Team:

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1) Installation

skip this section if have already installed kong and minio.

1.1 Install Kong

```
sudo apt-get update
sudo apt-get install openssl libpcre3 procps perl
```

download https://bintray.com/kong/kong-deb/download_file?file_path=kong-1.4.0.trusty.amd64.deb and then

```
sudo dpkg -i kong-1.4.0.*.deb
sudo apt install --yes postgresql
sudo -u postgres psql -c "CREATE USER kong WITH ENCRYPTED PASSWORD 'kong'"
sudo -u postgres psql -c 'CREATE DATABASE kong OWNER kong'
sudo cp /etc/kong/kong.conf.default /etc/kong/kong.conf
```

sudoedit /etc/kong/kong.conf

-> search for pg_password

-> uncomment the line

-> pg_password = kong

1.1.1 To start kong:

```
sudo kong migrations bootstrap
ulimit -n 4096 && sudo kong start
```

Test Kong : curl -i http://localhost:8001/

1.2 Setup Minio:

Install Minio:

wget https://dl.min.io/server/minio/release/linux-amd64/minio

chmod +x minio

1.2.1 Start Minio

./minio server /home/student/data **(if u use /data you will get error)**

→ Copy minio tokens and keep for future

Endpoint: http://10.0.2.15:9000 http://127.0.0.1:9000

AccessKey: CHKH8D13MGHGWFOZR1TD

SecretKey: qD2VXhvJ3Yc3wXmmZdfsjvXwiK1xFso+ffYsWSeb

2) Setup Services

If you had already configured all the services you can skip this section

2.1 Start kong:

sudo kong migrations bootstrap

ulimit -n 4096 && sudo kong start

To check whether kong is working

-> curl -i http://localhost:8001/

2.2 Start Minio:

```
./minio server /home/student/data
```

→ **Copy minio tokens and keep for future**

Endpoint: http://10.0.2.15:9000 http://127.0.0.1:9000

AccessKey: CHKH8D13MGHGWFOZR1TD

SecretKey: qD2VXhvJ3Yc3wXmmZdfsjvXwiK1xFso+ffYsWSeb

Note: The accesskeys will differ from system to system

2.3 Create tracks bucket in Minio

Open minio browser -> http://127.0.0.1:9000

→ Login with credentials (AccessKey and SecretKey)

-> create new bucket named "tracks"

->Edit the policy for this bucket to add the prefix * as Read Only.

2.4 Connect kong with minio

To setup minio to use the kong execute the following commands:

1. Create a service named media

```
 curl -i -X POST http://localhost:8001/services/ \
   -d 'name=media' \
   -d 'url=http://10.0.2.15:9000/tracks/'
```

→ Output should be 201 created with details about the service in the json. Copy the value for **id**

2. Add the routes for the service media. Use the value of **id** for **service.id**

```
curl -i -X POST http://localhost:8001/routes/ \
   -d 'hosts[]=localhost' \
   -d 'paths[]=/media' \
   -d 'service.id=1f4aa3c8-d87f-4b3d-9bb4-b7267ff99207'
```

3. Now try opening http://localhost:8000/media/<file_name>

if service is up you will be able to access the file.

2.5 Start 3 instances of microservices

foreman start -c user=3,descriptions=3,tracks=3,playlist=3

2.6 Setup kong for load balancing user micro-service (3 instances)

Follow below instructions :

1. Setup the upstream

```
curl -X POST http://localhost:8001/upstreams \
   --data "name=Users_Upstream"
```

2. Add three targets(user micro-service) generated by foreman to the upstream. Make sure port numbers are correct.

```
curl -X POST http://localhost:8001/upstreams/Users_Upstream/targets \
    --data "target=127.0.0.1:5000" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Users_Upstream/targets \
    --data "target=127.0.0.1:5001" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Users_Upstream/targets \
    --data "target=127.0.0.1:5002" --data "weight=100"
```

3. Create the service "<name>" pointing to upstream "<host>"
(path refers to the path which has to be appended to the target)

```
curl -X POST http://localhost:8001/services/ \
    --data "name=Users_Service" \
    --data "host=Users_Upstream" \
    --data "path=/api/v1/resources/user"
```

4. Add a Route as an entry-point into the Service
(paths here refers to the matching in the url)

```
curl -X POST http://localhost:8001/services/Users_Service/routes/ \
    --data "hosts[]=localhost" --data "paths=/api/v1/resources/user"
```

