application.

Parameters **cursor** (*django.db.backends.util.CursorWrapper*) – The database cursor used to execute queries.

Raises ***django_evolution.errors.EvolutionExecutionError*** – The evolution task failed. Details are in the error.

__str__()
Return a string description of the task.

Returns The string description.

Return type unicode

class django_evolution.evolve.**EvolveAppTask**(*evolver*, *app*, *evolutions=None*, *migrations=None*)
Bases: *django_evolution.evolve.BaseEvolutionTask*

A task for evolving models in an application.

This task will run through any evolutions in the provided application and handle applying each of those evolutions that haven't yet been applied.

app
The app module to evolve.

Type module

app_label
The app label for the app to evolve.

Type unicode

classmethod prepare_tasks(*evolver*, *tasks*, ***kwargs*)
Prepare a list of tasks.

If migrations are supported, then before preparing any of the tasks, this will begin setting up state needed to apply any migrations for apps that use them (or will use them after any evolutions are applied).

After tasks are prepared, this will apply any migrations that need to be applied, updating the app's signature appropriately and recording all applied migrations.

Parameters

- **evolver** (*Evolver*) – The evolver that's handling the tasks.
- **tasks** (*list of BaseEvolutionTask*) – The list of tasks to prepare. These will match the current class.
- ****kwargs** (*dict*) – Keyword arguments to pass to the tasks' *:py:meth:`prepare* methods.

Raises ***django_evolution.errors.BaseMigrationError*** – There was an error with the setup or validation of migrations. A subclass containing additional details will be raised.

classmethod execute_tasks(*evolver*, *tasks*, ***kwargs*)
Execute a list of tasks.

This is responsible for calling *execute()* on each of the provided tasks. It can augment this by executing any steps before or after the tasks.

Parameters

- **evolver** (*Evolver*) – The evolver that's handling the tasks.
- **tasks** (*list of BaseEvolutionTask*) – The list of tasks to execute. These will match the current class.
- **cursor** (*django.db.backends.util.CursorWrapper*) – The database cursor used to execute queries.
- ****kwargs** (*dict*) – Keyword arguments to pass to the tasks' *:py:meth:`execute* methods.

__init__(*evolver*, *app*, *evolutions=None*, *migrations=None*)
Initialize the task.

Parameters

- **evolver** (*Evolver*) – The evolver that will execute the task.
- **app** (*module*) – The app module to evolve.
- **evolutions** (*list of dict, optional*) – Optional evolutions to use for the app instead of loading from a file. This is intended for testing purposes.

  Each dictionary needs a `label` key for the evolution label and a `mutations` key for a list of *BaseMutation* instances.
- **migrations** (*list of django.db.migrations.Migration, optional*) – Optional migrations to use for the app instead of loading from files. This is intended for testing purposes.

prepare(*hinted=False*, ***kwargs*)
Prepare state for this task.

This will determine if there are any unapplied evolutions in the app, and record that state and the SQL needed to apply the evolutions.

Parameters

- **hinted** (*bool, optional*) – Whether to prepare the task for hinted evolutions.
- ****kwargs** (*dict, unused*) – Additional keyword arguments passed for task preparation.

execute(*cursor*, *create_models_now=False*)
Execute the task.

This will apply any evolutions queued up for the app.

Before the evolutions are applied for the app, the *applying_evolution* signal will be emitted. After, *applied_evolution* will be emitted.

Parameters

- **cursor** (*django.db.backends.util.CursorWrapper*) – The database cursor used to execute queries.
- **create_models_now** (*bool, optional*) – Whether to create models as part of this execution. Normally, this is handled in *execute_tasks()*, but this flag allows for more fine-grained control of table creation in limited circumstances (intended only by *Evolver*).

Raises ***django_evolution.errors.EvolutionExecutionError*** – The evolution task failed. Details are in the error.

get_evolution_content()
Return the content for an evolution file for this task.

Returns The evolution content.

Return type unicode

__str__()
Return a string description of the task.

Returns The string description.

Return type unicode

class django_evolution.evolve.**Evolver**(*hinted=False*, *verbosity=0*, *interactive=False*, *database_name='default'*)

Bases: object

The main class for managing database evolutions.

The evolver is used to queue up tasks that modify the database. These allow for evolving database models and purging applications across an entire Django project or only for specific applications. Custom tasks can even be written by an application if very specific database operations need to be made outside of what's available in an evolution.

Tasks are executed in order, but batched by the task type. That is, if two instances of `TaskType1` are queued, followed by an instance of `TaskType2`, and another of `TaskType1`, all 3 tasks of `TaskType1` will be executed at once, with the `TaskType2` task following.

Callers are expected to create an instance and queue up one or more tasks. Once all tasks are queued, the changes can be made using *evolve()*. Alternatively, evolution hints can be generated using `generate_hints()`.

Projects will generally utilize this through the existing `evolve` Django management command.

connection
The database connection object being used for the evolver.

Type django.db.backends.base.base.BaseDatabaseWrapper

database_name
The name of the database being evolved.

Type unicode

database_state
The state of the database, for evolution purposes.

Type *django_evolution.db.state.DatabaseState*

evolved
Whether the evolver has already performed its evolutions. These can only be done once per evolver.

Type bool

hinted
Whether the evolver is operating against hinted evolutions. This may result in changes to the database without there being any accompanying evolution files backing those changes.

Type bool

interactive
Whether the evolution operations are being performed in a way that allows interactivity on the command line. This is passed along to signal emissions.

Type bool

initial_diff
The initial diff between the stored project signature and the current project signature.

Type *django_evolution.diff.Diff*

project_sig
The project signature. This will start off as the previous signature stored in the database, but will be modified when mutations are simulated.

Type *django_evolution.signature.ProjectSignature*

verbosity
The verbosity level for any output. This is passed along to signal emissions.

Type int

version
The project version entry saved as the result of any evolution operations. This contains the current version of the project signature. It may be `None` until *`evolve()`* is called.

Type *django_evolution.models.Version*

__init__(*hinted=False*, *verbosity=0*, *interactive=False*, *database_name='default'*)
Initialize the evolver.

Parameters

- **hinted** (*bool, optional*) – Whether to operate against hinted evolutions. This may result in changes to the database without there being any accompanying evolution files backing those changes.

- **verbosity** (*int, optional*) – The verbosity level for any output. This is passed along to signal emissions.
- **interactive** (*bool, optional*) – Whether the evolution operations are being performed in a way that allows interactivity on the command line. This is passed along to signal emissions.
- **database_name** (*unicode, optional*) – The name of the database to evolve.

Raises ***django_evolution.errors.EvolutionBaselineMissingError*** – An initial baseline for the project was not yet installed. This is due to `syncdb`/`migrate` not having been run.

property tasks
A list of all tasks that will be performed.

This can only be accessed after all necessary tasks have been queued.

can_simulate()
Return whether all queued tasks can be simulated.

If any tasks cannot be simulated (for instance, a hinted evolution requiring manually-entered values), then this will return `False`.

This can only be called after all tasks have been queued.

Returns `True` if all queued tasks can be simulated. `False` if any cannot.

Return type bool

get_evolution_required()
Return whether there are any evolutions required.

This can only be called after all tasks have been queued.

Returns `True` if any tasks require evolution. `False` if none do.

Return type bool

diff_evolutions()
Return a diff between stored and post-evolution project signatures.

This will run through all queued tasks, preparing them and simulating their changes. The returned diff will represent the changes made in those tasks.

This can only be called after all tasks have been queued.

Returns The diff between the stored signature and the queued changes.

Return type *django_evolution.diff.Diff*

iter_evolution_content()
Generate the evolution content for all queued tasks.

This will loop through each tasks and yield any evolution content provided.

This can only be called after all tasks have been queued.

Yields *tuple* – A tuple of `(task, evolution_content)`.

queue_evolve_all_apps()
Queue an evolution of all registered Django apps.

This cannot be used if *queue_evolve_app()* is also being used.

Raises

- ***django_evolution.errors.EvolutionTaskAlreadyQueuedError*** – An evolution for an app was already queued.
- ***django_evolution.errors.QueueEvolverTaskError*** – Error queueing a non-duplicate task. Tasks may have already been prepared and finalized.

queue_evolve_app(*app*)
Queue an evolution of a registered Django app.

Parameters **app** (*module*) – The Django app to queue an evolution for.

Raises

- ***django_evolution.errors.EvolutionTaskAlreadyQueuedError*** – An evolution for this app was already queued.
- ***django_evolution.errors.QueueEvolverTaskError*** – Error queueing a non-duplicate task. Tasks may have already been prepared and finalized.

queue_purge_old_apps()
Queue the purging of all old, stale Django apps.

This will purge any apps that exist in the stored project signature but that are no longer registered in Django.

This generally should not be used if *queue_purge_app()* is also being used.

Raises

- ***django_evolution.errors.EvolutionTaskAlreadyQueuedError*** – A purge of an app was already queued.
- ***django_evolution.errors.QueueEvolverTaskError*** – Error queueing a non-duplicate task. Tasks may have already been prepared and finalized.

queue_purge_app(*app_label*)
Queue the purging of a Django app.

Parameters **app_label** (*unicode*) – The label of the app to purge.

Raises

- ***django_evolution.errors.EvolutionTaskAlreadyQueuedError*** – A purge of this app was already queued.
- ***django_evolution.errors.QueueEvolverTaskError*** – Error queueing a non-duplicate task. Tasks may have already been prepared and finalized.

queue_task(*task*)
Queue a task to run during evolution.

This should only be directly called if working with custom tasks. Otherwise, use a more specific queue method.

Parameters **task** (BaseEvolutionTask) – The task to queue.

Raises

- ***django_evolution.errors.EvolutionTaskAlreadyQueuedError*** – A purge of this app was already queued.
- ***django_evolution.errors.QueueEvolverTaskError*** – Error queueing a non-duplicate task. Tasks may have already been prepared and finalized.

evolve()
Perform the evolution.

This will run through all queued tasks and attempt to apply them in a database transaction, tracking each new batch of evolutions as the tasks finish.

This can only be called once per evolver instance.

Raises

- ***django_evolution.errors.EvolutionException*** – Something went wrong during the evolution process. Details are in the error message. Note that a more specific exception may be raised.
- ***django_evolution.errors.EvolutionExecutionError*** – A specific evolution task failed. Details are in the error.

transaction()

Execute database operations in a transaction.

This is a convenience method for executing in a transaction using the evolver's current database.

Context: django.db.backends.util.CursorWrapper: The cursor used to execute statements.

django_evolution.mock_models

Utilities for building mock database models and fields.

Functions

create_field(project_sig, field_name, ... [, ...])	Create a Django field instance for the given signature data.

Classes

MockMeta(project_sig, app_name, model_name, ...)	A mock of a models Options object, based on the model signature.
MockModel(project_sig, app_name, model_name, ...)	A mock model.
MockRelated(related_model, model, field)	A mock RelatedObject for relation fields.

django_evolution.mock_models.**create_field**(*project_sig*, *field_name*, *field_type*, *field_attrs*, *parent_model*, *related_model=None*)

Create a Django field instance for the given signature data.

This creates a field in a way that's compatible with a variety of versions of Django. It takes in data such as the field's name and attributes and creates an instance that can be used like any field found on a model.

Parameters

- **field_name** (*unicode*) – The name of the field.
- **field_type** (*cls*) – The class for the type of field being constructed. This must be a subclass of django.db.models.Field.
- **field_attrs** (*dict*) – Attributes to set on the field.
- **parent_model** (*cls*) – The parent model that would own this field. This must be a subclass of django.db.models.Model.

- **related_model** (*unicode, optional*) – The full class path to a model this relates to. This requires a django.db.models.ForeignKey field type.

Returns A new field instance matching the provided data.

Return type django.db.models.Field

class django_evolution.mock_models.**MockMeta**(*project_sig*, *app_name*, *model_name*, *model_sig*, *managed=False*, *auto_created=False*)

Bases: object

A mock of a models Options object, based on the model signature.

This emulates the standard Meta class for a model, storing data and providing mock functions for setting up fields from a signature.

__init__(*project_sig*, *app_name*, *model_name*, *model_sig*, *managed=False*, *auto_created=False*)

Initialize the meta instance.

Parameters

- **project_sig** (django_evolution.signature.ProjectSignature) – The project's schema signature.
- **app_name** (*unicode*) – The name of the Django application owning the model.
- **model_name** (*unicode*) – The name of the model.
- **model_sig** (*dict*) – The model's schema signature.
- **managed** (*bool, optional*) – Whether this represents a model managed internally by Django, rather than a developer-created model.
- **auto_created** (*bool, optional*) – Whether this represents an auto-created model (such as an intermediary many-to-many model).

property local_fields

A list of all local fields on the model.

property fields

A list of all local fields on the model.

property local_many_to_many

A list of all local Many-to-Many fields on the model.

setup_fields(*model*, *stub=False*)

Set up the fields listed in the model's signature.

For each field in the model signature's list of fields, a field instance will be created and stored in _fields or _many_to_many (depending on the type of field).

Some fields (for instance, a field representing a primary key) may also influence the attributes on this model.

Parameters

- **model** (*cls*) – The model class owning this meta instance. This must be a subclass of django.db.models.Model.
- **stub** (*bool, optional*) – If provided, only a primary key will be set up. This is used internally when creating relationships between models and fields in order to prevent recursive relationships.

__getattr__(*name*)
Return an attribute from the meta class.

This will look up the attribute from the correct location, depending on the attribute being accessed.

Parameters **name** (*unicode*) – The attribute name.

Returns The attribute value.

Return type object

get_field(*name*)
Return a field with the given name.

Parameters **name** (*unicode*) – The name of the field.

Returns The field with the given name.

Return type django.db.models.Field

Raises **django.db.models.fields.FieldDoesNotExist** – The field could not be found.

get_field_by_name(*name*)
Return information on a field with the given name.

This is a stub that provides only basic functionality. It will return information for a field with the given name, with most data hard-coded.

Parameters **name** (*unicode*) – The name of the field.

Returns

A tuple of information for the following:

- The field instance (`django.db.models.Field`)
- The model (hard-coded as `None`)
- Whether this field is owned by this model (hard-coded as `True`)
- Whether this is for a many-to-many relationship (hard-coded as `None`)

Return type tuple

Raises **django.db.models.fields.FieldDoesNotExist** – The field could not be found.

class django_evolution.mock_models.**MockModel**(*project_sig*, *app_name*, *model_name*, *model_sig*, *auto_created=False*, *managed=False*, *stub=False*, *db_name=None*)

Bases: `object`

A mock model.

This replicates some of the state and functionality of a model for use when generating, reading, or mutating signatures.

__init__(*project_sig*, *app_name*, *model_name*, *model_sig*, *auto_created=False*, *managed=False*, *stub=False*, *db_name=None*)
Initialize the model.

Parameters

- **project_sig** (`django_evolution.signature.ProjectSignature`) – The project's schema signature.
- **app_name** (*unicode*) – The name of the Django app that owns the model.

- **model_name** (*unicode*) – The name of the model.
- **model_sig** (*dict*) – The model's schema signature.
- **auto_created** (*bool, optional*) – Whether this represents an auto-created model (such as an intermediary many-to-many model).
- **managed** (*bool, optional*) – Whether this represents a model managed internally by Django, rather than a developer-created model.
- **stub** (*bool, optional*) – Whether this is a stub model. This is used internally to create models that only contain a primary key field and no others, for use when dealing with circular relationships.
- **db_name** (*unicode, optional*) – The name of the database where the model would be read from or written to.

__repr__()
Return a string representation of the model.

Returns A string representation of the model.

Return type unicode

__hash__()
Return a hash of the model instance.

This is used to allow the model instance to be used as a key in a dictionary.

Django would return a hash of the primary key's value, but that's not necessary for our needs, and we don't have field values in most mock models.

Returns The hash of the model.

Return type int

__eq__(*other*)
Return whether two mock models are equal.

Both are considered equal if they're both mock models with the same app name and model name.

Parameters **other** (MockModel) – The other mock model to compare to.

Returns `True` if both are equal. `False` if they are not.

Return type bool

class django_evolution.mock_models.**MockRelated**(*related_model*, *model*, *field*)
Bases: object

A mock RelatedObject for relation fields.

This replicates some of the state and functionality of `django.db.models.related.RelatedObject`, used for generating signatures and applying mutations.

__init__(*related_model*, *model*, *field*)
Initialize the object.

Parameters

- **related_model** (MockModel) – The mock model on the other end of the relation.
- **model** (MockModel) – The mock model on this end of the relation.
- **field** (*django.db.models.Field*) – The field owning the relation.

django_evolution.models

Database models for tracking project schema history.

Classes

Evolution(id, version, app_label, label)	
SignatureField([verbose_name, name, ...])	A field for loading and storing project signatures.
Version(id, signature, when)	
VersionManager(*args, **kwargs)	Manage Version models.

class django_evolution.models.**VersionManager**(**args*, ***kwargs*)

Bases: django.db.models.manager.Manager

Manage Version models.

This introduces a convenience function for finding the current Version model for the database.

current_version(*using=None*)

Return the Version model for the current schema.

This will find the Version with both the latest timestamp and the latest ID. It's here as a replacement for the old call to latest(), which only operated on the timestamp and would find the wrong entry if two had the same exact timestamp.

Parameters **using** (*unicode*) – The database alias name to use for the query. Defaults to None, the default database.

Raises **Version.DoesNotExist** – No such version exists.

Returns The current Version object for the database.

Return type *Version*

__slotnames__ = []

class django_evolution.models.**SignatureField**(*verbose_name=None*, *name=None*, *primary_key=False*, *max_length=None*, *unique=False*, *blank=False*, *null=False*, *db_index=False*, *rel=None*, *default=<class 'django.db.models.fields.NOT_PROVIDED'>*, *editable=True*, *serialize=True*, *unique_for_date=None*, *unique_for_month=None*, *unique_for_year=None*, *choices=None*, *help_text=''*, *db_column=None*, *db_tablespace=None*, *auto_created=False*, *validators=()*, *error_messages=None*)

Bases: django.db.models.fields.TextField

A field for loading and storing project signatures.

This will handle deserializing any project signatures stored in the database, converting them into a ProjectSignature, and then writing a serialized version back to the database.

description = 'Signature'

contribute_to_class(*cls*, *name*)

Perform operations when added to a class.

This will listen for when an instance is constructed in order to perform some initial work.

Parameters

- **cls** (*type*) – The model class.
- **name** (*str*) – The name of the field.

value_to_string(*obj*)
Return a serialized string value from the field.

Parameters **obj** (*django.db.models.Model*) – The model instance.

Returns The serialized string contents.

Return type unicode

to_python(*value*)
Return a ProjectSignature value from the field contents.

Parameters **value** (*object*) – The current value assigned to the field. This might be serialized string content or a `ProjectSignature` instance.

