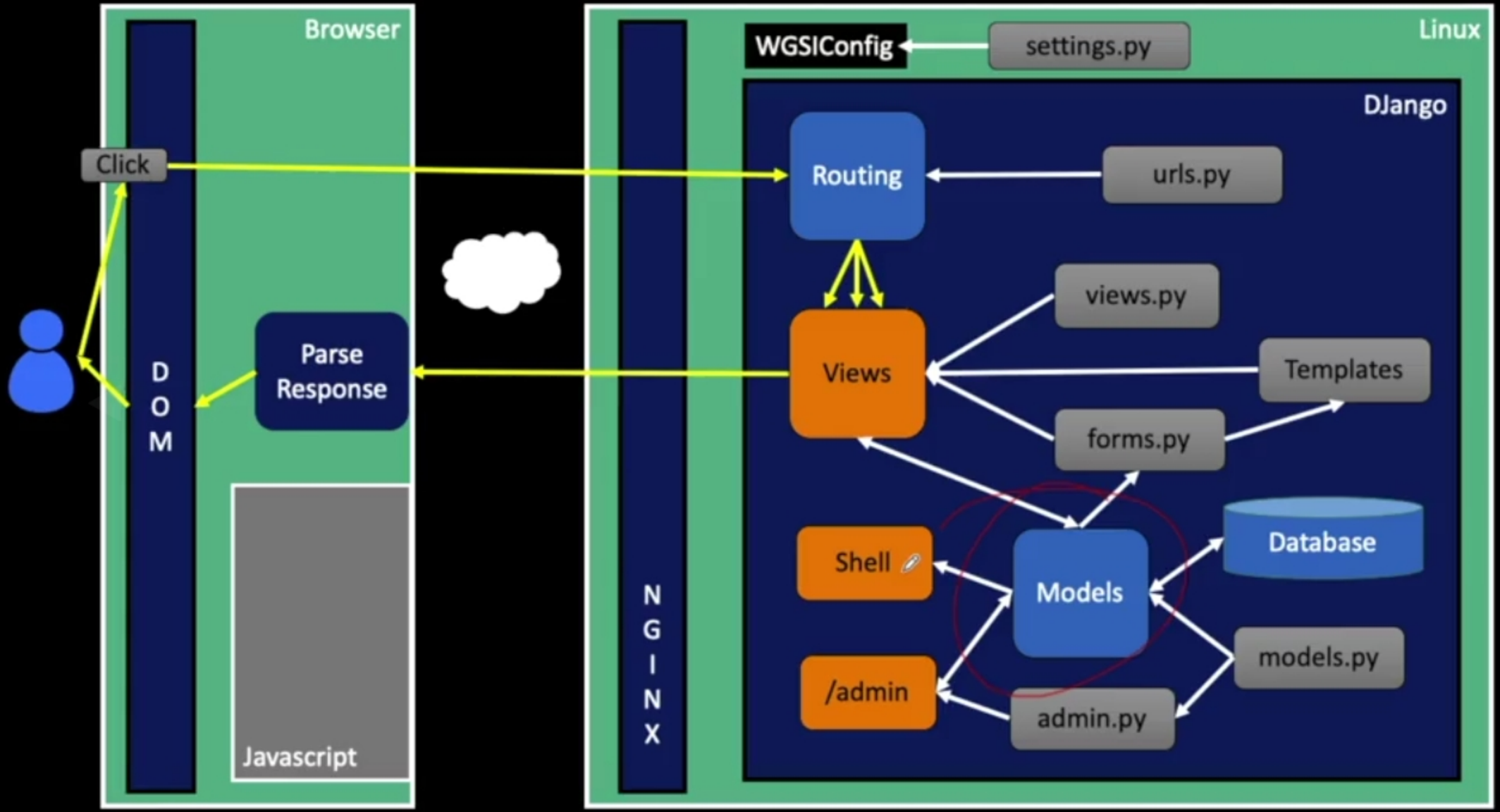
Browser
Click
DOM
Parse Response
Javascript
NGINX
WGSIConfig
settings.py
Linux
DJango
Routing
urls.py
views.py
Views
Templates
forms.py
Shell
Models
Database
models.py
/admin
admin.py

Object Relational Mapping (ORM)

- Allows us to map tables to objects and columns
- We use those objects to store and retrieve data from the database
- Improved portability across database dialects (SQLite, MySQL, Postgres, Oracle)

Checking...

```
$ sqlite3 db.sqlite3
SQLite version 3.24.0 2018-06-04 14:10:15
Enter ".help" for usage hints.
sqlite> .tables
auth_group                  django_admin_log
auth_group_permissions      django_content_type
auth_permission             django_migrations
auth_user                   django_session
auth_user_groups            usermodel_user
auth_user_user_permissions
sqlite> .schema usermodel_user
CREATE TABLE IF NOT EXISTS "usermodel_user" (
    "id" integer NOT NULL PRIMARY KEY AUTOINCREMENT,
    "name" varchar(128) NOT NULL,
    "email" varchar(128) NOT NULL
);
sqlite> .quit
```

https://github.com/csev/dj4e-samples/tree/master/users

Inserting a Record

```
$ python3 manage.py shell
>>> from usermodel.models import User
>>> u = User(name='Kristen', email='kf@umich.edu')
>>> u.save()
>>> print(u.id)
1
>>> print(u.email)
kf@umich.edu
>>>
```

INSERT INTO Users (name, email) VALUES ('Kristin', 'kf@umich.edu')

https://github.com/csev/dj4e-samples/tree/master/users

So if you just say python3, you'll get this but this next command that is from usermodel.models import User, that will fail unless you let manage.py start your shell because again, it loads a bunch of objects and classes into your space, and then all of a sudden usermodel.models works, User's there, etc.