2.7 Setup kong for load balancing descriptions micro-service (3 instances)

Follow below instructions :

1. Setup the upstream

```
curl -X POST http://localhost:8001/upstreams \
   --data "name=Descirptions_Upstream"
```

2.Add three targets(descriptions micro-service) generated by foreman to the upstream. Make sure port numbers are correct.

```
curl -X POST http://localhost:8001/upstreams/Descirptions_Upstream/targets \
   --data "target=127.0.0.1:5100" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Descirptions_Upstream/targets \
   --data "target=127.0.0.1:5101" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Descirptions_Upstream/targets \
   --data "target=127.0.0.1:5102" --data "weight=100"
```

3. Create the service "<name>" pointing to upstream "<host>"

(path refers to the path which has to be appended to the target)

```
curl -X POST http://localhost:8001/services/ \
   --data "name=Descirptions_Service" \
   --data "host=Descirptions_Upstream"   --data "path=/api/v1/resources/descriptions"
```

4. Add a Route as an entry-point into the Service

(paths here refers to the matching in the url)

```
curl -X POST http://localhost:8001/services/Descirptions_Service/routes/ \
    --data "hosts[]=localhost" --data "paths=/api/v1/resources/descriptions"
```

2.8 Setup kong for load balancing tracks micro-service (3 instances)

Follow below instructions :

1. Setup the upstream

```
curl -X POST http://localhost:8001/upstreams \
    --data "name=Tracks_Upstream"
```

2.Add three targets(tracks micro-service) generated by foreman to the upstream. Make sure port numbers are correct.

```
curl -X POST http://localhost:8001/upstreams/Tracks_Upstream/targets \
    --data "target=127.0.0.1:5200" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Tracks_Upstream/targets \
    --data "target=127.0.0.1:5201" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Tracks_Upstream/targets \
    --data "target=127.0.0.1:5202" --data "weight=100"
```

3. Create the service "<name>" pointing to upstream "<host>"
(path refers to the path which has to be appended to the target)

```
curl -X POST http://localhost:8001/services/ \
    --data "name=Tracks_Service" \
    --data "host=Tracks_Upstream"  --data "path=/api/v1/resources/tracks"
```

4. Add a Route as an entry-point into the Service
(paths here refers to the matching in the url)

```
curl -X POST http://localhost:8001/services/Tracks_Service/routes/ \
    --data "hosts[]=localhost" --data "paths=/api/v1/resources/tracks"
```

2.9 Setup kong for load balancing Playlist micro-service (3 instances)

Follow below instructions :

1. Setup the upstream

```
curl -X POST http://localhost:8001/upstreams \
    --data "name=Playlist_Upstream"
```

2.Add three targets(playlist micro-service) generated by foreman to the upstream. Make sure port numbers are correct.

```
curl -X POST http://localhost:8001/upstreams/Playlist_Upstream/targets \
    --data "target=127.0.0.1:5300" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Playlist_Upstream/targets \
    --data "target=127.0.0.1:5301" --data "weight=100"

curl -X POST http://localhost:8001/upstreams/Playlist_Upstream/targets \
    --data "target=127.0.0.1:5302" --data "weight=100"
```

3. Create the service "<name>" pointing to upstream "<host>"
  (path refers to the path which has to be appended to the target)

```
curl -X POST http://localhost:8001/services/ \
    --data "name=Playlist_Service" \
    --data "host=Playlist_Upstream"   --data "path=/api/v1/resources/playlist"
```

4. Add a Route as an entry-point into the Service
 (paths here refers to the matching in the url)

```
curl -X POST http://localhost:8001/services/Playlist_Service/routes/ \
    --data "hosts[]=localhost" --data "paths=/api/v1/resources/playlist"
```

3) How Install Memcached and ScyllaDB

```
pip3 install --user pymemcache
sudo apt-get install memcached
sudo service memcached start
```

```
$ sudo apt update
$ sudo apt install --yes docker.io
$ sudo usermod -aG docker $USER
```

Installing ScyllaDB

Ordinarily, Cassandra and ScyllaDB should run in a cluster of multiple servers. Since we are doing development on a single VM and RAM is at a premium, we will start only a single instance of ScyllaDB. Use the following command (entered all on one line):

```
$ sudo  docker run --name scylla -d scylladb/scylla --smp 1 --memory 1G
--overprovisioned 1 --developer-mode 1 --experimental 1
```