Returns The project signature stored in the field.

Return type django_evolution.signatures.ProjectSignature

Raises **django.core.exceptions.ValidationError** – The field contents are of an unexpected type.

get_prep_value(*value*)
Return a prepared Python value to work with.

This simply wraps *to_python()*.

Parameters **value** (*object*) – The current value assigned to the field. This might be serialized string content or a `ProjectSignature` instance.

Returns The project signature stored in the field.

Return type django_evolution.signatures.ProjectSignature

Raises **django.core.exceptions.ValidationError** – The field contents are of an unexpected type.

get_db_prep_value(*value*, *connection*, *prepared=False*)
Return a prepared value for use in database operations.

Parameters

- **value** (*object*) – The current value assigned to the field. This might be serialized string content or a `ProjectSignature` instance.
- **connection** (*django.db.backends.base.BaseDatabaseWrapper*) – The database connection to operate on.
- **prepared** (*bool, optional*) – Whether the value is already prepared for Python.

Returns The value prepared for database operations.

Return type unicode

class django_evolution.models.**Version**(*id*, *signature*, *when*)
Bases: `django.db.models.base.Model`

signature
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

when
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

objects = <django_evolution.models.VersionManager object>

is_hinted()
Return whether this is a hinted version.

Hinted versions store a signature without any accompanying evolutions.

Returns `True` if this is a hinted evolution. `False` if it's based on explicit evolutions.

Return type bool

__str__()
Return str(self).

evolutions
Accessor to the related objects manager on the reverse side of a many-to-one relation.

In the example:

```
class Child(Model):
    parent = ForeignKey(Parent, related_name='children')
```

`Parent.children` is a `ReverseManyToOneDescriptor` instance.

Most of the implementation is delegated to a dynamically defined manager class built by `create_forward_many_to_many_manager()` defined below.

get_next_by_when(*, *field=<django.db.models.fields.DateTimeField: when>*, *is_next=True*, ***kwargs*)

get_previous_by_when(*, *field=<django.db.models.fields.DateTimeField: when>*, *is_next=False*, ***kwargs*)

id
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

class django_evolution.models.**Evolution**(*id*, *version*, *app_label*, *label*)
Bases: `django.db.models.base.Model`

version
Accessor to the related object on the forward side of a many-to-one or one-to-one (via ForwardOneToOneDescriptor subclass) relation.

In the example:

```
class Child(Model):
    parent = ForeignKey(Parent, related_name='children')
```

`Child.parent` is a `ForwardManyToOneDescriptor` instance.

app_label
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

label
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

__str__()
Return str(self).

id
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

objects = <django.db.models.manager.Manager object>

version_id
A wrapper for a deferred-loading field. When the value is read from this object the first time, the query is executed.

django_evolution.mutations

Support for schema mutation operations and hint output.

Classes

AddField(model_name, field_name, field_type)	A mutation that adds a field to a model.
BaseModelFieldMutation(model_name, field_name)	Base class for any fields that mutate a model.
BaseModelMutation(model_name)	Base class for a mutation affecting a single model.
BaseMutation()	Base class for a schema mutation.
ChangeField(model_name, field_name[, initial])	A mutation that changes attributes on a field on a model.
ChangeMeta(model_name, prop_name, new_value)	A mutation that changes meta proeprties on a model.
DeleteApplication()	A mutation that deletes an application.
DeleteField(model_name, field_name)	A mutation that deletes a field from a model.
DeleteModel(model_name)	A mutation that deletes a model.
MoveToDjangoMigrations([mark_applied])	A mutation that uses Django migrations for an app's future upgrades.
RenameAppLabel(old_app_label, new_app_label)	A mutation that renames the app label for an application.
RenameField(model_name, old_field_name, ...)	A mutation that renames a field on a model.
RenameModel(old_model_name, new_model_name, ...)	A mutation that renames a model.
SQLMutation(tag, sql[, update_func])	A mutation that executes SQL on the database.
Simulation(mutation, app_label, project_sig, ...)	State for a database mutation simulation.

class django_evolution.mutations.**Simulation**(*mutation*, *app_label*, *project_sig*, *database_state*, *legacy_app_label=None*, *database='default'*)

Bases: object

State for a database mutation simulation.

This provides state and utility functions for simulating a mutation on a database signature. This is provided to *BaseMutation.simulate()* functions, given them access to all simulation state and a consistent way of failing simulations.

__init__(*mutation*, *app_label*, *project_sig*, *database_state*, *legacy_app_label=None*, *database='default'*)
Initialize the simulation state.

Parameters

- **mutation** (BaseMutation) – The mutation this simulation applies to.
- **app_label** (*unicode*) – The name of the application this simulation applies to.
- **project_sig** (*dict*) – The project signature for the simulation to look up and modify.
- **database_state** (django_evolution.db.state.DatabaseState) – The database state for the simulation to look up and modify.
- **legacy_app_label** (*unicode, optional*) – The legacy label of the app this simulation applies to. This is based on the module name and is used in the transitioning of pre-Django 1.7 signatures.
- **database** (*unicode, optional*) – The registered database name in Django to simulate operating on.

get_evolver()
Return an evolver for the database.

Returns The database evolver for this type of database.

Return type django_evolution.db.EvolutionOperationsMulti

get_app_sig()
Return the current application signature.

Returns The application signature.

Return type dict

Returns The signature for the app.

Return type *django_evolution.signature.AppSignature*

Raises ***django_evolution.errors.SimulationFailure*** – A signature could not be found for the application.

get_model_sig(*model_name*)
Return the signature for a model with the given name.

Parameters **model_name** (*unicode*) – The name of the model to fetch a signature for.

Returns The signature for the model.

Return type *django_evolution.signature.ModelSignature*

Raises ***django_evolution.errors.SimulationFailure*** – A signature could not be found for the model or its parent application.

get_field_sig(*model_name*, *field_name*)
Return the signature for a field with the given name.

Parameters

- **model_name** (*unicode*) – The name of the model containing the field.
- **field_name** (*unicode*) – The name of the field to fetch a signature for.

Returns The signature for the field.

Return type *django_evolution.signature.FieldSignature*

Raises *django_evolution.errors.SimulationFailure* – A signature could not be found for the field, its parent model, or its parent application.

fail(*error*, ***error_vars*)
Fail the simulation.

This will end up raising a *SimulationFailure* with an error message based on the mutation's simulation failed message an the provided message.

Parameters

- **error** (*unicode*) – The error message for this particular failure.
- ****error_vars** (*dict*) – Variables to include in the error message. These will override any defaults for the mutation's error.

Raises *django_evolution.errors.SimulationFailure* – The resulting simulation failure with the given error.

class django_evolution.mutations.**BaseMutation**
Bases: object

Base class for a schema mutation.

These are responsible for simulating schema mutations and applying actual mutations to a database signature.

simulation_failure_error = 'Cannot simulate the mutation.'

error_vars = {}

generate_hint()
Return a hinted evolution for the mutation.

This will generate a line that will be used in a hinted evolution file. This method generally should not be overridden. Instead, use *get_hint_params()*.

Returns A hinted evolution statement for this mutation.

Return type unicode

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

run_simulation(***kwargs*)
Run a simulation for a mutation.

This will prepare and execute a simulation on this mutation, constructing a *Simulation* and passing it to *simulate()*. The simulation will apply a mutation on the provided database signature, modifying it to match the state described to the mutation. This allows Django Evolution to test evolutions before they hit the database.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises

- *django_evolution.errors.CannotSimulate* – The simulation cannot be executed for this mutation. The reason is in the exception's message.
- *django_evolution.errors.SimulationFailure* – The simulation failed. The reason is in the exception's message.

simulate(*simulation*)
Perform a simulation of a mutation.

This will attempt to perform a mutation on the database signature, modifying it to match the state described to the mutation. This allows Django Evolution to test evolutions before they hit the database.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises

- ***django_evolution.errors.CannotSimulate*** – The simulation cannot be executed for this mutation. The reason is in the exception's message.
- ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*)
Schedule a database mutation on the mutator.

This will instruct the mutator to perform one or more database mutations for an app. Those will be scheduled and later executed on the database, if not optimized out.

Parameters **mutator** (django_evolution.mutators.AppMutator) – The mutator to perform an operation on.

Raises ***django_evolution.errors.EvolutionNotImplementedError*** – The configured mutation is not supported on this type of database.

is_mutable(*app_label*, *project_sig*, *database_state*, *database*)
Return whether the mutation can be applied to the database.

This should check if the database or parts of the signature matches the attributes provided to the mutation.

Parameters

- **app_label** (*unicode*) – The label for the Django application to be mutated.
- **project_sig** (*dict*) – The project's schema signature.
- **database_state** (django_evolution.db.state.DatabaseState) – The database's schema signature.
- **database** (*unicode*) – The name of the database the operation would be performed on.

Returns True if the mutation can run. False if it cannot.

Return type bool

serialize_value(*value*)
Serialize a value for use in a mutation statement.

This will attempt to represent the value as something Python can execute, across Python versions. The string representation of the value is used by default. If that representation is of a Unicode string, and that string include a u prefix, it will be stripped.

Parameters **value** (*object*) – The value to serialize.

Returns The serialized string.

Return type unicode

serialize_attr(*attr_name*, *attr_value*)
Serialize an attribute for use in a mutation statement.

This will create a name=value string, with the value serialized using *serialize_value()*.

Parameters

- **attr_name** (*unicode*) – The attribute's name.
- **attr_value** (*object*) – The attribute's value.

Returns The serialized attribute string.

Return type unicode

__str__()
Return a hinted evolution for the mutation.

Returns The hinted evolution.

Return type unicode

__repr__()
Return a string representation of the mutation.

Returns A string representation of the mutation.

Return type unicode

class django_evolution.mutations.**BaseModelMutation**(*model_name*)
Bases: *django_evolution.mutations.BaseMutation*

Base class for a mutation affecting a single model.

error_vars = {'model_name': 'model_name'}

__init__(*model_name*)
Initialize the mutation.

Parameters **model_name** (*unicode*) – The name of the model being mutated.

evolver(*model*, *database_state*, *database=None*)

mutate(*mutator*, *model*)
Schedule a model mutation on the mutator.

This will instruct the mutator to perform one or more database mutations for a model. Those will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (*django_evolution.mutators.ModelMutator*) – The mutator to perform an operation on.
- **model** (*MockModel*) – The model being mutated.

Raises ***django_evolution.errors.EvolutionNotImplementedError*** – The configured mutation is not supported on this type of database.

is_mutable(*app_label*, *project_sig*, *database_state*, *database*)
Return whether the mutation can be applied to the database.

This will if the database matches that of the model.

Parameters

- **app_label** (*unicode*) – The label for the Django application to be mutated.
- **project_sig** (*dict, unused*) – The project's schema signature.
- **database_state** (*django_evolution.db.state.DatabaseState, unused*) – The database state.

- **database** (*unicode*) – The name of the database the operation would be performed on.

Returns `True` if the mutation can run. `False` if it cannot.

Return type bool

class django_evolution.mutations.**BaseModelFieldMutation**(*model_name*, *field_name*)
Bases: *django_evolution.mutations.BaseModelMutation*

Base class for any fields that mutate a model.

This is used for classes that perform any mutation on a model. Such mutations will be provided a model they can work with.

Operations added to the mutator by this field will be associated with that model. That will allow the operations backend to perform any optimizations to improve evolution time for the model.

error_vars = {'field_name': 'field_name', 'model_name': 'model_name'}

__init__(*model_name*, *field_name*)
Initialize the mutation.

Parameters

- **model_name** (*unicode*) – The name of the model containing the field.
- **field_name** (*unicode*) – The name of the field to mutate.

class django_evolution.mutations.**DeleteField**(*model_name*, *field_name*)
Bases: *django_evolution.mutations.BaseModelFieldMutation*

A mutation that deletes a field from a model.

simulation_failure_error = 'Cannot delete the field "%(field_name)s" on model "%(app_l

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)
Simulate the mutation.

This will alter the database schema to remove the specified field, modifying meta fields (`unique_together`) if necessary.

It will also check to make sure this is not a primary key and that the field exists.

Parameters **simulation** (`Simulation`) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)
Schedule a field deletion on the mutator.

This will instruct the mutator to perform a deletion of a field on a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (`django_evolution.mutators.ModelMutator`) – The mutator to perform an operation on.

- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**SQLMutation**(*tag*, *sql*, *update_func=None*)
Bases: *django_evolution.mutations.BaseMutation*

A mutation that executes SQL on the database.

Unlike most mutations, this one is largely database-dependent. It allows arbitrary SQL to be executed. It's recommended that the execution does not modify the schema of a table (unless it's highly database-specific with no counterpart in Django Evolution), but rather is limited to things like populating data.

SQL statements cannot be optimized. Any scheduled database operations prior to the SQL statement will be executed without any further optimization. This can lead to longer database evolution times.

__init__(*tag*, *sql*, *update_func=None*)
Initialize the mutation.

Parameters

- **tag** (*unicode*) – A unique tag identifying this SQL operation.
- **sql** (*unicode*) – The SQL to execute.
- **update_func** (*callable, optional*) – A function to call to simulate updating the database signature. This is required for *simulate()* to work.

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)
Simulate a mutation for an application.

This will run the update_func provided when instantiating the mutation, passing it app_label and project_sig. It should then modify the signature to match what the SQL statement would do.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises

- ***django_evolution.errors.CannotSimulate*** – update_func was not provided or was not a function.
- ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message. This would be run by update_func.

mutate(*mutator*)
Schedule a database mutation on the mutator.

This will instruct the mutator to execute the SQL for an app.

Parameters **mutator** (django_evolution.mutators.AppMutator) – The mutator to perform an operation on.

Raises ***django_evolution.errors.EvolutionNotImplementedError*** – The configured mutation is not supported on this type of database.

is_mutable(**args*, ***kwargs*)
Return whether the mutation can be applied to the database.

Parameters

- ***args** (*tuple, unused*) – Unused positional arguments.

- ****kwargs** (*tuple, unused*) – Unused positional arguments.

Returns True, always.

Return type bool

class django_evolution.mutations.**AddField**(*model_name*, *field_name*, *field_type*, *initial=None*, ***field_attrs*)

Bases: *django_evolution.mutations.BaseModelFieldMutation*

A mutation that adds a field to a model.

simulation_failure_error = 'Cannot add the field "%(field_name)s" to model "%(app_label

__init__(*model_name*, *field_name*, *field_type*, *initial=None*, ***field_attrs*)

Initialize the mutation.

Parameters

- **model_name** (*unicode*) – The name of the model to add the field to.
- **field_name** (*unicode*) – The name of the new field.
- **field_type** (*cls*) – The field class to use. This must be a subclass of django.db.models.Field.
- **initial** (*object, optional*) – The initial value for the field. This is required if non-null.
- ****field_attrs** (*dict*) – Attributes to set on the field.

get_hint_params()

Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)

Simulate the mutation.

This will alter the database schema to add the specified field.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)

Schedule a field addition on the mutator.

This will instruct the mutator to add a new field on a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.
- **model** (MockModel) – The model being mutated.

add_column(*mutator*, *model*)

Add a standard column to the model.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.

- **model** (MockModel) – The model being mutated.

add_m2m_table(*mutator*, *model*)
Add a ManyToMany column to the model and an accompanying table.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.
- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**RenameField**(*model_name*, *old_field_name*, *new_field_name*, *db_column=None*, *db_table=None*)
Bases: *django_evolution.mutations.BaseModelFieldMutation*

A mutation that renames a field on a model.

simulation_failure_error = 'Cannot rename the field "%(field_name)s" on model "%(app_l

__init__(*model_name*, *old_field_name*, *new_field_name*, *db_column=None*, *db_table=None*)
Initialize the mutation.

Parameters

- **model_name** (*unicode*) – The name of the model to add the field to.
- **old_field_name** (*unicode*) – The old (existing) name of the field.
- **new_field_name** (*unicode*) – The new name for the field.
- **db_column** (*unicode, optional*) – The explicit column name to set for the field.
- **db_table** (*object, optional*) – The explicit table name to use, if specifying a ManyToManyField.

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)
Simulate the mutation.

This will alter the database schema to rename the specified field.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)
Schedule a field rename on the mutator.

This will instruct the mutator to rename a field on a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.
- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**ChangeField**(*model_name*, *field_name*, *initial=None*, ***field_attrs*)

Bases: *django_evolution.mutations.BaseModelFieldMutation*

A mutation that changes attributes on a field on a model.

simulation_failure_error = 'Cannot change the field "%(field_name)s" on model "%(app_l

__init__(*model_name*, *field_name*, *initial=None*, ***field_attrs*)

Initialize the mutation.

Parameters

- **model_name** (*unicode*) – The name of the model containing the field to change.
- **field_name** (*unicode*) – The name of the field to change.
- **initial** (*object, optional*) – The initial value for the field. This is required if non-null.
- ****field_attrs** (*dict*) – Attributes to set on the field.

get_hint_params()

Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)

Simulate the mutation.

This will alter the database schema to change attributes for the specified field.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)

Schedule a field change on the mutator.

This will instruct the mutator to change attributes on a field on a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.
- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**RenameModel**(*old_model_name*, *new_model_name*, *db_table*)

Bases: *django_evolution.mutations.BaseModelMutation*

A mutation that renames a model.

simulation_failure_error = 'Cannot rename the model "%(app_label)s.%(model_name)s".'

__init__(*old_model_name*, *new_model_name*, *db_table*)

Initialize the mutation.

Parameters

- **old_model_name** (*unicode*) – The old (existing) name of the model to rename.
- **new_model_name** (*unicode*) – The new name for the model.

- **db_table** (*unicode*) – The table name in the database for this model.

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)
Simulate the mutation.

This will alter the database schema to rename the specified model.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)
Schedule a model rename on the mutator.

This will instruct the mutator to rename a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.
- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**DeleteModel**(*model_name*)
Bases: *django_evolution.mutations.BaseModelMutation*

A mutation that deletes a model.

simulation_failure_error = 'Cannot delete the model "%(app_label)s.%(model_name)s".'

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)
Simulate the mutation.

This will alter the database schema to delete the specified model.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)
Schedule a model deletion on the mutator.

This will instruct the mutator to delete a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.

- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**DeleteApplication**
Bases: *django_evolution.mutations.BaseMutation*

A mutation that deletes an application.

simulation_failure_error = 'Cannot delete the application "%(app_label)s".'

simulate(*simulation*)
Simulate the mutation.

This will alter the database schema to delete the specified application.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*)
Schedule an application deletion on the mutator.

This will instruct the mutator to delete an application, if it exists. It will be scheduled and later executed on the database, if not optimized out.

Parameters **mutator** (django_evolution.mutators.AppMutator) – The mutator to perform an operation on.

is_mutable(**args*, ***kwargs*)
Return whether the mutation can be applied to the database.