So this is pulling from your models.py file that you built. And so usermodel is the application name and models is the models.py file. We import the User model which is, in this case, a class, User is a class, and we're going to do a constructor call.

Checking...

```
>>> from django.db import connection
>>> print(connection.queries)
[
{'sql': 'BEGIN', 'time': '0.000'},
{'sql': 'INSERT INTO "usermodel_user" ("name", "email")
          VALUES (\'Kristen\', \'kf@umich.edu\')',
     'time': '0.002'}
]
>>>
```

INSERT INTO Users (name, email) VALUES ('Kristin', 'kf@umich.edu')

https://github.com/csev/dj4e-samples/tree/master/users

CRUD in the ORM

```
u = User(name='Sally', email='a2@umich.edu')
u.save()

User.objects.values()
User.objects.filter(email='csev@umich.edu').values()

User.objects.filter(email='ted@umich.edu').delete()
User.objects.values()

User.objects.filter(email='csev@umich.edu').update(name='Charles')
User.objects.values()

User.objects.values().order_by('email')
User.objects.values().order_by('-name')
```

The save is the INSERT. SELECT is basically User.object.values. That's like SELECT star, so give me all of the objects.

A WHERE clause is User.objects.filter, and there's your WHERE clause. email is a column name and csev@umich.edu is a value in that column. values is actually go get them so you can create kind of a query.

So if you don't put values on, you get sort of a query that's not yet executed, and then values says, "Go do it, do it now." You can delete something where you say So this is a little different syntax.

Migrations: From Model to Database

- The makemigrations command reads all the models.py files in all the applications, end creates / evolves the migration files
- Guided by the applications listed in settings.py
- Migrations are portable across databases

- The migrate command reads all the migrations folders in the application folders and creates / evolves the tables in the database (i.e. db.sqlite3)

makemigrations

```
dj4e-samples$ ls */models.py
autos/models.py         many/models.py
bookone/models.py       menu/models.py
crispy/models.py        myarts/models.py
favs/models.py          pics/models.py
favsql/models.py        rest/models.py
form/models.py          route/models.py
forums/models.py        session/models.py
getpost/models.py       tmpl/models.py
gview/models.py         tracks/models.py
hello/models.py         users/models.py
home/models.py          views/models.py
dj4e-samples$
```

```
dj4e-samples$ ls  */migrations/0*.py
autos/migrations/0001_initial.py
bookone/migrations/0001_initial.py
favs/migrations/0001_initial.py
favs/migrations/0002_auto_20190420_1624.py
favsql/migrations/0001_initial.py
forums/migrations/0001_initial.py
gview/migrations/0001_initial.py
many/migrations/0001_initial.py
many/migrations/0002_auto_20190329_1653.py
myarts/migrations/0001_initial.py
pics/migrations/0001_initial.py
rest/migrations/0001_initial.py
tracks/migrations/0001_initial.py
users/migrations/0001_initial.py
dj4e-samples$
```

migrate

```
dj4e-samples$ ls  */migrations/0*.py
autos/migrations/0001_initial.py
bookone/migrations/0001_initial.py
favs/migrations/0001_initial.py
favs/migrations/0002_auto_20190420_1624.py
favsql/migrations/0001_initial.py
forums/migrations/0001_initial.py
gview/migrations/0001_initial.py
many/migrations/0001_initial.py
many/migrations/0002_auto_20190329_1653.py
myarts/migrations/0001_initial.py
pics/migrations/0001_initial.py
rest/migrations/0001_initial.py
tracks/migrations/0001_initial.py
users/migrations/0001_initial.py
dj4e-samples$
```

```
dj4e-samples$ sqlite3 db.sqlite3
SQLite version 3.24.0 2018-06-04 14:10:15
Enter ".help" for usage hints.
sqlite> .tables
auth_group                  gview_car
auth_group_permissions      gview_cat
auth_permission             gview_dog
auth_user                   gview_horse
auth_user_groups            many_course
auth_user_user_permissions  many_membership
autos_auto                  many_person
autos_make                  myarts_article
bookone_book                pics_pic
bookone_instance            rest_breed
bookone_lang                rest_cat
django_admin_log            social_auth_association
django_content_type         social_auth_code
django_migrations           social_auth_nonce
django_session              social_auth_partial
favs_fav                    social_auth_usersocialauth
favs_thing                  tracks_album
favsql_fav                  tracks_artist
favsql_thing                tracks_genre
forums_comment              tracks_track
forums_forum                users_user
sqlite> .quit
dj4e-samples$
```