Once the image has been downloaded, wait a few moments, then check that ScyllaDB is up with

```
$ sudo  docker exec -it scylla nodetool status
```

4) <u>How To Start Services</u>

4.1 Initialize databases:

```
FLASK_APP=user flask init
```

4.2 Start 3 instance of all microservices:

```
foreman start -c user=3,descriptions=3,tracks=3,playlist=3
```

4.3 Start kong:

```
sudo kong migrations bootstrap
ulimit -n 4096 && sudo kong start
```

4.4 Start Minio:

```
./minio server /home/student/data
```

4.5 Start XSPF generator service:

```
FLASK_APP=xspf_service flask run -p 5400
```

4.6 Create keyspace:

Execute **$ sudo docker exec -it scylla cqlsh**

```
cqlsh> CREATE KEYSPACE IF NOT EXISTS music_store WITH REPLICATION = { 'class' :
'NetworkTopologyStrategy', 'datacenter1' : 1 };
```

4.7 Start Memcached server:

To start

```
sudo service memcached start
```

To stop

```
sudo service memcached stop
```

5) Instructions to use the USER Micro-service:

To initialize the database use command:

FLASK_APP=user flask init

To start all the Micro-services use command: foreman start)

Note: if you want to use kong use url http://localhost:8000/api/v1/resources/user

5.1 Get User Deatils:

- **To a retrieve User's profile (GET method) use the following curl command:**

curl -v 'http://127.0.0.1:5000/api/v1/resources/user?username=user_pavan'

5.2 Authenticate user

You can authenticate user using 2 ways:

1. **Using the POST request by passing only uesrname and password in json.**

curl -X POST -v http://127.0.0.1:5000/api/v1/resources/user -d '{"username": "user_pavan", "password": "12ds"}'

*NOTE: If other fields are passed in json, then it will be treated as create new user scenario.

2. **Using the GET request by passing the uesrname and password in the url parameters (not advised because of security concerns):**
   curl -v 'http://127.0.0.1:5000/api/v1/resources/user?username=user_pavan&password=12ds'

5.3 Create User

- **To create a new User profile use the following curl command (POST method):**

curl -X POST -v http://127.0.0.1:5000/api/v1/resources/user -d '{"username": "joker12", "display_name": "Joker", "password": "serious", "homepage_url": "joker.com", "email": "joker@joker.com"}'

5.4 Update User Password

- **Change User's Password use the following curl command:**

```
PATCH: curl -X PATCH -v http://127.0.0.1:5000/api/v1/resources/user?username=joker12 -d
'{ "password": "serious123" }'
```

5.5 Delete User

- **To delete a User’s use the following curl command:**

```
DELETE: curl -X DELETE -v 'http://127.0.0.1:5000/api/v1/resources/user?username=user_joker12'
```

6) Instructions to use the TRACKS Micro-service:

6.1 Get Track:

- **To retrieve a particular Track (GET method) by passing the track_url, use the following command:**

curl -v "http://127.0.0.1:5200/api/v1/resources/tracks?track_uuid=65bf6758-50f0-4c9f-937e-0b453721def6"

- **To retrieve all Track's (GET method) use the following curl command:**

curl -v 'http://127.0.0.1:5200/api/v1/resources/tracks'

6.2 Create Track

- **To create a new Track (POST method) use the following command:**

curl -X POST -v http://127.0.0.1:5200/api/v1/resources/tracks -d '{"track_title": "tango", "album_title": "Joker", "artist": "brad", "length": "121212", "track_url": "http://localhost:8000/media/ThanBefore.mp3", "album_art_url": "tuffy.com"}'

*NOTE: Add all the field. If no value then leave the double quotes empty. Ex. “”.

6.3 Edit Tracks

- **To edit a Track (PUT method) use the following command:**

curl -X PUT -v http://127.0.0.1:5200/api/v1/resources/tracks?track_uuid= 275fc399a955403dacb158cdb6f273b5 -d '{"track_title": "JustMe", "album_title": "Joker", "artist": "rf", "length": "12:60:12", "track_url": "http://localhost:8000/media/Newsong.mp3", "album_art_url": "LetsSee.com" , “track_uuid”=”275fc399a955403dacb158cdb6f273b5“}'

*NOTE: Add all the field. If no value then leave the double quotes empty. Ex. “”.