This will always return true. The mutation will safely handle the application no longer being around.

Parameters

- ***args** (*tuple, unused*) – Positional arguments passed to the function.
- ****kwargs** (*dict, unused*) – Keyword arguments passed to the function.

Returns True, always.

Return type bool

class django_evolution.mutations.**ChangeMeta**(*model_name*, *prop_name*, *new_value*)
Bases: *django_evolution.mutations.BaseModelMutation*

A mutation that changes meta proeprties on a model.

simulation_failure_error = 'Cannot change the "%(prop_name)s" meta property on model "

error_vars = {'model_name': 'model_name', 'prop_name': 'prop_name'}

__init__(*model_name*, *prop_name*, *new_value*)
Initialize the mutation.

Parameters

- **model_name** (*unicode*) – The name of the model to change meta properties on.
- **prop_name** (*unicode*) – The name of the property to change.
- **new_value** (*object*) – The new value for the property.

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

simulate(*simulation*)
Simulate the mutation.

This will alter the database schema to change metadata on the specified model.

Parameters **simulation** (Simulation) – The state for the simulation.

Raises ***django_evolution.errors.SimulationFailure*** – The simulation failed. The reason is in the exception's message.

mutate(*mutator*, *model*)
Schedule a model meta property change on the mutator.

This will instruct the mutator to change a meta property on a model. It will be scheduled and later executed on the database, if not optimized out.

Parameters

- **mutator** (django_evolution.mutators.ModelMutator) – The mutator to perform an operation on.
- **model** (MockModel) – The model being mutated.

class django_evolution.mutations.**RenameAppLabel**(*old_app_label*, *new_app_label*, *legacy_app_label=None*, *model_names=None*)
Bases: *django_evolution.mutations.BaseMutation*

A mutation that renames the app label for an application.

__init__(*old_app_label*, *new_app_label*, *legacy_app_label=None*, *model_names=None*)
Initialize self. See help(type(self)) for accurate signature.

get_hint_params()
Return parameters for the mutation's hinted evolution.

Returns A list of parameter strings to pass to the mutation's constructor in a hinted evolution.

Return type list of unicode

is_mutable(*app_label*, *project_sig*, *database_state*, *database*)
Return whether the mutation can be applied to the database.

Parameters

- **app_label** (*unicode*) – The label for the Django application to be mutated.
- **project_sig** (*dict*, *unused*) – The project's schema signature.
- **database_state** (django_evolution.db.state.DatabaseState, *unused*) – The database state.
- **database** (*unicode*) – The name of the database the operation would be performed on.

Returns True if the mutation can run. False if it cannot.

Return type bool

simulate(*simulation*)
Simulate the mutation.

This will alter the signature to make any changes needed for the application's evolution storage.

mutate(*mutator*)
Schedule an app mutation on the mutator.

This will inform the mutator of the new app label, for use in any future operations.

Parameters **mutator** (django_evolution.mutators.AppMutator) – The mutator to perform an operation on.

class django_evolution.mutations.**MoveToDjangoMigrations**(*mark_applied=['0001_initial']*)
Bases: *django_evolution.mutations.BaseMutation*

A mutation that uses Django migrations for an app's future upgrades.

This directs this app to evolve only up until this mutation, and to then hand any future schema changes over to Django's migrations.

Once this mutation is used, no further mutations can be added for the app.

__init__(*mark_applied=['0001_initial']*)
Initialize the mutation.

Parameters **mark_applied** (*unicode, optional*) – The list of migrations to mark as applied. Each of these should have been covered by the initial table or subsequent evolutions. By default, this covers the `0001_initial` migration.

is_mutable(**args*, ***kwargs*)
Return whether the mutation can be applied to the database.

Parameters

- ***args** (*tuple, unused*) – Unused positional arguments.
- ****kwargs** (*tuple, unused*) – Unused positional arguments.

Returns `True`, always.

Return type bool

simulate(*simulation*)
Simulate the mutation.

This will alter the app's signature to mark it as being handled by Django migrations.

Parameters **simulation** (Simulation) – The simulation being performed.

mutate(*mutator*)
Schedule an app mutation on the mutator.

As this mutation just modifies state on the signature, no actual database operations are performed.

Parameters **mutator** (django_evolution.mutators.AppMutator, *unused*) – The mutator to perform an operation on.

django_evolution.mutators

Classes that optimize mutations and generate SQL to apply.

Classes

AppMutator(app_label, project_sig, ... [, ...])	Tracks and runs mutations for an app.
ModelMutator(app_mutator, model_name, ... [, ...])	Tracks and runs mutations for a model.
SQLMutator(mutation, sql)	

class django_evolution.mutators.**ModelMutator**(*app_mutator*, *model_name*, *app_label*, *legacy_app_label*, *project_sig*, *database_state*, *database=None*)

Bases: object

Tracks and runs mutations for a model.

A ModelMutator is bound to a particular model (by type, not instance) and handles operations that apply to that model.

Operations are first registered by mutations, and then later provided to the database's operations backend, where they will be applied to the database.

After all operations are added, the caller is expected to call to_sql() to get the SQL statements needed to apply those operations. Once called, the mutator is finalized, and new operations cannot be added.

ModelMutator only works with mutations that are instances of BaseModelFieldMutation. It is also intended for internal use by AppMutator.

__init__(*app_mutator*, *model_name*, *app_label*, *legacy_app_label*, *project_sig*, *database_state*, *database=None*)

Initialize the mutator.

Parameters

- **app_mutator** (AppMutator) – The app mutator that owns this model mutator.
- **model_name** (*unicode*) – The name of the model being evolved.
- **app_label** (*unicode*) – The label of the app to evolve.
- **legacy_app_label** (*unicode*) – The legacy label of the app to evolve. This is based on the module name and is used in the transitioning of pre-Django 1.7 signatures.
- **project_sig** (django_evolution.signature.ProjectSignature) – The project signature being evolved.
- **database_state** (django_evolution.db.state.DatabaseState) – The database state information to manipulate.
- **database** (*unicode, optional*) – The name of the database being evolved.

property project_sig

property database_state

property model_sig

The model signature that this mutator is working with.

Type: django_evolution.signature.ModelSignature

create_model()

Creates a mock model instance with the stored information.

This is typically used when calling a mutation's mutate() function and passing a model instance, but can also be called whenever a new instance of the model is needed for any lookups.

add_column(*mutation*, *field*, *initial*)
Adds a pending Add Column operation.

This will cause to_sql() to include SQL for adding the column with the given information to the model.

change_column(*mutation*, *field*, *new_attrs*)
Adds a pending Change Column operation.

This will cause to_sql() to include SQL for changing one or more attributes for the given column.

delete_column(*mutation*, *field*)
Adds a pending Delete Column operation.

This will cause to_sql() to include SQL for deleting the given column.

delete_model(*mutation*)
Adds a pending Delete Model operation.

This will cause to_sql() to include SQL for deleting the model.

change_meta(*mutation*, *prop_name*, *new_value*)
Adds a pending Change Meta operation.

This will cause to_sql() to include SQL for changing a supported attribute in the model's Meta class.

add_sql(*mutation*, *sql*)
Adds an operation for executing custom SQL.

This will cause to_sql() to include the provided SQL statements. The SQL should be a list of a statements.

run_mutation(*mutation*)
Runs the specified mutation.

The mutation will be provided with a temporary mock instance of a model that can be used for field or meta lookups.

The mutation must be an instance of BaseModelMutation.

run_simulation(*mutation*)

to_sql()
Returns SQL for the operations added to this mutator.

The SQL will represent all the operations made by the mutator, as determined by the database operations backend.

Once called, no new operations can be added to the mutator.

finish_op(*op*)
Finishes handling an operation.

This is called by the evolution operations backend when it is done with an operation.

Simulations for the operation's associated mutation will be applied, in order to update the signatures for the changes made by the mutation.

class django_evolution.mutators.**SQLMutator**(*mutation*, *sql*)
Bases: object

__init__(*mutation*, *sql*)
Initialize self. See help(type(self)) for accurate signature.

to_sql()

class django_evolution.mutators.**AppMutator**(*app_label*, *project_sig*, *database_state*, *legacy_app_label=None*, *database=None*)
Bases: object

Tracks and runs mutations for an app.

An AppMutator is bound to a particular app name, and handles operations that apply to anything on that app.

This will create a ModelMutator internally for each set of adjacent operations that apply to the same model, allowing the database operations backend to optimize those operations. This means that it's in the best interest of a developer to keep related mutations batched together as much as possible.

After all operations are added, the caller is expected to call to_sql() to get the SQL statements needed to apply those operations. Once called, the mutator is finalized, and new operations cannot be added.

classmethod from_evolver(*evolver*, *app_label*, *legacy_app_label=None*)
Create an AppMutator based on the state from an Evolver.

Parameters

- **evolver** (django_evolution.evolve.Evolver) – The Evolver containing the state for the app mutator.
- **app_label** (*unicode*) – The label of the app to evolve.
- **legacy_app_label** (*unicode, optional*) – The legacy label of the app to evolve. This is based on the module name and is used in the transitioning of pre-Django 1.7 signatures.

Returns The new app mutator.

Return type *AppMutator*

__init__(*app_label*, *project_sig*, *database_state*, *legacy_app_label=None*, *database=None*)
Initialize the mutator.

Parameters

- **app_label** (*unicode*) – The label of the app to evolve.
- **project_sig** (django_evolution.signature.ProjectSignature) – The project signature being evolved.
- **database_state** (django_evolution.db.state.DatabaseState) – The database state information to manipulate.
- **legacy_app_label** (*unicode, optional*) – The legacy label of the app to evolve. This is based on the module name and is used in the transitioning of pre-Django 1.7 signatures.
- **database** (*unicode, optional*) – The name of the database being evolved.

run_mutation(*mutation*)
Runs a mutation that applies to this app.

If the mutation applies to a model, a ModelMutator for that model will be given the job of running this mutation. If the prior operation operated on the same model, then the previously created ModelMutator will be used. Otherwise, a new one will be created.

run_mutations(*mutations*)
Runs a list of mutations.

add_sql(*mutation*, *sql*)
Adds SQL that applies to the application.

to_sql()
Returns SQL for the operations added to this mutator.

The SQL will represent all the operations made by the mutator. Once called, no new operations can be added.

django_evolution.signals

Signals for monitoring the evolution process.

django_evolution.signals.**evolving = <django.dispatch.dispatcher.Signal object>**
Emitted when an Evolver begins evolving.

django_evolution.signals.**evolved = <django.dispatch.dispatcher.Signal object>**
Emitted when an Evolver finishes evolving.

django_evolution.signals.**evolving_failed = <django.dispatch.dispatcher.Signal object>**
Emitted when an Evolver fails evolving.

Parameters **exception** (*Exception*) – The exception raised when evolution failed.

django_evolution.signals.**applying_evolution = <django.dispatch.dispatcher.Signal object>**
Emitted when an evolution is about to be applied to an app.

Parameters

- **app_label** (*unicode*) – The label of the application being applied.
- **task** (django_evolution.evolve.EvolveAppTask) – The task evolving the app.

django_evolution.signals.**applied_evolution = <django.dispatch.dispatcher.Signal object>**
Emitted when an evolution has been applied to an app.

Parameters

- **app_label** (*unicode*) – The label of the application being applied.
- **task** (django_evolution.evolve.EvolveAppTask) – The task that evolved the app.

django_evolution.signals.**applying_migration = <django.dispatch.dispatcher.Signal object>**
Emitted when a migration is about to be applied to an app.

Parameters **migration** (*django.db.migrations.migration.Migration*) – The migration that's being applied.

django_evolution.signals.**applied_migration = <django.dispatch.dispatcher.Signal object>**
Emitted when a migration has been applied to an app.

Parameters **migration** (*django.db.migrations.migration.Migration*) – The migration that was applied.

django_evolution.signals.**creating_models = <django.dispatch.dispatcher.Signal object>**
Emitted when creating new models for an app outside of a migration.

Parameters

- **app_label** (*unicode*) – The app label for the models being created.
- **model_names** (*list of unicode*) – The list of models being created.

django_evolution.signals.**created_models = <django.dispatch.dispatcher.Signal object>**
Emitted when finished creating new models for an app outside of a migration.

Parameters

- **migration** (*django.db.migrations.migration.Migration*) – The migration that was applied.
- **model_names** (*list of unicode*) – The list of models that were created.

django_evolution.signature

Classes for working with stored evolution state signatures.

These provide a way to work with the state of Django apps and their models in an abstract way, and to deserialize from or serialize to a string. Signatures can also be diffed, showing the changes between an older and a newer version in order to help see how the current database's signature differs from an older stored version.

Serialized versions of signatures are versioned, and the signature classes handle loading and saving as any version. However, state may be lost when downgrading a signature.

The following versions are currently supported:

Version 1: The original version of the signature, used up until Django Evolution 1.0. This is in the form of:

```
{
    '__version__': 1,
    '<legacy_app_label>': {
        '<model_name>': {
            'meta': {
                'db_table': '<table name>',
                'db_tablespace': '<tablespace>',
                'index_together': [
                    ('<colname>', ...),
                    ...
                ],
                'indexes': [
                    {
                        'name': '<name>',
                        'fields': ['<colname>', ...],
                    },
                    ...
                ],
                'pk_column': '<colname>',
                'unique_together': [
                    ('<colname>', ...),
                    ...
                ],
                '__unique_together_applied': True|False,
            },
            'fields': {
                'field_type': <class>,
                'related_model': '<app_label>.<class_name>',
                '<field_attr>': <value>,
                ...
            },
        },
        ...
    },
    ...
}
```

Version 2: Introduced in Django Evolution 2.0. This differs from version 1 in that it's deeper, with explicit namespaces for apps, models, and field attributes that can exist alongside metadata keys. This is in the form of:

```
{
    '__version__': 2,
    'apps': {
        '<app_label>': {
            'legacy_app_label': '<legacy app_label>',
            'upgrade_method': 'migrations'|'evolutions'|None,
            'applied_migrations' ['<migration name>', ...],
            'models': {
                '<model_name>': {
                    'meta': {
                        'constraints': [
                            {
                                'name': '<name>',
                                'type': '<class_path>',
                                'attrs': {
                                    '<attr_name>': <value>,
                                },
                            },
                            ...
                        ],
                        'db_table': '<table name>',
                        'db_tablespace': '<tablespace>',
                        'index_together': [
                            ('<colname>', ...),
                            ...
                        ],
                        'indexes': [
                            {
                                'name': '<name>',
                                'fields': ['<colname>', ...],
                            },
                            ...
                        ],
                        'pk_column': '<colname>',
                        'unique_together': [
                            ('<colname>', ...),
                            ...
                        ],
                        '__unique_together_applied': True|False,
                    },
                    'fields': {
                        'type': '<class_path>',
                        'related_model': '<app_label>.<class_name>',
                        'attrs': {
                            '<field_attr_name>': <value>,
                            ...
                        },
                    },
                },
                ...
            },
        },
        ...
    },
}
```

Module Attributes

LATEST_SIGNATURE_VERSION	The latest signature version.

Functions

validate_sig_version(sig_version)	Validate that a signature version is supported.

Classes

AppSignature(app_id[, legacy_app_label, ...])	Signature information for an application.
BaseSignature()	Base class for a signature.
ConstraintSignature(name, constraint_type[, ...])	Signature information for a explicit constraint.
FieldSignature(field_name, field_type[, ...])	Signature information for a field.
IndexSignature(fields[, name])	Signature information for an explicit index.
ModelSignature(model_name, table_name[, ...])	Signature information for a model.
ProjectSignature()	Signature information for a project.

django_evolution.signature.**LATEST_SIGNATURE_VERSION = 2**
The latest signature version.

class django_evolution.signature.**BaseSignature**
Bases: object

Base class for a signature.

classmethod deserialize(*sig_dict*, *sig_version*, *database='default'*)
Deserialize the signature.

Parameters

- **sig_dict** (*dict*) – The dictionary containing signature data.
- **sig_version** (*int*) – The stored signature version.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature class.

Return type *BaseSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

diff(*old_sig*)
Diff against an older signature.

The resulting data is dependent on the type of signature.

Parameters **old_sig** (BaseSignature) – The old signature to diff against.

Returns The resulting diffed data.

Return type object

clone()
Clone the signature.

Returns The cloned signature.

Return type *BaseSignature*

serialize(*sig_version=2*)
Serialize data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two signatures are equal.

Parameters **other** (BaseSignature) – The other signature.

Returns `True` if the project signatures are equal. `False` if they are not.

Return type bool

__ne__(*other*)
Return whether two signatures are not equal.

Parameters **other** (BaseSignature) – The other signature.

Returns `True` if the project signatures are not equal. `False` if they are equal.

Return type bool

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

__hash__ = None

class django_evolution.signature.**ProjectSignature**
Bases: *django_evolution.signature.BaseSignature*

Signature information for a project.

Projects are the top-level signature deserialized from and serialized to a *Version* model. They contain a signature version and information on all the applications tracked for the project.

classmethod from_database(*database*)
Create a project signature from the database.

This will look up all the applications registered in Django, turning each of them into a *AppSignature* stored in this project signature.

Parameters **database** (*unicode*) – The name of the database.

Returns The project signature based on the current application and database state.

Return type *ProjectSignature*

classmethod deserialize(*project_sig_dict*, *database='default'*)
Deserialize a serialized project signature.

Parameters

- **project_sig_dict** (*dict*) – The dictionary containing project signature data.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature instance.

Return type *ProjectSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version found in the dictionary is unsupported.

__init__()
Initialize the signature.

property app_sigs
The application signatures in the project signature.

add_app(*app*, *database*)
Add an application to the project signature.

This will construct an *AppSignature* and add it to the project signature.

Parameters

- **app** (*module*) – The application module to create the signature from.
- **database** (*unicode*) – The database name.

add_app_sig(*app_sig*)
Add an application signature to the project signature.

Parameters **app_sig** (AppSignature) – The application signature to add.

remove_app_sig(*app_id*)
Remove an application signature from the project signature.

Parameters **app_id** (*unicode*) – The ID of the application signature to remove.

Raises ***django_evolution.errors.MissingSignatureError*** – The application ID does not represent a known application signature.

get_app_sig(*app_id*, *required=False*)
Return an application signature with the given ID.

Parameters

- **app_id** (*unicode*) – The ID of the application signature. This may be a modern app label, or a legacy app label.
- **required** (*bool, optional*) – Whether the app signature must be present. If `True` and the signature is missing, this will raise an exception.

Returns The application signature, if found. If no application signature matches the ID, `None` will be returned.

Return type *AppSignature*

Raises ***django_evolution.errors.MissingSignatureError*** – The application signature was not found, and `required` was `True`.

diff(*old_project_sig*)
Diff against an older project signature.

