

Web Development

Session 1 - Backend

BY GDSC@KTH

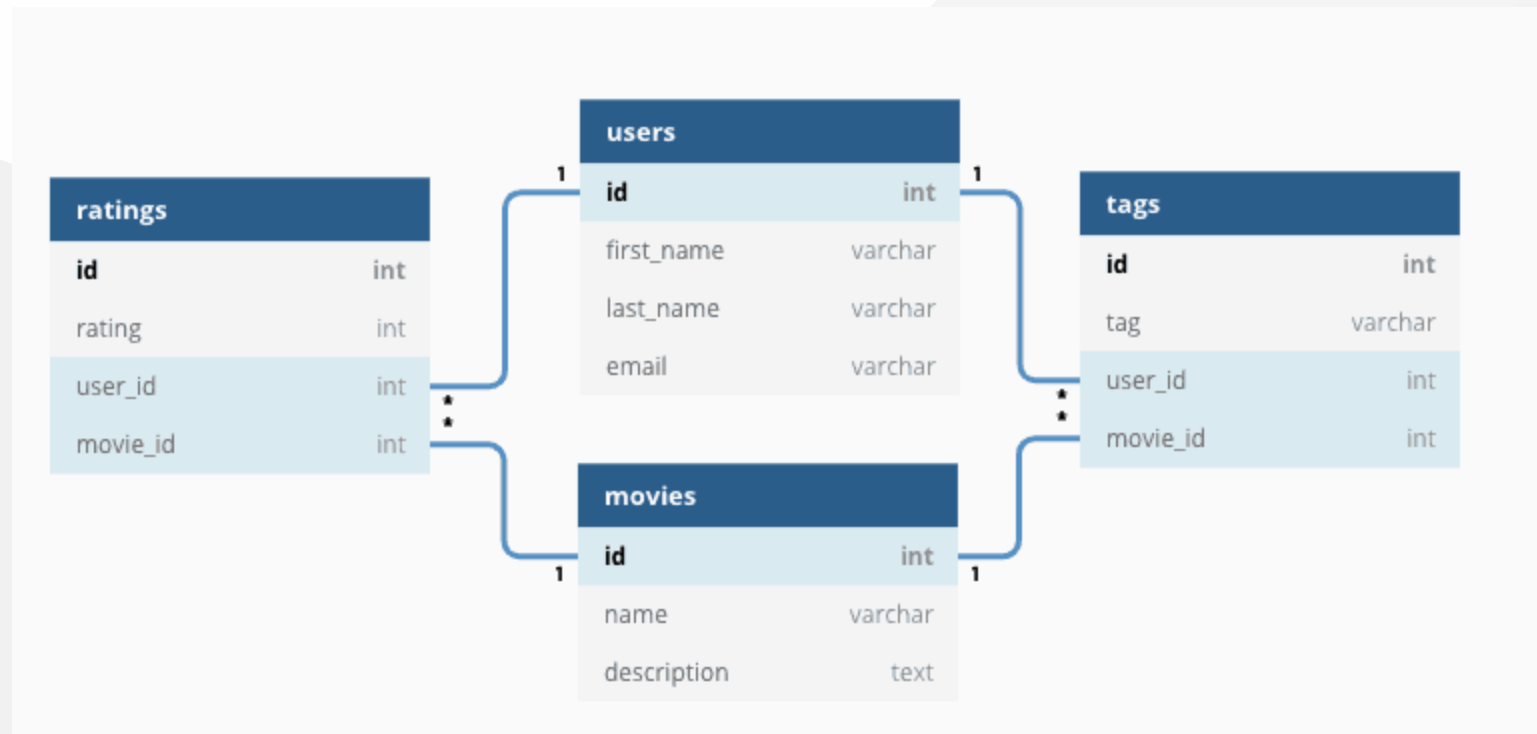
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What Can Be Expected Today?