This will return a dictionary of changes between two project signatures.

Parameters **old_project_sig** (ProjectSignature) – The old project signature to diff against.

Returns

A dictionary in the following form:

```
{
    'changed': {
        <app ID>: <AppSignature diff>,
        ...
    },
    'deleted': [
        <app ID>: [
            <model name>,
            ...
        ],
        ...
    ],
}
```

Any key lacking a value will be ommitted from the diff.

Return type collections.OrderedDict

Raises **TypeError** – The old signature provided was not a *ProjectSignature*.

clone()
Clone the signature.

Returns The cloned signature.

Return type *ProjectSignature*

serialize(*sig_version=2*)
Serialize project data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two project signatures are equal.

Parameters **other** (ProjectSignature) – The other project signature.

Returns True if the project signatures are equal. False if they are not.

Return type bool

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

__hash__ = None

class django_evolution.signature.**AppSignature**(*app_id*, *legacy_app_label=None*, *upgrade_method=None*, *applied_migrations=None*)

Bases: *django_evolution.signature.BaseSignature*

Signature information for an application.

Application signatures store information on a Django application and all models registered under that application.

classmethod from_app(*app*, *database*)

Create an application signature from an application.

This will store data on the application and create a *ModelSignature* for each of the application's models.

Parameters

- **app** (*module*) – The application module to create the signature from.
- **database** (*unicode*) – The name of the database.

Returns The application signature based on the application.

Return type *AppSignature*

classmethod deserialize(*app_id*, *app_sig_dict*, *sig_version*, *database='default'*)

Deserialize a serialized application signature.

Parameters

- **app_id** (*unicode*) – The application ID.
- **app_sig_dict** (*dict*) – The dictionary containing application signature data.
- **sig_version** (*int*) – The version of the serialized signature data.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature instance.

Return type *AppSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__init__(*app_id*, *legacy_app_label=None*, *upgrade_method=None*, *applied_migrations=None*)

Initialize the signature.

Parameters

- **app_id** (*unicode*) – The ID of the application. This will be the application label. On modern versions of Django, this may differ from the legacy app label.
- **legacy_app_label** (*unicode, optional*) – The legacy label for the application. This is based on the module name.
- **upgrade_method** (*unicode, optional*) – The upgrade method used for this application. This must be a value from `UpgradeMethod`, or `None`.
- **applied_migrations** (*set of unicode, optional*) – The migration names that are applied as of this signature.

property model_sigs
The model signatures stored on the application signature.

property applied_migrations
The set of migration names applied to the app.

Type: set of unicode

is_empty()
Return whether the application signature is empty.

An empty application signature contains no models.

Returns `True` if the signature is empty. `False` if it still has models in it.

Return type bool

add_model(*model*)
Add a model to the application signature.

This will construct a *ModelSignature* and add it to this application signature.

Parameters **model** (*django.db.models.Model*) – The model to create the signature from.

add_model_sig(*model_sig*)
Add a model signature to the application signature.

Parameters **model_sig** (ModelSignature) – The model signature to add.

remove_model_sig(*model_name*)
Remove a model signature from the application signature.

Parameters **model_name** (*unicode*) – The name of the model.

Raises ***django_evolution.errors.MissingSignatureError*** – The model name does not represent a known model signature.

clear_model_sigs()
Clear all model signatures from the application signature.

get_model_sig(*model_name*, *required=False*)
Return a model signature for the given model name.

Parameters

- **model_name** (*unicode*) – The name of the model.
- **required** (*bool, optional*) – Whether the model signature must be present. If `True` and the signature is missing, this will raise an exception.

Returns The model signature, if found. If no model signature matches the model name, `None` will be returned.

Return type *ModelSignature*

Raises ***django_evolution.errors.MissingSignatureError*** – The model signature was not found, and `required` was `True`.

diff(*old_app_sig*)
Diff against an older application signature.

This will return a dictionary containing the differences between two application signatures.

Parameters **old_app_sig** (AppSignature) – The old app signature to diff against.

Returns

A dictionary in the following form:

```
{
    'changed': {
        '<model_name>': <ModelSignature diff>,
        ...
    },
    'deleted': [ <list of deleted model names> ],
    'meta_changed': {
        '<prop_name>': {
            'old': <old value>,
            'new': <new value>,
        },
        ...
    }
}
```

Any key lacking a value will be ommitted from the diff.

Return type collections.OrderedDict

Raises **TypeError** – The old signature provided was not an *AppSignature*.

clone()
Clone the signature.

Returns The cloned signature.

Return type *AppSignature*

serialize(*sig_version=2*)
Serialize application data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two application signatures are equal.

Parameters **other** (AppSignature) – The other application signature.

Returns `True` if the application signatures are equal. `False` if they are not.

Return type bool

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

__hash__ = None

class django_evolution.signature.**ModelSignature**(*model_name*, *table_name*, *db_tablespace=None*, *index_together=[]*, *pk_column=None*, *unique_together=[]*)

Bases: *django_evolution.signature.BaseSignature*

Signature information for a model.

Model signatures store information on the model and include signatures for its fields and _meta attributes.

classmethod from_model(*model*)

Create a model signature from a model.

This will store data on the model and its _meta attributes, and create a *FieldSignature* for each field.

Parameters **model** (*django.db.models.Model*) – The model to create a signature from.

Returns The signature based on the model.

Return type *ModelSignature*

classmethod deserialize(*model_name*, *model_sig_dict*, *sig_version*, *database='default'*)

Deserialize a serialized model signature.

Parameters

- **model_name** (*unicode*) – The model name.
- **model_sig_dict** (*dict*) – The dictionary containing model signature data.
- **sig_version** (*int*) – The version of the serialized signature data.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature instance.

Return type *ModelSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__init__(*model_name*, *table_name*, *db_tablespace=None*, *index_together=[]*, *pk_column=None*, *unique_together=[]*)

Initialize the signature.

Parameters

- **model_name** (*unicode*) – The name of the model.
- **table_name** (*unicode*) – The name of the table in the database.
- **db_tablespace** (*unicode, optional*) – The tablespace for the model. This is database-specific.
- **index_together** (*list of tuple, optional*) – A list of fields that are indexed together.
- **pk_column** (*unicode, optional*) – The column for the primary key.
- **unique_together** (*list of tuple, optional*) – The list of fields that are unique together.

property field_sigs

The field signatures on the model signature.

add_field(*field*)
Add a field to the model signature.

This will construct a *FieldSignature* and add it to this model signature.

Parameters **field** (*django.db.models.Field*) – The field to create the signature from.

add_field_sig(*field_sig*)
Add a field signature to the model signature.

Parameters **field_sig** (FieldSignature) – The field signature to add.

remove_field_sig(*field_name*)
Remove a field signature from the model signature.

Parameters **field_name** (*unicode*) – The name of the field.

Raises ***django_evolution.errors.MissingSignatureError*** – The field name does not represent a known field signature.

get_field_sig(*field_name*, *required=False*)
Return a field signature for the given field name.

Parameters

- **field_name** (*unicode*) – The name of the field.
- **required** (*bool, optional*) – Whether the model signature must be present. If `True` and the signature is missing, this will raise an exception.

Returns The field signature, if found. If no field signature matches the field name, `None` will be returned.

Return type *FieldSignature*

Raises ***django_evolution.errors.MissingSignatureError*** – The model signature was not found, and `required` was `True`.

add_constraint(*constraint*)
Add an explicit constraint to the models.

This is only used on Django 2.2 or higher. It corresponds to the `model._meta.constraints <django.db.models.Options.constraints` attribute.

Parameters **constraint** (*django.db.models.BaseConstraint*) – The constraint to add.

add_constraint_sig(*constraint_sig*)
Add an explicit constraint signature to the models.

This is only used on Django 2.2 or higher. It corresponds to the `model._meta.constraints <django.db.models.Options.constraints` attribute.

Parameters **constraint_sig** (ConstraintSignature) – The constraint signature to add.

add_index(*index*)
Add an explicit index to the models.

This is only used on Django 1.11 or higher. It corresponds to the `model._meta.indexes <django.db.models.Options.indexes` attribute.

Parameters **index** (*django.db.models.Index*) – The index to add.

add_index_sig(*index_sig*)
Add an explicit index signature to the models.

This is only used on Django 1.11 or higher. It corresponds to the `model._meta.indexes <django.db.models.Options.indexes` attribute.

Parameters **index_sig** (`IndexSignature`) – The index signature to add.

has_unique_together_changed(*old_model_sig*)
Return whether unique_together has changed between signatures.

`unique_together` is considered to have changed under the following conditions:

- They are different in value.
- Either the old or new is non-empty (even if equal) and evolving from an older signature from Django Evolution pre-0.7, where unique_together wasn't applied to the database.

Parameters **old_model_sig** (`ModelSignature`) – The old model signature to compare against.

Returns `True` if the value has changed. `False` if they're considered equal for the purposes of evolution.

Return type bool

diff(*old_model_sig*)
Diff against an older model signature.

This will return a dictionary containing the differences in fields and meta information between two signatures.

Parameters **old_model_sig** (`ModelSignature`) – The old model signature to diff against.

Returns

A dictionary in the following form:

```
{
    'added': [
        <field name>,
        ...
    ],
    'deleted': [
        <field name>,
        ...
    ],
    'changed': {
        <field name>: <FieldSignature diff>,
        ...
    },
    'meta_changed': [
        <'constraints'>,
        <'indexes'>,
        <'index_together'>,
        <'unique_together'>,
    ],
}
```

Any key lacking a value will be ommitted from the diff.

Return type collections.OrderedDict

Raises **TypeError** – The old signature provided was not a *ModelSignature*.

clone()
Clone the signature.

Returns The cloned signature.

Return type *ModelSignature*

serialize(*sig_version=2*)
Serialize model data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two model signatures are equal.

Parameters **other** (ModelSignature) – The other model signature.

Returns `True` if the model signatures are equal. `False` if they are not.

Return type bool

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

__hash__ = None

class django_evolution.signature.**ConstraintSignature**(*name*, *constraint_type*, *attrs=None*)
Bases: *django_evolution.signature.BaseSignature*

Signature information for a explicit constraint.

These indexes were introduced in Django 1.11. They correspond to entries in the `model._meta.indexes <django.db.models.Options.indexes` attribute.

Constraint signatures store information on a constraint on model, including the constraint name, type, and any attribute values needed for constructing the constraint.

classmethod from_constraint(*constraint*)
Create a constraint signature from a field.

Parameters **constraint** (*django.db.models.BaseConstraint*) – The constraint to create a signature from.

Returns The signature based on the constraint.

Return type *ConstraintSignature*

classmethod deserialize(*constraint_sig_dict*, *sig_version*, *database='default'*)
Deserialize a serialized constraint signature.

Parameters

- **constraint_sig_dict** (*dict*) – The dictionary containing constraint signature data.
- **sig_version** (*int*) – The version of the serialized signature data.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature instance.

Return type *ConstraintSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__init__(*name*, *constraint_type*, *attrs=None*)
Initialize the signature.

Parameters

- **name** (*unicode*) – The name of the constraint.
- **constraint_type** (*cls*) – The class for the constraint. This would be a subclass of `django.db.models.BaseConstraint`.
- **attrs** (*dict, optional*) – Attributes to pass when constructing the constraint.

clone()
Clone the signature.

Returns The cloned signature.

Return type *ConstraintSignature*

serialize(*sig_version=2*)
Serialize constraint data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two constraint signatures are equal.

Parameters **other** (`ConstraintSignature`) – The other constraint signature.

Returns `True` if the constraint signatures are equal. `False` if they are not.

Return type bool

__hash__()
Return a hash of the signature.

This is required for comparison within a `set`.

Returns The hash of the signature.

Return type int

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

class django_evolution.signature.**IndexSignature**(*fields*, *name=None*)
Bases: *django_evolution.signature.BaseSignature*

Signature information for an explicit index.

These indexes were introduced in Django 1.11. They correspond to entries in the `model._meta.indexes <django.db.models.Options.indexes` attribute.

classmethod from_index(*index*)
Create an index signature from an index.

Parameters **index** (*django.db.models.Index*) – The index to create the signature from.

Returns The signature based on the index.

Return type *IndexSignature*

classmethod deserialize(*index_sig_dict*, *sig_version*, *database='default'*)
Deserialize a serialized index signature.

Parameters

- **index_sig_dict** (*dict*) – The dictionary containing index signature data.
- **sig_version** (*int*) – The version of the serialized signature data.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature instance.

Return type *IndexSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__init__(*fields*, *name=None*)
Initialize the signature.

Parameters

- **fields** (*list of unicode*) – The list of field names the index is comprised of.
- **name** (*unicode, optional*) – The optional name of the index.

clone()
Clone the signature.

Returns The cloned signature.

Return type *IndexSignature*

serialize(*sig_version=2*)
Serialize index data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two index signatures are equal.

Parameters **other** (IndexSignature) – The other index signature.

Returns True if the index signatures are equal. False if they are not.

Return type bool

__hash__()
Return a hash of the signature.

This is required for comparison within a set.

Returns The hash of the signature.

Return type int

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

class django_evolution.signature.**FieldSignature**(*field_name*, *field_type*, *field_attrs=None*, *related_model=None*)
Bases: *django_evolution.signature.BaseSignature*

Signature information for a field.

Field signatures store information on a field on model, including the field name, type, and any attribute values needed for migrating the schema.

classmethod from_field(*field*)
Create a field signature from a field.

Parameters **field** (*django.db.models.Field*) – The field to create a signature from.

Returns The signature based on the field.

Return type *FieldSignature*

classmethod deserialize(*field_name*, *field_sig_dict*, *sig_version*, *database='default'*)
Deserialize a serialized field signature.

Parameters

- **field_name** (*unicode*) – The name of the field.
- **field_sig_dict** (*dict*) – The dictionary containing field signature data.
- **sig_version** (*int*) – The version of the serialized signature data.
- **database** (*unicode, optional*) – The name of the database.

Returns The resulting signature instance.

Return type *FieldSignature*

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__init__(*field_name*, *field_type*, *field_attrs=None*, *related_model=None*)
Initialize the signature.

Parameters

- **field_name** (*unicode*) – The name of the field.
- **field_type** (*cls*) – The class for the field. This would be a subclass of `django.db.models.Field`.
- **field_attrs** (*dict, optional*) – Attributes to set on the field.
- **related_model** (*unicode, optional*) – The full path to a related model.

get_attr_value(*attr_name*, *use_default=True*)
Return the value for an attribute.

By default, this will return the default value for the attribute if it's not explicitly set.

Parameters

- **attr_name** (*unicode*) – The name of the attribute.
- **use_default** (*bool, optional*) – Whether to return the default value for the attribute if it's not explicitly set.

Returns The value for the attribute.

Return type object

get_attr_default(*attr_name*)
Return the default value for an attribute.

Parameters **attr_name** (*unicode*) – The attribute name.

Returns The default value for the attribute, or `None`.

Return type object

is_attr_value_default(*attr_name*)
Return whether an attribute is set to its default value.

Parameters **attr_name** (*unicode*) – The attribute name.

Returns `True` if the attribute's value is set to its default value. `False` if it has a custom value.

Return type bool

diff(*old_field_sig*)
Diff against an older field signature.

This will return a list of field names that have changed between this field signature and an older one.

Parameters **old_field_sig** (`FieldSignature`) – The old field signature to diff against.

Returns The list of field names.

Return type list

Raises **TypeError** – The old signature provided was not a *FieldSignature*.

clone()
Clone the signature.

Returns The cloned signature.

Return type *FieldSignature*

serialize(*sig_version=2*)
Serialize field data to a signature dictionary.

Parameters **sig_version** (*int, optional*) – The signature version to serialize as. This always defaults to the latest.

Returns The serialized data.

Return type dict

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

__eq__(*other*)
Return whether two field signatures are equal.

Parameters **other** (FieldSignature) – The other field signature.

Returns True if the field signatures are equal. False if they are not.

Return type bool

__hash__ = None

__repr__()
Return a string representation of the signature.

Returns A string representation of the signature.

Return type unicode

django_evolution.signature.**validate_sig_version**(*sig_version*)
Validate that a signature version is supported.

Parameters **sig_version** (*int*) – The version of the signature to validate.

Raises ***django_evolution.errors.InvalidSignatureVersion*** – The signature version provided isn't supported.

django_evolution.support

Constants indicating available Django features.

Module Attributes

supports_index_together	Index names changed in Django 1.5, with the introduction of index_together.
supports_indexes	Whether new-style Index classes are available.
supports_constraints	Whether new-style Constraint classes are available.
supports_migrations	Whether built-in support for Django Migrations is present.

django_evolution.support.**supports_index_together = True**
Index names changed in Django 1.5, with the introduction of index_together.

django_evolution.support.**supports_indexes = True**
Whether new-style Index classes are available.

Django 1.11 introduced formal support for defining explicit indexes not bound to a field definition or as part of index_together/unique_together.

django_evolution.support.**supports_constraints = True**
Whether new-style Constraint classes are available.

Django 2.2 introduced formal support for defining explicit constraints not bound to a field definition.

django_evolution.support.**supports_migrations = True**
Whether built-in support for Django Migrations is present.

This is available in Django 1.7+.

django_evolution.compat.apps

Compatibility functions for the application registration.

This provides functions for app registration and lookup. These functions translate to the various versions of Django that are supported.

Functions

clear_app_cache()	Clear the Django app/models caches.
get_app(app_label[, emptyOK])	Return the app with the given label.
get_apps()	Return the list of all installed apps with models.
is_app_registered(app)	Return whether the app registry is tracking a given app.
register_app(app_label, app)	Register a new app in the registry.
register_app_models(app_label, model_infos)	Register one or more models to a given app.
unregister_app(app_label)	Unregister an app in the registry.
unregister_app_model(app_label, model_name)	Unregister a model with the given name from the given app.

django_evolution.compat.apps.**clear_app_cache**()
Clear the Django app/models caches.

This cache is used in Django >= 1.2 to quickly return results when fetching models. It needs to be cleared when modifying the model registry.

django_evolution.compat.apps.**get_app**(*app_label*, *emptyOK=False*)
Return the app with the given label.

This returns the app from the app registry on Django >= 1.7, and from the old-style cache on Django < 1.7.

app_label (str): The label for the app containing the models.

emptyOK (bool, optional): Impacts the return value if the app has no models in it.

Returns

The app module, if available.

If the app module is available, but the models module is not and `emptyOK` is set, this will return `None`. Otherwise, if modules are not available, this will raise `ImproperlyConfigured`.

Return type module

Raises **django.core.exceptions.ImproperlyConfigured** – The app module was not found, or it was found but a models module was not and `emptyOK` was `False`.

django_evolution.compat.apps.**get_apps**()
Return the list of all installed apps with models.

This returns the apps from the app registry on Django >= 1.7, and from the old-style cache on Django < 1.7.

Returns A list of all the modules containing model classes.

Return type list

django_evolution.compat.commands

Compatibility module for management commands.

Classes

BaseCommand([stdout, stderr, no_color, ...])	Base command compatible with a range of Django versions.
OptionParserWrapper(parser)	Compatibility wrapper for OptionParser.

class django_evolution.compat.commands.**OptionParserWrapper**(*parser*)

Bases: object

Compatibility wrapper for OptionParser.

This exports a more modern ArgumentParser-based API for OptionParser, for use when adding arguments in management commands. This only contains a subset of the functionality of ArgumentParser.

__init__(*parser*)

Initialize the wrapper.

Parameters **parser** (*optparse.OptionParser*) – The option parser.

add_argument(**args*, ***kwargs*)

Add an argument to the parser.

This is a simple wrapper that provides compatibility with most of argparse.ArgumentParser.add_argument(). It supports the types that optparse.OptionParser.add_option() supports (though those types should be passed as the primitive types and not as the string names).

Parameters

- ***args** (*tuple*) – Positional arguments to pass to optparse.OptionParser.add_option().
- ****kwargs** (*dict*) – Keyword arguments to pass to optparse.OptionParser.add_option().

class django_evolution.compat.commands.**BaseCommand**(*stdout=None*, *stderr=None*, *no_color=False*, *force_color=False*)

Bases: django.core.management.base.BaseCommand

Base command compatible with a range of Django versions.

This is a version of django.core.management.base.BaseCommand that supports the modern way of adding arguments while retaining compatibility with older versions of Django. See the parent class's documentation for details on usage.

property use_argparse

Whether argparse should be used for argument parsing.

This is used internally by Django.

create_parser(**args*, ***kwargs*)

Create a parser for the command.

This is a wrapper around Django's method that ensures compatibility with old-style (<= 1.6)) and new-style (>= 1.7) argument parsing logic.

Parameters

- ***args** (*tuple*) – Positional arguments to pass to the parent method.
- ****kwargs** (*dict*) – Keyword arguments to pass to the parent method.

Returns The argument parser. This will be a `optparse.OptionParser` or a `argparse.ArgumentParser`.

Return type object

add_arguments(*parser*)
Add arguments to the command.

By default, this does nothing. Subclasses can override to add additional arguments.

Parameters **parser** (*object*) – The argument parser. This will be a `optparse.OptionParser` or a `argparse.ArgumentParser`.

__getattribute__(*name*)
Return an attribute from the command.

If the attribute name is "option_list", some special work will be done to ensure we're returning a valid list that the caller can work with, even if the options were created in *add_arguments()*.

Parameters **name** (*unicode*) – The attribute name.

Returns The attribute value.

Return type object

django_evolution.compat.datastructures

Compatibility imports for data structures.

This provides imports for data structures that are needed internally, to provide compatibility with different versions of Django.

class django_evolution.compat.datastructures.**OrderedDict**
Bases: dict

Dictionary that remembers insertion order

__init__(**args*, ***kwargs*)
Initialize self. See help(type(self)) for accurate signature.

__setitem__(*key*, *value*, */*)
Set self[key] to value.

__delitem__(*key*, */*)
Delete self[key].

__iter__()
Implement iter(self).

__reversed__() <==> *reversed(od)*

clear() → None. Remove all items from od.

popitem(*last=True*)
Remove and return a (key, value) pair from the dictionary.

Pairs are returned in LIFO order if last is true or FIFO order if false.

move_to_end(*key*, *last=True*)
Move an existing element to the end (or beginning if last is false).

Raise KeyError if the element does not exist.

__sizeof__() → size of D in memory, in bytes

update(*[E]*, ***F*) → None. Update D from dict/iterable E and F.
If E is present and has a .keys() method, then does: for k in E: D[k] = E[k] If E is present and lacks a .keys() method, then does: for k, v in E: D[k] = v In either case, this is followed by: for k in F: D[k] = F[k]

keys() → a set-like object providing a view on D's keys

items() → a set-like object providing a view on D's items

values() → an object providing a view on D's values

__ne__(*value*, */*)
Return self!=value.

pop(*k[, d]*) → v, remove specified key and return the corresponding
value. If key is not found, d is returned if given, otherwise KeyError is raised.

setdefault(*key*, *default=None*)
Insert key with a value of default if key is not in the dictionary.

Return the value for key if key is in the dictionary, else default.

__repr__()
Return repr(self).

__reduce__()
Return state information for pickling

copy() → a shallow copy of od

fromkeys(*value=None*)
Create a new ordered dictionary with keys from iterable and values set to value.

__eq__(*value*, */*)
Return self==value.

__ge__(*value*, */*)
Return self>=value.

__gt__(*value*, */*)
Return self>value.

__hash__ = None

__le__(*value*, */*)
Return self<=value.

__lt__(*value*, */*)
Return self<value.

django_evolution.compat.db

Compatibility functions for database-related operations.

This provides functions for database operations, SQL generation, index name generation, and more. These functions translate to the various versions of Django that are supported.

Functions

atomic([using])	Perform database operations atomically within a transaction.
convert_table_name(connection, name)	Convert a table name to a format required by the database backend.
create_constraint_name(connection, r_col, ...)	Return the name of a constraint.
create_index_name(connection, table_name[, ...])	Return the name for an index for a field.
create_index_together_name(connection, ...)	Return the name of an index for an index_together.
db_get_installable_models_for_app(app, db_state)	Return models that can be installed in a database.
db_router_allows_migrate(database, ...)	Return whether a database router allows migrate operations for a model.
db_router_allows_schema_upgrade(database, ...)	Return whether a database router allows a schema upgrade for a model.
db_router_allows_syncdb(database, model_cls)	Return whether a database router allows syncdb operations for a model.
digest(connection, *args)	Return a digest hash for a set of arguments.
sql_add_constraints(connection, model, refs)	Return SQL statements for adding constraints.
sql_create_app(app[, db_name])	Return SQL statements for creating all models for an app.
sql_create_for_many_to_many_field(...)	Return SQL statements for creating a ManyToManyField's table.
sql_create_models(models[, tables, db_name])	Return SQL statements for creating a list of models.
sql_delete(app[, db_name])	Return SQL statements for deleting all models in an app.
sql_delete_constraints(connection, model, ...)	Return SQL statements for deleting constraints.
sql_delete_index(connection, model, index_name)	Return SQL statements for deleting an index.
sql_indexes_for_field(connection, model, field)	Return SQL statements for creating indexes for a field.
sql_indexes_for_fields(connection, model, fields)	Return SQL statements for creating indexes covering multiple fields.
sql_indexes_for_model(connection, model)	Return SQL statements for creating all indexes for a model.

django_evolution.compat.db.**atomic**(*using=None*)

Perform database operations atomically within a transaction.

The caller can use this to ensure SQL statements are executed within a transaction and then cleaned up nicely if there's an error.

This provides compatibility with all supported versions of Django.

Parameters **using** (*str, optional*) – The database connection name to use. Defaults to the default database connection.

django_evolution.compat.db.**create_constraint_name**(*connection*, *r_col*, *col*, *r_table*, *table*)

Return the name of a constraint.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **r_col** (*str*) – The column name for the source of the relation.
- **col** (*str*) – The column name for the "to" end of the relation.
- **r_table** (*str*) – The table name for the source of the relation.
- **table** (*str*) – The table name for the "to" end of the relation.

Returns The generated constraint name for this version of Django.

Return type str

django_evolution.compat.db.**create_index_name**(*connection*, *table_name*, *field_names=[]*, *col_names=[]*, *unique=False*, *suffix=''*)

Return the name for an index for a field.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **table_name** (*str*) – The name of the table.
- **field_names** (*list of str, optional*) – The list of field names for the index.
- **col_names** (*list of str, optional*) – The list of column names for the index.
- **unique** (*bool, optional*) – Whether or not this index is unique.
- **suffix** (*str, optional*) – A suffix for the index. This is only used with Django >= 1.7.

Returns The generated index name for this version of Django.

Return type str

django_evolution.compat.db.**create_index_together_name**(*connection*, *table_name*, *field_names*)

Return the name of an index for an index_together.

This provides compatibility with all supported versions of Django >= 1.5. Prior versions don't support index_together.

Parameters

- **connection** (*object*) – The database connection.
- **table_name** (*str*) – The name of the table.
- **field_names** (*list of str*) – The list of field names indexed together.

Returns The generated index name for this version of Django.

Return type str

django_evolution.compat.db.**db_get_installable_models_for_app**(*app*, *db_state*)
Return models that can be installed in a database.

Parameters

- **app** (*module*) – The models module for the app.
- **db_state** (django_evolution.db.state.DatabaseState) – The introspected state of the database.

django_evolution.compat.db.**db_router_allows_migrate**(*database*, *app_label*, *model_cls*)
Return whether a database router allows migrate operations for a model.

This will only return True for Django 1.7 and newer and if the router allows migrate operations. This is compatible with both the Django 1.7 and 1.8+ versions of allow_migrate.

Parameters

- **database** (*unicode*) – The name of the database.
- **app_label** (*unicode*) – The application label.
- **model_cls** (*type*) – The model class.

Returns True if routers allow migrate for this model.

Return type bool

django_evolution.compat.db.**db_router_allows_schema_upgrade**(*database*, *app_label*, *model_cls*)
Return whether a database router allows a schema upgrade for a model.

This is a convenience wrapper around *db_router_allows_migrate()* and *db_router_allows_syncdb()*.

Parameters

- **database** (*unicode*) – The name of the database.
- **app_label** (*unicode*) – The application label.
- **model_cls** (*type*) – The model class.

Returns True if routers allow migrate for this model.

Return type bool

django_evolution.compat.db.**db_router_allows_syncdb**(*database*, *model_cls*)
Return whether a database router allows syncdb operations for a model.

This will only return True for Django 1.6 and older and if the router allows syncdb operations.

Parameters

- **database** (*unicode*) – The name of the database.
- **model_cls** (*type*) – The model class.

Returns True if routers allow syncdb for this model.

Return type bool

django_evolution.compat.db.**digest**(*connection*, **args*)
Return a digest hash for a set of arguments.

This is mostly used as part of the index/constraint name generation processes. It offers compatibility with a range of Django versions.

Parameters

- **connection** (*object*) – The database connection.
- ***args** (*tuple*) – The positional arguments used to build the digest hash out of.

Returns The resulting digest hash.

Return type str

django_evolution.compat.db.**sql_add_constraints**(*connection*, *model*, *refs*)

Return SQL statements for adding constraints.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The database model to add constraints on.
- **refs** (*dict*) – A dictionary of constraint references to add.

  The keys are instances of django.db.models.Model. The values are a tuple of (django.db.models.Model, django.db.models.Field).

Returns The list of SQL statements for adding constraints.

Return type list

django_evolution.compat.db.**sql_create_app**(*app*, *db_name=None*)

Return SQL statements for creating all models for an app.

This provides compatibility with all supported versions of Django.

Parameters

- **app** (*module*) – The application module.
- **db_name** (*str, optional*) – The database connection name. Defaults to the default database connection.

Returns The list of SQL statements used to create the models for the app.

Return type list

django_evolution.compat.db.**sql_create_models**(*models*, *tables=None*, *db_name=None*)

Return SQL statements for creating a list of models.

This provides compatibility with all supported versions of Django.

It's recommended that callers include auto-created models in the list, to ensure all references are correct.

Parameters

- **models** (*list of type*) – The list of Model subclasses.
- **tables** (*list of unicode, optional*) – A list of existing table names from the database. If not provided, this will be introspected from the database.
- **db_name** (*str, optional*) – The database connection name. Defaults to the default database connection.

Returns The list of SQL statements used to create the models for the app.

Return type list

django_evolution.compat.db.**sql_create_for_many_to_many_field**(*connection*, *model*, *field*)

Return SQL statements for creating a ManyToManyField's table.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The model for the ManyToManyField's relations.
- **field** (*django.db.models.ManyToManyField*) – The field setting up the many-to-many relation.

Returns The list of SQL statements for creating the table and constraints.

Return type list

django_evolution.compat.db.**sql_delete**(*app*, *db_name=None*)

Return SQL statements for deleting all models in an app.

This provides compatibility with all supported versions of Django.

Parameters

- **app** (*module*) – The application module containing the models to delete.
- **db_name** (*str, optional*) – The database connection name. Defaults to the default database connection.

Returns The list of SQL statements for deleting the models and constraints.

Return type list

django_evolution.compat.db.**sql_delete_constraints**(*connection*, *model*, *remove_refs*)

Return SQL statements for deleting constraints.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The database model to delete constraints on.
- **remove_refs** (*dict*) – A dictionary of constraint references to remove.

  The keys are instances of `django.db.models.Model`. The values are a tuple of (`django.db.models.Model`, `django.db.models.Field`).

Returns The list of SQL statements for deleting constraints.

Return type list

django_evolution.compat.db.**sql_delete_index**(*connection*, *model*, *index_name*)

Return SQL statements for deleting an index.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The database model to delete an index on.
- **index_name** (*unicode*) – The name of the index to delete.

Returns The list of SQL statements for deleting the index.

Return type list

django_evolution.compat.db.**sql_indexes_for_field**(*connection*, *model*, *field*)
Return SQL statements for creating indexes for a field.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The database model owning the field.
- **field** (*django.db.models.Field*) – The field being indexed.

Returns The list of SQL statements for creating the indexes.

Return type list

django_evolution.compat.db.**sql_indexes_for_fields**(*connection*, *model*, *fields*, *index_together=False*)
Return SQL statements for creating indexes covering multiple fields.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The database model owning the fields.
- **fields** (*list of django.db.models.Field*) – The list of fields for the index.
- **index_together** (*bool, optional*) – Whether this is from an index_together rule.

Returns The list of SQL statements for creating the indexes.

Return type list

django_evolution.compat.db.**sql_indexes_for_model**(*connection*, *model*)
Return SQL statements for creating all indexes for a model.

This provides compatibility with all supported versions of Django.

Parameters

- **connection** (*object*) – The database connection.
- **model** (*django.db.models.Model*) – The database model to create indexes for.

Returns The list of SQL statements for creating the indexes.

Return type list

django_evolution.compat.db.**truncate_name**(*identifier*, *length=None*, *hash_len=4*)
Shorten a SQL identifier to a repeatable mangled version with the given length.

If a quote stripped name contains a namespace, e.g. USERNAME"."TABLE, truncate the table portion only.

django_evolution.compat.models

Compatibility functions for model-related operations.

This provides functions for working with models or importing moved fields. These translate to the various versions of Django that are supported.

Functions

get_model_name(model)	Return the model's name.
get_models([app_mod, include_auto_created])	Return the models belonging to an app.
get_rel_target_field(field)	Return the target field for a field's relation.
get_remote_field(field)	Return the remote field for a relation.
get_remote_field_model(rel)	Return the model a relation is pointing to.
set_model_name(model, name)	Set the name of a model.

exception django_evolution.compat.models.**FieldDoesNotExist**

Bases: Exception

The requested model field does not exist

class django_evolution.compat.models.**GenericForeignKey**(*ct_field='content_type'*, *fk_field='object_id'*, *for_concrete_model=True*)

Bases: django.db.models.fields.mixins.FieldCacheMixin

Provide a generic many-to-one relation through the content_type and object_id fields.

This class also doubles as an accessor to the related object (similar to ForwardManyToOneDescriptor) by adding itself as a model attribute.

auto_created = False

concrete = False

hidden = False

is_relation = True

many_to_many = False

many_to_one = True

one_to_many = False

one_to_one = False

related_model = None

remote_field = None

__init__(*ct_field='content_type'*, *fk_field='object_id'*, *for_concrete_model=True*)

Initialize self. See help(type(self)) for accurate signature.

editable = False

contribute_to_class(*cls*, *name*, ***kwargs*)

get_filter_kwargs_for_object(*obj*)

See corresponding method on Field

get_forward_related_filter(*obj*)
See corresponding method on RelatedField

__str__()
Return str(self).

check(***kwargs*)

get_cache_name()

get_content_type(*obj=None*, *id=None*, *using=None*)

get_prefetch_queryset(*instances*, *queryset=None*)

__get__(*instance*, *cls=None*)

__set__(*instance*, *value*)

class django_evolution.compat.models.**GenericRelation**(*to*, *object_id_field='object_id'*, *content_type_field='content_type'*, *for_concrete_model=True*, *related_query_name=None*, *limit_choices_to=None*, ***kwargs*)

Bases: `django.db.models.fields.related.ForeignObject`

Provide a reverse to a relation created by a GenericForeignKey.

auto_created = False

many_to_many = False

many_to_one = False

one_to_many = True

one_to_one = False

rel_class
alias of `GenericRel`

mti_inherited = False

__init__(*to*, *object_id_field='object_id'*, *content_type_field='content_type'*, *for_concrete_model=True*, *related_query_name=None*, *limit_choices_to=None*, ***kwargs*)
Initialize self. See help(type(self)) for accurate signature.

check(***kwargs*)

resolve_related_fields()

get_path_info(*filtered_relation=None*)
Get path from this field to the related model.

get_reverse_path_info(*filtered_relation=None*)
Get path from the related model to this field's model.

value_to_string(*obj*)
Return a string value of this field from the passed obj. This is used by the serialization framework.

contribute_to_class(*cls*, *name*, ***kwargs*)
Register the field with the model class it belongs to.

If private_only is True, create a separate instance of this field for every subclass of cls, even if cls is not an abstract model.

set_attributes_from_rel()

get_internal_type()

get_content_type()
Return the content type associated with this field's model.

get_extra_restriction(*where_class*, *alias*, *remote_alias*)
Return a pair condition used for joining and subquery pushdown. The condition is something that responds to as_sql(compiler, connection) method.

Note that currently referring both the 'alias' and 'related_alias' will not work in some conditions, like subquery pushdown.

A parallel method is get_extra_descriptor_filter() which is used in instance.fieldname related object fetching.

bulk_related_objects(*objs*, *using='default'*)
Return all objects related to `objs` via this `GenericRelation`.

django_evolution.compat.models.**get_model**(*app_label*, *model_name=None*, *require_ready=True*)
Return the model matching the given app_label and model_name.

As a shortcut, app_label may be in the form <app_label>.<model_name>.

model_name is case-insensitive.

Raise LookupError if no application exists with this label, or no model exists with this name in the application. Raise ValueError if called with a single argument that doesn't contain exactly one dot.

django_evolution.compat.models.**get_models**(*app_mod=None*, *include_auto_created=False*)
Return the models belonging to an app.

Parameters

- **app_mod** (*module, optional*) – The application module.
- **include_auto_created** (*bool, optional*) – Whether to return auto-created models (such as many-to-many models) in the results.

Returns The list of modules belonging to the app.