- Manage blog data in database
- Build up APIs for a Blog app
 - Create, edit, view and delete blog data
- Access control
 - Only the administrator can access the APIs

Databases

Relation Databases (eg. PostgreSQL)

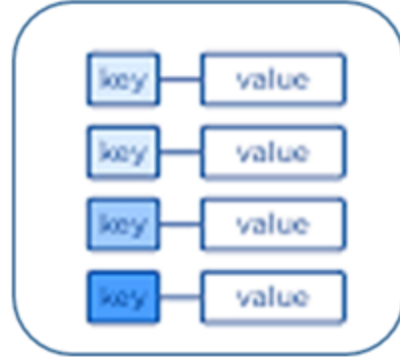


Databases

NonSQL Databases (eg. MongoDB)



Document
Store



Key-Value
Store



Wide-Column
Store



Graph
Store

NonSQL Databases - Document

```
{  
  "FirstName": "Bob",  
  "Address": "5 Oak St.",  
  "Hobby": "sailing"  
}
```

```
<contact>  
  <firstname>Bob</firstname>  
  <hobby>sailing</phone>  
  <address>  
    <street1>5 Oak St.</street1>  
  </address>  
</contact>
```

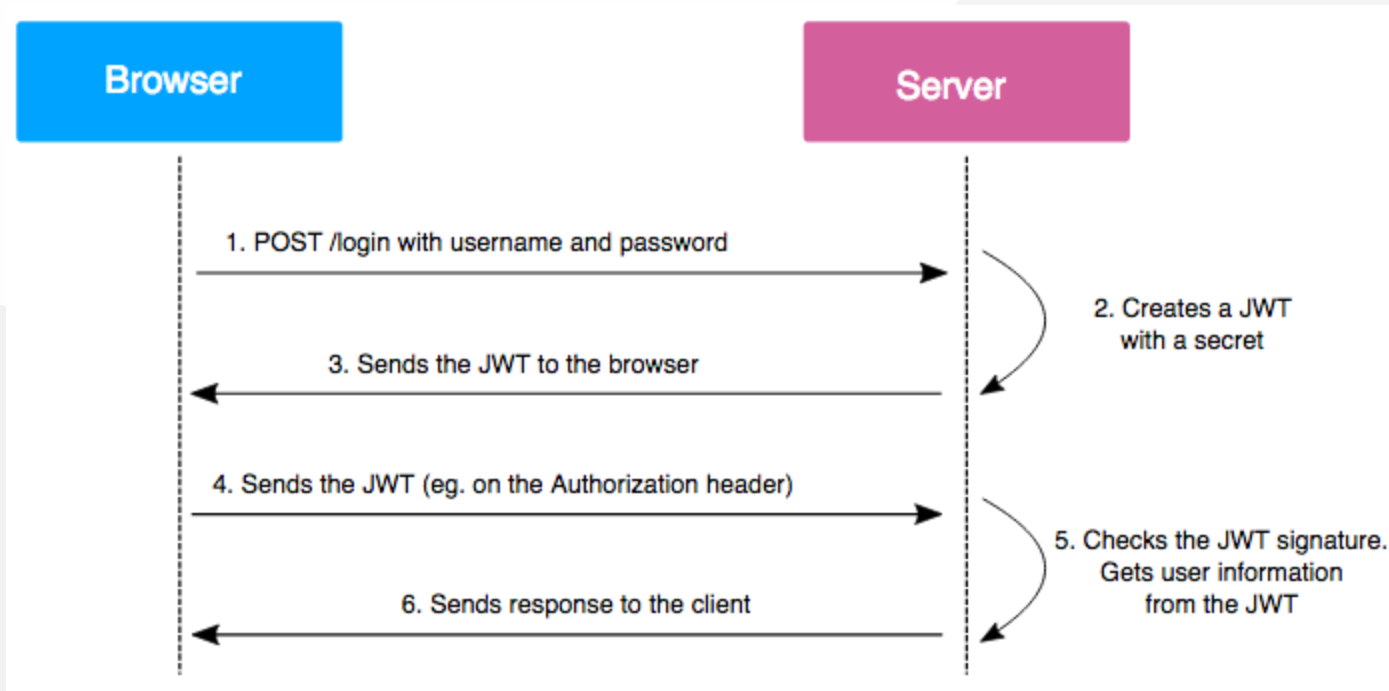
NonSQL Databases - Key-Value

Key	Value
K1	AAA,BBB,CCC
K2	AAA,BBB
K3	AAA,DDD
K4	AAA,2,01/01/2015
K5	3,ZZZ,5623

Authorization

- Basic authentication
- OAuth 1.0
- OAuth 2.0
- **Json Web Token**
- ...

Json Web Token



Restful API

REpresentational State Transfer (REST) architectural constraints:

1. Uniform interface
2. Client-server
3. Stateless
4. Cacheable
5. Layered system
6. Code on demand

Setup of Django Project

```
pip install django
django-admin startproject myblog
cd myblog
python manage.py migrate
python manage.py createsuperuser
```

Now have a look at the settings! What we'll use today:

- **INSTALLED_APPS**
- **DATABASES**

PostgreSQL Configuration

- Run docker instance: `docker run --name my-postgres -p 5432:5432 -e POSTGRES_PASSWORD=mypassword -d postgres`
- Access bash in docker instance: `docker exec -it DOCKER_ID bash`

```
su postgres
psql
CREATE DATABASE myblog;
```

Project Settings

- Install database engine for django: `pip install psycopg2-binary`

```
DATABASES = {  
    'default': {  
        'ENGINE': 'django.db.backends.postgresql',  
        'NAME': 'myblog',  
        'USER': 'postgres',  
        'PASSWORD': 'mypassword',  
        'HOST': 'localhost',  
        'PORT': 5432,  
    }  
}
```

Blog Model

- Create an app: `python manage.py startapp blogs`
- Add the app to settings:

```
INSTALLED_APPS = [  
    ...  
    'blogs',  
]
```

Model Class

Define the model in `models.py`

```
class Blog(models.Model):  
    author = models.ForeignKey(  
        settings.AUTH_USER_MODEL, on_delete=models.CASCADE,  
    )  
    created_at = models.DateTimeField(auto_now_add=True)  
    title = models.TextField()  
    content = models.TextField()
```

Migrate to database:

```
python manage.py makemigrations  
python manage.py migrate
```

Admin Page

Blog Model

Register to admin page in `admin.py`

```
from django.contrib import admin
from blogs.models import Blog

class BlogAdmin(admin.ModelAdmin):
    pass
admin.site.register(Blog, BlogAdmin)
```

Run the server by
`python manage.py runserver 0.0.0.0:8000`
and check out the admin page:
<http://localhost:8000/admin>

Json Web Token

Install Django REST framework JWT:

```
pip install djangorestframework-simplejwt
```

Follow the guide to configure

https://django-rest-framework-simplejwt.readthedocs.io/en/latest/getting_started.html#installation

Restful API

Install Django REST framework:
`pip install djangorestframework`

Serializer and ViewSet

Create `Serializer` and `ViewSet` in `views.py`

```
class BlogSerializer(serializers.ModelSerializer):
    author = serializers.PrimaryKeyRelatedField(read_only=True)
    class Meta:
        model = Blog
        fields = '__all__'

class BlogViewSet(viewsets.ModelViewSet):
    queryset = Blog.objects.all()
    serializer_class = BlogSerializer
```

Router

Add urls in `urls.py`

```
router = routers.SimpleRouter()
router.register(r'blogs', BlogViewSet)

urlpatterns = [
    ...
    path('', include(router.urls)),
]
```

Router document: <https://www.django-rest-framework.org/api-guide/routers/>

Access Control

Only allow the author to change his/her blogs:

```
class AuthorPermission(permissions.BasePermission):  
    def has_object_permission(self, request, view, obj):  
        if request.method in permissions.SAFE_METHODS:  
            return True  
        return obj.author == request.user
```

Assign it to the `permission_classes` of `BlogViewSet` :

```
permission_classes = [AuthorPermission, ]
```

Check Out Your Results

Online demo: <https://gdsc-web.herokuapp.com/>

Available users:

admin:admin

testuser:testpassword

Useful Links

- Authorization:
<https://learning.postman.com/docs/sending-requests/authorization/>