Return type list

django_evolution.compat.models.**get_model_name**(*model*)
Return the model's name.

Parameters **model** (*django.db.models.Model*) – The model for which to return the name.

Returns The model's name.

Return type str

django_evolution.compat.models.**get_rel_target_field**(*field*)
Return the target field for a field's relation.

Parameters **field** (*django.db.models.Field*) – The relation field.

Returns The field on the other end of the relation.

Return type django.db.models.Field

django_evolution.compat.models.**get_remote_field**(*field*)
Return the remote field for a relation.

This is equivalent to `rel` prior to Django 1.9 and `remote_field` in 1.9 onward.

Parameters **field** (*django.db.models.Field*) – The relation field.

Returns The remote field on the relation.

Return type django.db.models.Field

django_evolution.compat.models.**get_remote_field_model**(*rel*)
Return the model a relation is pointing to.

This is equivalent to `rel.to` prior to Django 1.9 and `remote_field.model` in 1.9 onward.

Parameters **rel** (*object*) – The relation object.

Returns The model the relation points to.

Return type type

django_evolution.compat.models.**set_model_name**(*model*, *name*)
Set the name of a model.

Parameters

- **model** (*django.db.models.Model*) – The model to set the new name on.
- **name** (*str*) – The new model name.

django_evolution.compat.picklers

Picklers for working with serialized data.

Classes

DjangoCompatUnpickler(file, *[, ...])	Unpickler compatible with changes to Django class/module paths.
SortedDict(*args, **kwargs)	Compatibility for unpickling a SortedDict.

class django_evolution.compat.picklers.**SortedDict**(**args*, ***kwargs*)
Bases: dict

Compatibility for unpickling a SortedDict.

Old signatures may use an old Django `SortedDict` structure, which does not exist in modern versions. This changes any construction of this data structure into a `collections.OrderedDict`.

static **__new__**(*cls*, **args*, ***kwargs*)
Construct an instance of the class.

Parameters

- ***args** (*tuple*) – Positional arguments to pass to the constructor.
- ****kwargs** (*dict*) – Keyword arguments to pass to the constructor.

Returns The new instance.

Return type collections.OrderedDict

class django_evolution.compat.picklers.**DjangoCompatUnpickler**(*file*, ***, *fix_imports=True*, *encoding='ASCII'*, *errors='strict'*)
Bases: pickle._Unpickler

Unpickler compatible with changes to Django class/module paths.

This provides compatibility across Django versions for various field types, updating referenced module paths for fields to a standard location so that the fields can be located on all Django versions.

find_class(*module*, *name*)
Return the class for a given module and class name.

If looking up a class from `django.db.models.fields`, the class will instead be looked up from `django.db.models`, fixing lookups on some Django versions.

Parameters

- **module** (*unicode*) – The module path.
- **name** (*unicode*) – The class name.

Returns The resulting class.

Return type type

Raises **AttributeError** – The class could not be found in the module.

django_evolution.compat.py23

Compatibility functions for Python 2 and 3.

Functions

pickle_dumps(obj)	Return a pickled representation of an object.
pickle_loads(pickled_str)	Return the unpickled data from a pickle payload.

django_evolution.compat.py23.**pickle_dumps**(*obj*)
Return a pickled representation of an object.

This will always use Pickle protocol 0, which is the default on Python 2, for compatibility across Python 2 and 3.

Parameters **obj** (*object*) – The object to dump.

Returns The Unicode pickled representation of the object, safe for storing in the database.

Return type unicode

django_evolution.compat.py23.**pickle_loads**(*pickled_str*)
Return the unpickled data from a pickle payload.

Parameters **pickled_str** (*bytes*) – The pickled data.

Returns The unpickled data.

Return type object

django_evolution.db.common

Common evolution operations backend for databases.

Classes

BaseEvolutionOperations(database_state[, ...])

class django_evolution.db.common.**BaseEvolutionOperations**(*database_state*, *connection=<django.db.DefaultConnectionProxy object>*)

Bases: object

supported_change_attrs = ('null', 'max_length', 'db_column', 'db_index', 'db_table', '

supported_change_meta = {'constraints': True, 'index_together': True, 'indexes': Tr

mergeable_ops = ('add_column', 'change_column', 'delete_column', 'change_meta')

ignored_m2m_attrs = {<class 'django.db.models.fields.related.ManyToManyField'>: {'nul

alter_table_sql_result_cls
alias of *django_evolution.db.sql_result.AlterTableSQLResult*

__init__(*database_state*, *connection=<django.db.DefaultConnectionProxy object>*)
Initialize the evolution operations.

Parameters

- **database_state** (django_evolution.db.state.DatabaseState) – The database state to track information through.
- **connection** (*object*) – The database connection.

generate_table_ops_sql(*mutator*, *ops*)
Generates SQL for a sequence of mutation operations.

This will process each operation one-by-one, generating default SQL, using generate_table_op_sql().

generate_table_op_sql(*mutator*, *op*, *prev_sql_result*, *prev_op*)
Generates SQL for a single mutation operation.

This will call different SQL-generating functions provided by the class, depending on the details of the operation.

If two adjacent operations can be merged together (meaning that they can be turned into one ALTER TABLE statement), they'll be placed in the same AlterTableSQLResult.

quote_sql_param(*param*)
Add protective quoting around an SQL string parameter

rename_column(*model*, *old_field*, *new_field*)
Renames the specified column.

This must be implemented by subclasses. It must return an SQLResult or AlterTableSQLResult representing the SQL needed to rename the column.

get_rename_table_sql(*model*, *old_db_table*, *new_db_table*)
Return SQL for renaming a table.

Parameters

- **model** (*django.db.models.Model*) – The model representing the table to rename.
- **old_db_table** (*unicode*) – The old table name.
- **new_db_table** (*unicode*) – The new table name.

Returns The resulting SQL for renaming the table.

Return type *django_evolution.db.sql_result.SQLResult*

rename_table(*model*, *old_db_table*, *new_db_table*)
Rename a table.

This will take care of removing and then restoring any primary field constraints. If an evolver backend doesn't support this, or has another method for managing these constraints, it should override this method.

Parameters

- **model** (*django.db.models.Model*) – The model representing the table to rename.
- **old_db_table** (*unicode*) – The old table name.
- **new_db_table** (*unicode*) – The new table name.

Returns The resulting SQL for renaming the table.

Return type *django_evolution.db.sql_result.SQLResult*

delete_column(*model*, *f*)

delete_table(*table_name*)

add_m2m_table(*model*, *field*)
Return SQL statements for creating a ManyToManyField's table.

Parameters

- **model** (*django.db.models.Model*) – The database model owning the field.
- **field** (*django.db.models.ManyToManyField*) – The field owning the table.

Returns The list of SQL statements for creating the table.

Return type list

add_column(*model*, *f*, *initial*)

set_field_null(*model*, *field*, *null*)

create_index(*model*, *field*)
Returns the SQL for creating an index for a single field.

The index will be recorded in the database signature for future operations within the transaction, and the appropriate SQL for creating the index will be returned.

This is not intended to be overridden.

create_unique_index(*model*, *index_name*, *fields*)

drop_index(*model*, *field*)
Returns the SQL for dropping an index for a single field.

The index matching the field's column will be looked up and, if found, the SQL for dropping it will be returned.

If the index was not found on the database or in the database signature, this won't return any SQL statements.

This is not intended to be overridden. Instead, subclasses should override *get_drop_index_sql*.

drop_index_by_name(*model*, *index_name*)
Returns the SQL to drop an index, given an index name.

The index will be removed fom the database signature, and the appropriate SQL for dropping the index will be returned.

This is not intended to be overridden. Instead, subclasses should override *get_drop_index_sql*.

get_drop_index_sql(*model*, *index_name*)
Returns the database-specific SQL to drop an index.

This can be overridden by subclasses if they use a syntax other than "DROP INDEX <name>;"

get_new_index_name(*model*, *fields*, *unique=False*)
Return a newly generated index name.

This returns a unique index name for any indexes created by django-evolution, based on how Django would compute the index.

Parameters

- **model** (*django.db.models.Model*) – The database model for the index.
- **fields** (*list of django.db.models.Field*) – The list of fields for the index.
- **unique** (*bool, optional*) – Whether this index is unique.

Returns The generated name for the index.

Return type str

get_new_constraint_name(*table_name*, *column*)
Return a newly-generated constraint name.

Parameters

- **table_name** (*unicode*) – The name of the table.
- **column** (*unicode*) – The name of the column.

Returns The new constraint name.

Return type unicode

get_default_index_name(*table_name*, *field*)
Return a default index name for the database.

This will return an index name for the given field that matches what the database or Django database backend would automatically generate when marking a field as indexed or unique.

This can be overridden by subclasses if the database or Django database backend provides different values.

Parameters

- **table_name** (*str*) – The name of the table for the index.
- **field** (*django.db.models.Field*) – The field for the index.

Returns The name of the index.

Return type str

get_default_index_together_name(*table_name*, *fields*)
Returns a default index name for an index_together.

This will return an index name for the given field that matches what Django uses for index_together fields.

Parameters

- **table_name** (*str*) – The name of the table for the index.
- **fields** (*list of django.db.models.Field*) – The fields for the index.

Returns The name of the index.

Return type str

change_column_attrs(*model*, *mutation*, *field_name*, *new_attrs*)
Returns the SQL for changing one or more column attributes.

This will generate all the statements needed for changing a set of attributes for a column.

The resulting AlterTableSQLResult contains all the SQL needed to apply these attributes.

change_column_attr_null(*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL for changing a column's NULL/NOT NULL attribute.

change_column_attr_max_length(*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL for changing a column's max length.

change_column_attr_db_column(*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL for changing a column's name.

change_column_attr_db_table(*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL for changing the table for a ManyToManyField.

change_column_attr_db_index(*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL for creating/dropping indexes for a column.

change_column_attr_unique(*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL to change a field's unique flag.

Changing the unique flag for a given column will affect indexes. If setting unique to True, an index will be created in the database signature for future operations within the transaction. If False, the index will be dropped from the database signature.

The SQL needed to change the column will be returned.

This is not intended to be overridden. Instead, subclasses should override *get_change_unique_sql*.

get_change_unique_sql(*model*, *field*, *new_unique_value*, *constraint_name*, *initial*)
Returns the database-specific SQL to change a column's unique flag.

This can be overridden by subclasses if they use a different syntax.

get_drop_unique_constraint_sql(*model*, *index_name*)

change_meta_unique_together(*model*, *old_unique_together*, *new_unique_together*)
Change the unique_together constraints of a table.

Parameters

- **model** (*django.db.models.Model*) – The model being changed.
- **old_unique_together** (*list*) – The old value for `unique_together`.
- **new_unique_together** (*list*) – The new value for `unique_together`.

Returns The SQL statements for changing the `unique_together` constraints.

Return type django_evolution.sql_result.SQLResult

change_meta_index_together(*model*, *old_index_together*, *new_index_together*)
Change the index_together indexes of a table.

Parameters

- **model** (*django.db.models.Model*) – The model being changed.
- **old_index_together** (*list*) – The old value for `index_together`.
- **new_index_together** (*list*) – The new value for `index_together`.

Returns The SQL statements for changing the `index_together` indexes.

Return type django_evolution.sql_result.SQLResult

change_meta_constraints(*model*, *old_constraints*, *new_constraints*)

Change the constraints of a table.

Constraints are a feature available in Django 2.2+ that allow for defining custom constraints on a table on `Meta.constraints`.

This will calculate the old and new list of constraint instances, and the list of added/removed constraints, and call out to *get_update_table_constraints_sql()* to generate the SQL for changing them.

Parameters

- **model** (*django.db.models.Model*) – The model being changed.
- **old_constraints** (*list of dict*) – A serialized representation of the old value for `Meta.constraints`.

  This will contain `name` and `type` keys, as well as all attributes on the constraint.
- **new_constraints** (*list of dict*) – A serialized representation of the new value for `Meta.constraints`.

  This is in the same format as `old_constraints`.

Returns The SQL statements for changing `Meta.constraints`.

Return type django_evolution.sql_result.SQLResult

get_update_table_constraints_sql(*model*, *old_constraints*, *new_constraints*, *to_add*, *to_remove*)

Return SQL for updating the constraints on a table.

The generated SQL will remove any old constraints and add any new constraints.

By default, this uses the schema editor for the connection. Subclasses can modify this if they need custom logic.

Parameters

- **model** (*django.db.models.Model*) – The model being changed.
- **(list of** (*new_constraints*) – django.db.models.constraints.BaseConstraint): The old constraints pre-evolution.
- **(list of** – django.db.models.constraints.BaseConstraint): The new constraints post-evolution.
- **to_add** (*list of django.db.models.constraints.BaseConstraint*) – A list of new constraints to add to the database that weren't set before.
- **to_remove** (*list of django.db.models.constraints.BaseConstraint*) – A list of old constraints to remove from the database that aren't set now.

Returns The SQL statements for changing the constraints.

Return type django_evolution.sql_result.SQLResult

change_meta_indexes(*model*, *old_indexes*, *new_indexes*)
Change the indexes of a table defined in a model's indexes list.

This will apply a set of indexes serialized from a `Meta.indexes` to the database. The serialized values are those passed to *ChangeMeta*, in the form of:

```
[
    {
        'name': 'optional-index-name',
        'fields': ['field1', '-field2_sorted_desc'],
    },
    ...
]
```

Parameters

- **model** (*django.db.models.Model*) – The model being changed.
- **old_indexes** (*list*) – The old serialized value for the indexes.
- **new_indexes** (*list*) – The new serialized value for the indexes.

Returns The SQL statements for changing the indexes.

Return type django_evolution.sql_result.SQLResult

get_fields_for_names(*model*, *field_names*, *allow_sort_prefixes=False*)
Return the field instances for the given field names.

This will go through each of the provided field names, optionally handling a sorting prefix (`-`, used by Django 1.11+'s `Index` field lists), and return the field instance for each.

Parameters

- **model** (*django.db.models.Model*) – The model to fetch fields from.
- **field_names** (*list of unicode*) – The list of field names to fetch.
- **allow_sort_prefixes** (*bool, optional*) – Whether to allow sorting prefixes in the field names.

Returns The resulting list of fields.

Return type list of django.db.models.Field

get_column_names_for_fields(*fields*)

get_indexes_for_table(*table_name*)
Returns a dictionary of indexes from the database.

This introspects the database to return a mapping of index names to index information, with the following keys:

- columns -> list of column names
- unique -> whether it's a unique index

This function must be implemented by subclasses.

stash_field_ref_constraints(*model*, *replaced_fields={}*, *renamed_db_tables={}*)
Return SQL for removing constraints on a primary key field.

This should be called before performing an operation that renames a field or changes the table on a ManyToManyField on databases that support adding/dropping constraints on primary keys. The constraints can then be restored through *restore_field_ref_constraints()*.

As of Django Evolution 2.0, this only considers fields on ManyToManyFields defined by `model`, keeping behavior consistent with prior versions of Django Evolution.

Parameters

- **model** (*django.db.models.Model*) – The model owning the fields to remove constraints from.
- **replaced_fields** (*dict*) – A dictionary mapping old fields to new fields. Each field is expected to be a primary key. These will be checked for field name and column changes.
- **renamed_db_tables** (*dict*) – A dictionary mapping old table names to new table names. This is used when renaming many-to-many intermediary tables.

Returns

A tuple containing the following items:

1. The `SQLResult` that contains the SQL to remove the current constraints.
2. A dictionary containing internal stashed state for restoring constraints. This should be considered opaque.

Return type tuple

restore_field_ref_constraints(*stash*)

Return SQL for adding back field constraints on a table.

This should be called after performing an operation that renames a field or a ManyToMany table name on databases that support adding/dropping constraints on primary keys.

This requires a prior call to *stash_field_ref_constraints()*.

Parameters **stash** (*dict*) – Stashed constraint data from *stash_field_ref_constraints()*.

Returns The SQL statements for adding back constraints on the field.

Return type django_evolution.sql_result.SQLResult

normalize_value(*value*)

normalize_bool(*value*)

django_evolution.db.mysql

Evolution operations backend for MySQL/MariaDB.

Classes

EvolutionOperations(database_state[, connection])	

class django_evolution.db.mysql.**EvolutionOperations**(*database_state*, *connection=<django.db.DefaultConnectionProxy object>*)

Bases: *django_evolution.db.common.BaseEvolutionOperations*

delete_column(*model*, *f*)

rename_column(*model*, *old_field*, *new_field*)

Renames the specified column.

This must be implemented by subclasses. It must return an SQLResult or AlterTableSQLResult representing the SQL needed to rename the column.

set_field_null (*model*, *field*, *null*)

change_column_attr_max_length (*model*, *mutation*, *field*, *old_value*, *new_value*)
Returns the SQL for changing a column's max length.

get_drop_index_sql (*model*, *index_name*)
Returns the database-specific SQL to drop an index.

This can be overridden by subclasses if they use a syntax other than "DROP INDEX <name>;"

get_change_unique_sql (*model*, *field*, *new_unique_value*, *constraint_name*, *initial*)
Returns the database-specific SQL to change a column's unique flag.

This can be overridden by subclasses if they use a different syntax.

get_rename_table_sql (*model*, *old_db_table*, *new_db_table*)
Return SQL for renaming a table.

Parameters

- **model** (*django.db.models.Model*) – The model representing the table to rename.
- **old_db_table** (*unicode*) – The old table name.
- **new_db_table** (*unicode*) – The new table name.

Returns The resulting SQL for renaming the table.

Return type *django_evolution.db.sql_result.SQLResult*

get_default_index_name (*table_name*, *field*)
Return a default index name for the database.

This will return an index name for the given field that matches what the database or Django database backend would automatically generate when marking a field as indexed or unique.

This can be overridden by subclasses if the database or Django database backend provides different values.

Parameters

- **table_name** (*str*) – The name of the table for the index.
- **field** (*django.db.models.Field*) – The field for the index.

Returns The name of the index.

Return type str

get_indexes_for_table (*table_name*)
Returns a dictionary of indexes from the database.

This introspects the database to return a mapping of index names to index information, with the following keys:

- columns -> list of column names
- unique -> whether it's a unique index

This function must be implemented by subclasses.

django_evolution.db.postgresql

Evolution operations backend for Postgres.

Classes

EvolutionOperations(database_state[, connection])	

class django_evolution.db.postgresql.**EvolutionOperations**(*database_state*, *connection=<django.db.DefaultConnectionProxy object>*)

Bases: *django_evolution.db.common.BaseEvolutionOperations*

rename_column(*model*, *old_field*, *new_field*)

Renames the specified column.

This must be implemented by subclasses. It must return an SQLResult or AlterTableSQLResult representing the SQL needed to rename the column.

get_drop_unique_constraint_sql(*model*, *index_name*)

get_default_index_name(*table_name*, *field*)

Return a default index name for the database.

This will return an index name for the given field that matches what the database or Django database backend would automatically generate when marking a field as indexed or unique.

This can be overridden by subclasses if the database or Django database backend provides different values.

Parameters

- **table_name** (*str*) – The name of the table for the index.
- **field** (*django.db.models.Field*) – The field for the index.

Returns The name of the index.

Return type str

get_indexes_for_table(*table_name*)

Returns a dictionary of indexes from the database.

This introspects the database to return a mapping of index names to index information, with the following keys:

- columns -> list of column names
- unique -> whether it's a unique index

This function must be implemented by subclasses.

normalize_bool(*value*)

django_evolution.db.sql_result

Classes for storing SQL statements and Alter Table operations.

Classes

AlterTableSQLResult(evolver, model[, ...])	Represents one or more SQL statements or Alter Table rules.
SQLResult([sql, pre_sql, post_sql])	Represents one or more SQL statements.

class django_evolution.db.sql_result.**SQLResult**(*sql=None*, *pre_sql=None*, *post_sql=None*)

Bases: object

Represents one or more SQL statements.

This is returned by functions generating SQL statements. It can store the main SQL statements to execute, or SQL statements to be executed before or after the main statements.

SQLResults can easily be added together or converted into a flat list of SQL statements to execute.

__init__(*sql=None*, *pre_sql=None*, *post_sql=None*)
Initialize self. See help(type(self)) for accurate signature.

add(*sql_or_result*)
Adds a list of SQL statements or an SQLResult.

If an SQLResult is passed, its pre_sql, sql, and post_sql lists will be added to this one.

If a list of SQL statements is passed, it will be added to this SQLResult's sql list.

Parameters **sql_or_result** (*object*) – The SQL to add. This may be one of the following:

- Anopther instance of *SQLResult*
- A list of SQL statements
- A single SQL statement
- A tuple pair containing the SQL statement and arguments for that statement
- A function to call later when executing SQL statements

Raises **TypeError** – sql_or_result wasn't a supported type.

add_pre_sql(*sql_or_result*)
Adds a list of SQL statements or an SQLResult to pre_sql.

If an SQLResult is passed, it will be converted into a list of SQL statements.

add_sql(*sql_or_result*)
Adds a list of SQL statements or an SQLResult to sql.

If an SQLResult is passed, it will be converted into a list of SQL statements.

add_post_sql(*sql_or_result*)
Adds a list of SQL statements or an SQLResult to post_sql.

If an SQLResult is passed, it will be converted into a list of SQL statements.

normalize_sql(*sql_or_result*)
Normalizes a list of SQL statements or an SQLResult into a list.

If a list of SQL statements is provided, it will be returned. If an SQLResult is provided, it will be converted into a list of SQL statements and returned.

to_sql()
Flattens the SQLResult into a list of SQL statements.

__repr__()
Return repr(self).

class django_evolution.db.sql_result.**AlterTableSQLResult**(*evolver*, *model*, *alter_table=None*, **args*, ***kwargs*)

Bases: *django_evolution.db.sql_result.SQLResult*

Represents one or more SQL statements or Alter Table rules.

This is returned by functions generating SQL statements. It can store the main SQL statements to execute, or SQL statements to be executed before or after the main statements.

SQLResults can easily be added together or converted into a flat list of SQL statements to execute.

__init__(*evolver*, *model*, *alter_table=None*, **args*, ***kwargs*)
Initialize self. See help(type(self)) for accurate signature.

add(*sql_result*)
Adds a list of SQL statements or an SQLResult.

If an SQLResult is passed, its `pre_sql`, `sql`, and `post_sql` lists will be added to this one.

If an AlterTableSQLResult is passed, its `alter_table` lists will also be added to this one.

If a list of SQL statements is passed, it will be added to this SQLResult's sql list.

add_alter_table(*alter_table*)
Adds a list of Alter Table rules to `alter_table`.

to_sql()
Flattens the AlterTableSQLResult into a list of SQL statements.

Any `alter_table` entries will be collapsed together into ALTER TABLE statements.

__repr__()
Return repr(self).

django_evolution.db.sqlite3

Evolution operations backend for SQLite.

Classes

EvolutionOperations(database_state[, connection])	Evolution operations backend for SQLite.
SQLiteAlterTableSQLResult(evolver, model[, ...])	Represents SQL statements used to rebuild a table on SQLite.

class django_evolution.db.sqlite3.**SQLiteAlterTableSQLResult**(*evolver*, *model*, *alter_table=None*, **args*, ***kwargs*)

Bases: *django_evolution.db.sql_result.AlterTableSQLResult*

Represents SQL statements used to rebuild a table on SQLite.

Unlike most databases, SQLite doesn't offer typical ALTER TABLE support, instead requiring a full table rebuild and data transfer. This class handles that process, allowing operations for the rebuild (adding, deleting, or changing columns) to be batched together.

The rebuild uses the step-by-step instructions recommended by SQLite. It creates a new table with the desired schema, copies all data from the old table, drops the old table, and then renames the new table over.

It can also update the newly-populated rows in the new table with new initial data, if needed by a new column.

to_sql()

Return a list of SQL statements for the table rebuild.

Any `alter_table` operations will be collapsed together into a single table rebuild.

Returns The list of SQL statements to run for the rebuild.

Return type list of unicode

class django_evolution.db.sqlite3.**EvolutionOperations**(*database_state*, *connection=<django.db.DefaultConnectionProxy object>*)

Bases: *django_evolution.db.common.BaseEvolutionOperations*

Evolution operations backend for SQLite.

alter_table_sql_result_cls

alias of *SQLiteAlterTableSQLResult*

rename_table(*model*, *old_db_table*, *new_db_table*)

Rename a table.

Parameters

- **model** (*django_evolution.mock_models.MockModel*) – The model representing the table to rename.
- **old_db_table** (*unicode*) – The old table name.
- **new_db_table** (*unicode*) – The new table name.

Returns The resulting SQL for renaming the table.

Return type *django_evolution.db.sql_result.SQLResult*

delete_column(*model*, *field*)

Delete a column from the table.

Parameters

- **model** (*type*) – The `Model` class representing the table to delete the column from.

- **field** (*django.db.models.Field*) – The field representing the column to delete.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

rename_column(*model*, *old_field*, *new_field*)
Rename a column on a table.

Parameters

- **model** (*type*) – The Model class representing the table to rename the column on.
- **old_field** (*django.db.models.Field*) – The field representing the old column.
- **new_field** (*django.db.models.Field*) – The field representing the new column.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

add_column(*model*, *field*, *initial*)
Add a column to the table.

Parameters

- **model** (*type*) – The Model class representing the table to add the column to.
- **field** (*django.db.models.Field*) – The field representing the column to add.
- **initial** (*object*) – The initial data to set for the column. If None, the data will not be set.

  This will be required for NOT NULL columns.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

change_column_attr_null(*model*, *mutation*, *field*, *old_value*, *new_value*)
Change a column's NULL flag.

Parameters

- **model** (*type*) – The Model class representing the table to change the column on.
- **mutation** (django_evolution.mutations.BaseModelMutation) – The mutation making this change.
- **field** (*django.db.models.Field*) – The field representing the column to change.
- **old_value** (*bool, unused*) – The old null flag.
- **new_value** (*bool*) – The new null flag.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

change_column_attr_max_length(*model*, *mutation*, *field*, *old_value*, *new_value*)
Change a column's max length.

Parameters

- **model** (*type*) – The Model class representing the table to change the column on.
- **mutation** (django_evolution.mutations.BaseModelMutation) – The mutation making this change.

- **field** (*django.db.models.Field*) – The field representing the column to change.
- **old_value** (*int, unused*) – The old max length.
- **new_value** (*int, unused*) – The new max length.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

get_change_unique_sql(*model*, *field*, *new_unique_value*, *constraint_name*, *initial*)
Change a column's unique flag.

Parameters

- **model** (*type*) – The Model class representing the table to change the column on.
- **mutation** (django_evolution.mutations.BaseModelMutation) – The mutation making this change.
- **field** (*django.db.models.Field*) – The field representing the column to change.
- **old_value** (*bool, unused*) – The old unique flag.
- **new_value** (*bool, unused*) – The new unique flag.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

get_update_table_constraints_sql(*model*, *old_constraints*, *new_constraints*, *to_add*, *to_remove*)
Return SQL for updating the constraints on a table.

This will perform a table rebuild, including only any new constraints in the new schema.

Parameters

- **model** (*django.db.models.Model*) – The model being changed.
- **(list of** (*new_constraints*) – django.db.models.constraints.BaseConstraint): The old constraints pre-evolution.
- **(list of** – django.db.models.constraints.BaseConstraint): The new constraints post-evolution.
- **to_add** (*list of django.db.models.constraints.BaseConstraint*) – A list of new constraints to add to the database that weren't set before.
- **to_remove** (*list of django.db.models.constraints.BaseConstraint*) – A list of old constraints to remove from the database that aren't set now.

Returns The SQL statements for changing the constraints.

Return type django_evolution.sql_result.SQLResult

get_drop_unique_constraint_sql(*model*, *index_name*)
Return SQL for dropping unique constraints.

Parameters

- **model** (*type*) – The Model class representing the table to drop unique constraints on.
- **index_name** (*unicode*) – The name of the unique constraint index to drop.

Returns The resulting SQL for rebuilding the table.

Return type *django_evolution.db.sql_result.SQLResult*

get_indexes_for_table(*table_name*)
Return all known indexes on a table.

Parameters **table_name** (*unicode*) – The name of the table.

Returns

A dictionary mapping index names to a dictionary containing:

unique (**bool**): Whether this is a unique index.

columns (**list**): The list of columns that the index covers.

Return type dict

is_column_referenced(*reffed_table_name*, *reffed_col_name*)
Return whether a column on a table is referenced by another table.

Parameters

- **reffed_table_name** (*unicode*) – The name of the table that may be referenced.
- **reffed_col_name** (*unicode*) – The name of the column that may be referenced.

Returns `True` if this table and column are referenced by another table, or `False` if it's not referenced.

Return type bool

django_evolution.db.state

Database state tracking for in-progress evolutions.

Classes

DatabaseState(db_name[, scan])	Tracks some useful state in the database.
IndexState(name, columns[, unique])	An index recorded in the database state.

class django_evolution.db.state.**IndexState**(*name*, *columns*, *unique=False*)
Bases: object

An index recorded in the database state.

__init__(*name*, *columns*, *unique=False*)
Initialize the index state.

Parameters

- **name** (*unicode*) – The name of the index.
- **columns** (*list of unicode*) – A list of columns that the index is comprised of.
- **unique** (*bool, optional*) – Whether this is a unique index.

__eq__(*other_state*)
Return whether two index states are equal.

Parameters **other_state** (IndexState) – The other index state to compare to.

Returns `True` if the two index states are equal. `False` if they are not.

Return type bool

__hash__()
Return a hash representation of the index.

Returns The hash representation.

Return type int

__repr__()
Return a string representation of the index state.

Returns A string representation of the index.

Return type unicode

class django_evolution.db.state.**DatabaseState**(*db_name*, *scan=True*)
Bases: object

Tracks some useful state in the database.

This primarily tracks indexes associated with tables, allowing them to be scanned from the database, explicitly added, removed, or cleared.

__init__(*db_name*, *scan=True*)
Initialize the state.

Parameters

- **db_name** (*unicode*) – The name of the database.
- **scan** (*bool, optional*) – Whether to automatically scan state from the database during initialization. By default, information is scanned.

clone()
Clone the database state.

Returns The cloned copy of the state.

Return type *DatabaseState*

add_table(*table_name*)
Add a table to track.

This will add an empty entry for the table to the state.

Parameters **table_name** (*unicode*) – The name of the table.

has_table(*table_name*)
Return whether a table is being tracked.

This does not necessarily mean that the table exists in the database. Rather, state for the table is being tracked.

Parameters **table_name** (*unicode*) – The name of the table to look up.

Returns `True` if the table is being tracked. `False` if it is not.

Return type bool

has_model(*model*)
Return whether a database model is installed in the database.

Parameters **model** (*type*) – The model class.

Returns `True` if the model has an accompanying table in the database. `False` if it does not.

Return type bool

add_index(*table_name*, *index_name*, *columns*, *unique=False*)
Add a table's index to the database state.

This index can be used for later lookup during the evolution process. It won't otherwise be preserved, though the resulting indexes are expected to match the result in the database.

This requires the table to be tracked first.

Parameters

- **table_name** (*unicode*) – The name of the table.
- **index_name** (*unicode*) – The name of the index.
- **columns** (*list of unicode*) – A list of column names the index is comprised of.
- **unique** (*bool, optional*) – Whether this is a unique index.

Raises ***django_evolution.errors.DatabaseStateError*** – There was an issue adding this index. Details are in the exception's message.

remove_index(*table_name*, *index_name*, *unique=False*)
Remove an index from the database state.

This index will no longer be found during lookups when generating evolution SQL, even if it exists in the database.

This requires the table to be tracked first and for the index to both exist and match the `unique` flag.

Parameters

- **table_name** (*unicode*) – The name of the table.
- **index_name** (*unicode*) – The name of the index.
- **unique** (*bool, optional*) – Whether this is a unique index.

Raises ***django_evolution.errors.DatabaseStateError*** – There was an issue removing this index. Details are in the exception's message.

get_index(*table_name*, *index_name*)
Return the index state for a given name.

Parameters

- **table_name** (*unicode*) – The name of the table.
- **index_name** (*unicode*) – The name of the index.

Returns The state for the index, if found. `None` if the index could not be found.

Return type *IndexState*

find_index(*table_name*, *columns*, *unique=False*)
Find and return an index matching the given columns and flags.

Parameters

- **table_name** (*unicode*) – The name of the table.
- **columns** (*list of unicode*) – The list of columns the index is comprised of.
- **unique** (*bool, optional*) – Whether this is a unique index.

Returns The state for the index, if found. `None` if an index matching the criteria could not be found.

Return type *IndexState*

clear_indexes(*table_name*)
Clear all recorded indexes for a table.

Parameters **table_name** (*unicode*) – The name of the table.

iter_indexes(*table_name*)
Iterate through all indexes for a table.

Parameters **table_name** (*unicode*) – The name of the table.

Yields *IndexState* – An index in the table.

rescan_tables()
Rescan the list of tables from the database.

This will look up all tables found in the database, along with information (such as indexes) on those tables.

Existing information on the tables will be flushed.

django_evolution.utils.apps

Utilities for working with apps.

Functions

get_app_config_for_app(app)	Return the app configuration for an app.
get_app_label(app)	Return the label of an app.
get_app_name(app)	Return the name of an app.
get_legacy_app_label(app)	Return the label of an app.
import_management_modules()	Import the management modules for all apps.

django_evolution.utils.apps.**get_app_config_for_app**(*app*)
Return the app configuration for an app.

This can only be called if running on Django 1.7 or higher.

Parameters **app** (*module*) – The app's models module to return the configuration for. The models module is used for legacy reasons within Django Evolution.

Returns The app configuration, or `None` if it couldn't be found.

Return type django.apps.AppConfig

django_evolution.utils.apps.**get_app_label**(*app*)
Return the label of an app.

Parameters **app** (*module*) – The app.

Returns The label of the app.

Return type str

django_evolution.utils.apps.**get_app_name**(*app*)
Return the name of an app.

Parameters **app** (*module*) – The app.

Returns The name of the app.

Return type str

django_evolution.utils.apps.**get_legacy_app_label**(*app*)
Return the label of an app.

Parameters **app** (*module*) – The app.

Returns The label of the app.

Return type str

django_evolution.utils.apps.**import_management_modules**()
Import the management modules for all apps.

Management modules often contain signal handlers for pre/post syncdb/migrate events. This will import them correctly for the current version of Django.

Raises **ImportError** – A management module failed to import.

django_evolution.utils.evolutions

Utilities for working with evolutions and mutations.

Functions

get_app_mutations(app[, evolution_labels, ...])	Return the mutations on an app provided by the given evolution names.
get_app_pending_mutations(app, evolution_labels)	Return an app's pending mutations provided by the given evolution names.
get_app_upgrade_info(app[, scan_evolutions, ...])	Return the upgrade information to use for a given app.
get_applied_evolutions(app[, database])	Return the list of labels for applied evolutions for a Django app.
get_evolution_sequence(app)	Return the list of evolution labels for a Django app.
get_evolutions_module(app)	Return the evolutions module for an app.
get_evolutions_path(app)	Return the evolutions path for an app.
get_evolutions_source(app)	Return the source for evolutions.
get_unapplied_evolutions(app[, database])	Return the list of labels for unapplied evolutions for a Django app.
has_evolutions_module(app)	Return whether an app has an evolutions module.

django_evolution.utils.evolutions.**has_evolutions_module**(*app*)
Return whether an app has an evolutions module.

Parameters **app** (*module*) – The app module.

Returns `True` if the app has an `evolutions` module. `False` if it does not.

Return type bool

django_evolution.utils.evolutions.**get_evolutions_source**(*app*)
Return the source for evolutions.

This is used to determine where evolutions are coming from. They can be provided by the app, project, or built into Django Evolution.

Parameters **app** (*module*) – The app module.

Returns The evolution source. This is an entry from *EvolutionsSource*.

Return type unicode

django_evolution.utils.evolutions.**get_evolutions_module**(*app*)
Return the evolutions module for an app.

Parameters **app** (*module*) – The app.

Returns The evolutions module for the app, or `None` if it could not be found.

Return type module

django_evolution.utils.evolutions.**get_evolutions_path**(*app*)
Return the evolutions path for an app.

Parameters **app** (*module*) – The app.

Returns The path to the evolutions module for the app, or `None` if it could not be found.

Return type str

django_evolution.utils.evolutions.**get_evolution_sequence**(*app*)
Return the list of evolution labels for a Django app.

Parameters **app** (*module*) – The app to return evolutions for.

Returns The list of evolution labels.

Return type list of unicode

django_evolution.utils.evolutions.**get_unapplied_evolutions**(*app*, *database='default'*)
Return the list of labels for unapplied evolutions for a Django app.

Parameters

- **app** (*module*) – The app to return evolutions for.
- **database** (*unicode, optional*) – The name of the database containing the *Evolution* entries.

Returns The labels of evolutions that have not yet been applied.

Return type list of unicode

django_evolution.utils.evolutions.**get_applied_evolutions**(*app*, *database='default'*)
Return the list of labels for applied evolutions for a Django app.

Parameters

- **app** (*module*) – The app to return evolutions for.
- **database** (*unicode, optional*) – The name of the database containing the *Evolution* entries.

Returns The labels of evolutions that have been applied.

Return type list of unicode

django_evolution.utils.evolutions.**get_app_mutations**(*app*, *evolution_labels=None*, *database='default'*)
Return the mutations on an app provided by the given evolution names.

Parameters

- **app** (*module*) – The app the evolutions belong to.

- **evolution_labels** (*list of unicode, optional*) – The labels of the evolutions to return mutations for.

  If None, this will factor in all evolution labels for the app.

- **database** (*unicode, optional*) – The name of the database the evolutions cover.

Returns The list of mutations provided by the evolutions.

Return type list of django_evolution.mutations.BaseMutation

Raises ***django_evolution.errors.EvolutionException*** – One or more evolutions are missing.

django_evolution.utils.evolutions.**get_app_pending_mutations**(*app*, *evolution_labels*, *database='default'*)

Return an app's pending mutations provided by the given evolution names.

This is similar to *get_app_mutations()*, but filters the list of mutations down to remove any that are unnecessary (ones that do not operate on changed parts of the project signature).

Parameters

- **app** (*module*) – The app the evolutions belong to.
- **evolution_labels** (*list of unicode, optional*) – The labels of the evolutions to return mutations for.

  If None, this will factor in all evolution labels for the app.

- **database** (*unicode, optional*) – The name of the database the evolutions cover.

Returns The list of mutations provided by the evolutions.

Return type list of django_evolution.mutations.BaseMutation

Raises ***django_evolution.errors.EvolutionException*** – One or more evolutions are missing.

django_evolution.utils.evolutions.**get_app_upgrade_info**(*app*, *scan_evolutions=True*, *simulate_applied=False*, *database=None*)

Return the upgrade information to use for a given app.

This will determine if the app should be using Django Evolution or Django Migrations for any schema upgrades.

If an evolutions module is found, then this will determine the method to be *UpgradeMethod.EVOLUTIONS*, unless the app has been moved over to using Migrations.

If instead there's a migrations module, then this will determine the method to be *UpgradeMethod.MIGRATIONS*.

Otherwise, this will return None, indicating that no established method has been chosen. This allows a determination to be made later, based on the Django version or the consumer's choice.

Note that this may return that migrations are the preferred method for an app even on versions of Django that do not support migrations. It's up to the caller to handle this however it chooses.

Parameters

- **app** (*module*) – The app module to determine the upgrade method for.
- **scan_evolutions** (*bool, optional*) – Whether to scan evolutions for the app to determine the current upgrade method.

- **simulate_applied** (*bool, optional*) – Return the upgrade method based on the state of the app if all mutations had been applied. This is useful for generating end state signatures.

  This is ignored if passing `scan_evolutions=False`.

- **database** (*unicode, optional*) – The database to use for accessing stored evolution and migration information.

Returns

A dictionary of information containing the following keys:

applied_migrations (***MigrationList***)**:** A list of migrations that have been applied to this app through any mutations. This will only be present if the upgrade method is set to use migrations and if running on a version of Django that supports migrations.

has_evolutions (**bool**)**:** Whether there are any evolutions for this app. This may come from the app, project, or Django Evolution.

has_migrations (**bool**)**:** Whether there are any migrations for this app.

upgrade_method (**unicode**)**:** The upgrade method. This will be a value from *UpgradeMethod*, or `None` if a clear determination could not be made.

Return type dict

django_evolution.utils.migrations

Utility functions for working with Django Migrations.

Functions

apply_migrations(executor, targets, plan, ...)	Apply migrations to the database.
create_pre_migrate_state(executor)	Create state needed before migrations are applied.
emit_post_migrate_or_sync(verbosity, ...)	Emit the post_migrate and/or post_sync signals.
emit_pre_migrate_or_sync(verbosity, ...)	Emit the pre_migrate and/or pre_sync signals.
filter_migration_targets(targets[, ...])	Filter migration execution targets based on the given criteria.
finalize_migrations(post_migrate_state)	Finalize any migrations operations.
has_migrations_module(app)	Return whether an app has a migrations module.
is_migration_initial(migration)	Return whether a migration is an initial migration.
record_applied_migrations(connection, migrations)	Record a list of applied migrations to the database.
unrecord_applied_migrations(connection, ...)	Remove the recordings of applied migrations from the database.

Classes

MigrationExecutor(connection[, ...])	Load and execute migrations.
MigrationList()	A list of applied or pending migrations.
MigrationLoader(connection[, custom_migrations])	Loads migration files from disk.

class django_evolution.utils.migrations.**MigrationList**
Bases: object

A list of applied or pending migrations.

This is used to manage a list of migrations in a way that's independent from the underlying representation used in Django. Migrations are tracked by app label and name, may be associated with a recorded migration database entry, and can be used to convert state to and from both signatures and Django migration state.

classmethod from_app_sig(*app_sig*)
Create a MigrationList based on an app signature.

Parameters **app_sig** (django_evolution.signature.AppSignature) – The app signature containing a list of applied migrations.

Returns The new migration list.

Return type *MigrationList*

classmethod from_database(*connection*, *app_label=None*)
Create a MigrationList based on recorded migrations.

Parameters

- **connection** (*django.db.backends.base.BaseDatabaseWrapper*) – The database connection used to query for migrations.
- **app_label** (*unicode, optional*) – An app label to filter migrations by.

Returns The new migration list.

Return type *MigrationList*

__init__()
Initialize the list.

has_migration_info(*app_label*, *name*)
Return whether the list contains an entry for a migration.

Parameters

- **app_label** (*unicode*) – The label for the application that was migrated.
- **name** (*unicode*) – The name of the migration.

Returns `True` if the migration is in the list. `False` if it is not.

Return type bool

add_migration_targets(*targets*)
Add a list of migration targets to the list.

Parameters **targets** (*list of tuple*) – The migration targets to each. Each is a tuple containing an app label and a migration name.

add_migration(*migration*)
Add a migration to the list.

This can only be called on Django 1.7 or higher.

Parameters **migration** (*django.db.migrations.Migration*) – The migration instance to add.

add_recorded_migration(*recorded_migration*)
Add a recorded migration to the list.

This can only be called on Django 1.7 or higher.

Parameters **(django.db.migrations.recorder.** (*recorded_migration*) – MigrationRecorder.Migration): The recorded migration model to add.

add_migration_info(*app_label*, *name*, *migration=None*, *recorded_migration=None*)
Add information on a migration to the list.

Parameters

- **app_label** (*unicode*) – The label for the application that was migrated.
- **name** (*unicode*) – The name of the migration.
- **migration** (*django.db.migrations.Migration, optional*) – An optional migration instance to associate with this entry.
- **(django.db.migrations.recorder.** (*recorded_migration*) – MigrationRecorder.Migration, optional): An optional recorded migration to associate with this entry.

update(*other*)
Update the list with the contents of another list.

If there's an entry in another list matching this one, and contains information that the entry in this list does not have, this list's entry will be updated.

Parameters **other** (MigrationList) – The list of migrations to put into this list.

to_targets()
Return a set of migration targets based on this list.

Returns A set of migration targets. Each entry is a tuple containing the app label and name.

Return type set

get_app_labels()
Iterate through the app labels.

Results are sorted alphabetically.

Returns The sorted list of app labels with associated migrations.

Return type list of unicode

clone()
Clone the list.

Returns The cloned migration list.

Return type *MigrationList*

__bool__()
Return whether this list is truthy or falsy.

The list is truthy only if it has items.

Returns `True` if the list has items. `False` if it's empty.

Return type bool

__len__()
Return the number of items in the list.

Returns The number of items in the list.

Return type int

__eq__(*other*)
Return whether this list is equal to another list.

The order of migrations is ignored when comparing lists.

Parameters **other** (`MigrationList`) – A list of migrations to compare to.

Returns `True` if the two lists have the same contents. `False` if there are differences in contents, or `other` is not a *`MigrationList`*.

Return type bool

__iter__()
Iterate through the list.

Entries are sorted first by app label, alphabetically, and then the order in which migrations were added for that app label.

Yields *info* – A dictionary containing the following keys:

app_label (unicode): The app label for the migration.

name (unicode): The name of the migration.

migration (django.db.migrations.Migration): The optional migration instance.

recorded_migration (django.db.migrations.recorder.MigrationRecorder.Migration) The optional recorded migration.

__add__(*other*)
Return a combined copy of this list and another list.

Parameters **other** (`MigrationList`) – The other list to add to this list.

Returns The new migration list containing contents of both lists.

Return type *MigrationList*

__sub__(*other*)
Return a copy of this list with another list's contents excluded.

Parameters **other** (`MigrationList`) – The other list containing contents to exclude.

Returns The new migration list containing the contents of this list that don't exist in the other list.

Return type *MigrationList*

__repr__()
Return a string representation of this list.

Returns The string representation.

Return type unicode

__hash__ = None

class django_evolution.utils.migrations.**MigrationLoader**(*connection*, *custom_migrations=None*, **args*, ***kwargs*)

Bases: django.db.migrations.loader.MigrationLoader

Loads migration files from disk.

This is a specialization of Django's own MigrationLoader that allows for providing additional migrations not available on disk.

extra_applied_migrations
Migrations to mark as already applied. This can be used to augment the results calculated from the database.

Type *MigrationList*

__init__(*connection*, *custom_migrations=None*, **args*, ***kwargs*)
Initialize the loader.

Parameters

- **connection** (*django.db.backends.base.BaseDatabaseWrapper*) – The connection to load applied migrations from.
- **custom_migrations** (*MigrationList, optional*) – Custom migrations not available on disk.
- ***args** (*tuple*) – Additional positional arguments for the parent class.
- ****kwargs** (*dict*) – Additional keyword arguments for the parent class.

property applied_migrations
The migrations already applied.

This will contain both the migrations applied from the database and any set in *extra_applied_migrations*.

build_graph(*reload_migrations=True*)
Rebuild the migrations graph.

Parameters **reload_migrations** (*bool, optional*) – Whether to reload migration instances from disk. If False, the ones loaded before will be used.

load_disk()
Load migrations from disk.

This will also load any custom migrations.

class django_evolution.utils.migrations.**MigrationExecutor**(*connection*, *custom_migrations=None*, *signal_sender=None*)

Bases: django.db.migrations.executor.MigrationExecutor

Load and execute migrations.

This is a specialization of Django's own MigrationExecutor that allows for providing additional migrations not available on disk, and for emitting our own signals when processing migrations.

__init__(*connection*, *custom_migrations=None*, *signal_sender=None*)
Initialize the executor.

Parameters

- **connection** (*django.db.backends.base.BaseDatabaseWrapper*) – The connection to load applied migrations from.

- **custom_migrations** (*dict, optional*) – Custom migrations not available on disk. Each key is a tuple of `(app_label, migration_name)`, and each value is a migration.
- **signal_sender** (*object, optional*) – A custom sender to pass when sending signals. This defaults to this instance.

run_checks()

Perform checks on the migrations and any history.

Raises

- ***django_evolution.errors.MigrationConflictsError*** – There are conflicts between migrations loaded from disk.
- ***django_evolution.errors.MigrationHistoryError*** – There are unapplied dependencies to applied migrations.

django_evolution.utils.migrations.**has_migrations_module**(*app*)

Return whether an app has a migrations module.

Parameters **app** (*module*) – The app module.

Returns `True` if the app has a `migrations` module. `False` if it does not.

Return type bool

django_evolution.utils.migrations.**record_applied_migrations**(*connection*, *migrations*)

Record a list of applied migrations to the database.

This can only be called when on Django 1.7 or higher.

Parameters

- **connection** (*django.db.backends.base.BaseDatabaseWrapper*) – The connection used to record applied migrations.
- **migrations** (MigrationList) – The list of migration targets to record as applied.

django_evolution.utils.migrations.**unrecord_applied_migrations**(*connection*, *app_label*, *migration_names=None*)

Remove the recordings of applied migrations from the database.

This can only be called when on Django 1.7 or higher.

Parameters

- **connection** (*django.db.backends.base.BaseDatabaseWrapper*) – The connection used to unrecord applied migrations.
- **app_label** (*unicode*) – The app label that the migrations pertain to.
- **migration_names** (*list of unicode, optional*) – The list of migration names to unrecord. If not provided, all migrations for the app will be unrecorded.

django_evolution.utils.migrations.**filter_migration_targets**(*targets*, *app_labels=None*, *exclude=None*)

Filter migration execution targets based on the given criteria.

Parameters

- **targets** (*list of tuple*) – The migration targets to be executed.

- **app_labels** (*set of unicode, optional*) – The app labels to limit the targets to.
- **exclude** (*set, optional*) – Explicit targets to exclude.

Returns The resulting list of migration targets.

Return type list of tuple

django_evolution.utils.migrations.**is_migration_initial**(*migration*)

Return whether a migration is an initial migration.

Initial migrations are those that set up an app or models for the first time. Generally, they should be limited to model creations, or to those adding fields to a (non-migration-aware) model for the first time. They also should not have any dependencies on other migrations within the same app.

An initial migration should be able to be safely soft-applied (in other words, ignored if the model already appears to exist in the database).

Migrations on Django 1.9+ may declare themselves as explicitly initial or explicitly not initial.

Parameters **migration** (*django.db.migrations.Migration*) – The migration to check.

Returns `True` if the migration appears to be an initial migration. `False` if it does not.

Return type bool

django_evolution.utils.migrations.**create_pre_migrate_state**(*executor*)

Create state needed before migrations are applied.

The return value is dependent on the version of Django.

Parameters **executor** (*django.db.migrations.executor.MigrationExecutor*) – The migration executor that will handle the migrations.

Returns The state needed for applying migrations.

Return type object

django_evolution.utils.migrations.**apply_migrations**(*executor*, *targets*, *plan*, *pre_migrate_state*)

Apply migrations to the database.

Migrations will be applied using the `fake_initial` mode, which means that any initial migrations (those constructing the models for an app) will be skipped if the models already appear in the database. This is to avoid issues with applying those migrations when the models have already been created in the past outside of Django's Migrations framework. In theory, this could cause some issues if those migrations also perform other important operations around data population, but this is really up to Django to handle, as this is part of the upgrade method when going from pre-1.7 to 1.7+ anyway.

This can only be called when on Django 1.7 or higher.

Parameters

- **executor** (*django.db.migrations.executor.MigrationExecutor*) – The migration executor that will handle applying the migrations.
- **targets** (*list of tuple*) – The list of migration targets to apply.
- **plan** (*list of tuple*) – The order in which migrations will be applied.
- **pre_migrate_state** (*object*) – The pre-migration state needed to apply these migrations. This must be generated with *create_pre_migrate_state()* or a previous call to *apply_migrations()*.

Returns The state generated from applying migrations. Any final state must be passed to *finalize_migrations()*.

Return type object

django_evolution.utils.migrations.**finalize_migrations**(*post_migrate_state*)
Finalize any migrations operations.

This will update any internal state in Django for any migrations that were applied and represented by the provided post-migrate state.

Parameters **post_migrate_state** (*object*) – The state generated from applying migrations. This must be the result of *apply_migrations()*.

django_evolution.utils.migrations.**emit_pre_migrate_or_sync**(*verbosity*, *interactive*, *database_name*, *create_models*, *pre_migrate_state*, *plan*)
Emit the pre_migrate and/or pre_sync signals.

This will emit the pre_migrate and/or pre_sync signals, providing the appropriate arguments for the current version of Django.

Parameters

- **verbosity** (*int*) – The verbosity level for output.
- **interactive** (*bool*) – Whether handlers of the signal can prompt on the terminal for input.
- **database_name** (*unicode*) – The name of the database being migrated.
- **create_models** (*list of django.db.models.Model*) – The list of models being created outside of any migrations.
- **pre_migrate_state** (*django.db.migrations.state.ProjectState*) – The project state prior to any migrations.
- **plan** (*list*) – The full migration plan being applied.

django_evolution.utils.migrations.**emit_post_migrate_or_sync**(*verbosity*, *interactive*, *database_name*, *created_models*, *post_migrate_state*, *plan*)
Emit the post_migrate and/or post_sync signals.

This will emit the post_migrate and/or post_sync signals, providing the appropriate arguments for the current version of Django.

Parameters

- **verbosity** (*int*) – The verbosity level for output.
- **interactive** (*bool*) – Whether handlers of the signal can prompt on the terminal for input.
- **database_name** (*unicode*) – The name of the database that was migrated.
- **created_models** (*list of django.db.models.Model*) – The list of models created outside of any migrations.
- **post_migrate_state** (*django.db.migrations.state.ProjectState*) – The project state after applying migrations.

- **plan** (*list*) – The full migration plan that was applied.

django_evolution.utils.models

Utilities for working with models.

Functions

get_database_for_model_name(app_name, model_name)	Return the database used for a given model.

django_evolution.utils.models.**get_database_for_model_name**(*app_name*, *model_name*)

Return the database used for a given model.

Given an app name and a model name, this will return the proper database connection name used for making changes to that model. It will go through any custom routers that understand that type of model.

Parameters

- **app_name** (*unicode*) – The name of the app owning the model.
- **model_name** (*unicode*) – The name of the model.

Returns The name of the database used for the model.

Return type unicode

django_evolution.utils.sql

Utilities for working with SQL statements.

Functions

execute_sql(cursor, sql, database[, capture])	Execute a list of SQL statements.
run_sql(sql, cursor, database[, capture, ...])	Run (execute and/or capture) a list of SQL statements.
write_sql(sql, database)	Output and return a list of SQL statements.

django_evolution.utils.sql.**write_sql**(*sql*, *database*)

Output and return a list of SQL statements.

Parameters

- **sql** (*list*) – A list of SQL statements. Each entry might be a string, or a tuple consisting of a format string and formatting arguments.
- **database** (*unicode*) – The database the SQL statements would be executed on.

Returns The formatted list of SQL statements.

Return type list of unicode

django_evolution.utils.sql.**execute_sql**(*cursor*, *sql*, *database*, *capture=False*)

Execute a list of SQL statements.

Parameters

- **cursor** (*object*) – The database backend's cursor.
- **sql** (*list*) – A list of SQL statements. Each entry might be a string, or a tuple consisting of a format string and formatting arguments.
- **database** (*unicode*) – The database the SQL statements would be executed on.
- **capture** (*bool, optional*) – Whether to capture any processed SQL statements.

django_evolution.utils.sql.**run_sql**(*sql*, *cursor*, *database*, *capture=False*, *execute=False*)

Run (execute and/or capture) a list of SQL statements.

Parameters

- **cursor** (*object*) – The database backend's cursor.
- **sql** (*list*) – A list of SQL statements. Each entry might be a string, or a tuple consisting of a format string and formatting arguments.
- **database** (*unicode*) – The database the SQL statements would be executed on.
- **capture** (*bool, optional*) – Whether to capture any processed SQL statements.
- **execute** (*bool, optional*) – Whether to execute any executed SQL statements and return them.

Returns The list of SQL statements executed, if passing `capture_sql=True`. Otherwise, this will just be an empty list.

Return type list of unicode

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