6.4 Delete Track

- **To delete a Track (DELETE method) use the following command:**

```
curl -X DELETE -v 'http://127.0.0.1:5200/api/v1/resources/tracks?track_uuid=65bf6758-50f0-4c9f-
937e-0b453721def6’
'
```

7) Instructions to use the DESCRIPTIONS Micro-service:

7.1 Create a User’s Description of a track

```
curl -X POST -v http://127.0.0.1:5100/api/v1/resources/descriptions -d '{"username":"user_anthony",
"track_uuid":"275fc399a955403dacb158cdb6f273b5","description":"Looks good"}'
```

*NOTE: Add all the field. If no value then leave the double quotes empty. Ex. “”.

7.2 GET a User’s Description of a track :

```
curl -v "http://127.0.0.1:5100/api/v1/resources/descriptions?
username=user_anthony&track_uuid=275fc399a955403dacb158cdb6f273b5"
```

8) Instructions to use the Playlist Micro-service:

8.1 GET a Playlist:

curl -v 'http://127.0.0.1:5300/api/v1/resources/playlist?playlist_id=6ba5d5ca085944dd9b2f6392141e993b'

8.2 GET method all Playlists:

curl -v 'http://127.0.0.1:5300/api/v1/resources/playlist'

8.3 GET all Playlists created by a particular User:

curl -v 'http://127.0.0.1:5300/api/v1/resources/playlist?username=user_anthony'

8.4 Create a new Playlist:

```
curl -X POST -v http://127.0.0.1:5300/api/v1/resources/playlist -d '{ "all_tracks": [
 {
 "track_uuid": "275fc399a955403dacb158cdb6f273b5"
 },
 {
 "track_uuid": "ac3d3e62d61140138bc922d90623d5db"
 }
 ],"playlist_title": "NewPlaylistIsThis", "username": "user_priyanka", "description": "This playlist contains some of my songs"}'
```

*NOTE: Track's microservice url can also be directly be placed in the location of track_uuid.

Ex. Instead of this: "track_uuid": "275fc399-a955-403d-acb1-58cdb6f273b5",

we can also pass:

“track_uuid”: “http://127.0.0.1:5200/api/v1/resources/tracks?track_uuid=275fc399-a955-403d-acb1-58cdb6f273b5”

ii) Add all the field. If no value then leave the double quotes empty. Ex. “”.

8.5 **Delete a Playlist :**

curl -X DELETE -v 'http://127.0.0.1:5300/api/v1/resources/playlist?playlist_id=6ba5d5ca085944dd9b2f6392141e993b'

9) XSPF Generator Microservice:

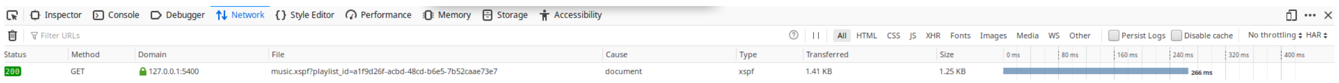
curl -v 'http://127.0.0.1:5400/api/v1/resources/music.xspf?playlist_id=a1f9d26f-acbd-48cd-b6e5-7b52caae73e7'

**sometimes uuid copying doesnt work properly . Look for blank spaces

10) Memstat statistics:

(Images are added separately in the screenshot folder)

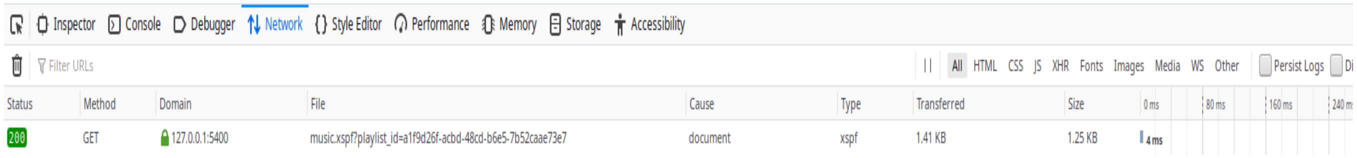
Before Cache:



Status	Method	Domain	File	Cause	Type	Transferred	Size
200	GET	127.0.0.1:5400	music.xspf?playlist_id=a1f9d26f-acbd-48cd-b6e5-7b52caae73e7	document	xspf	1.41 KB	1.25 KB

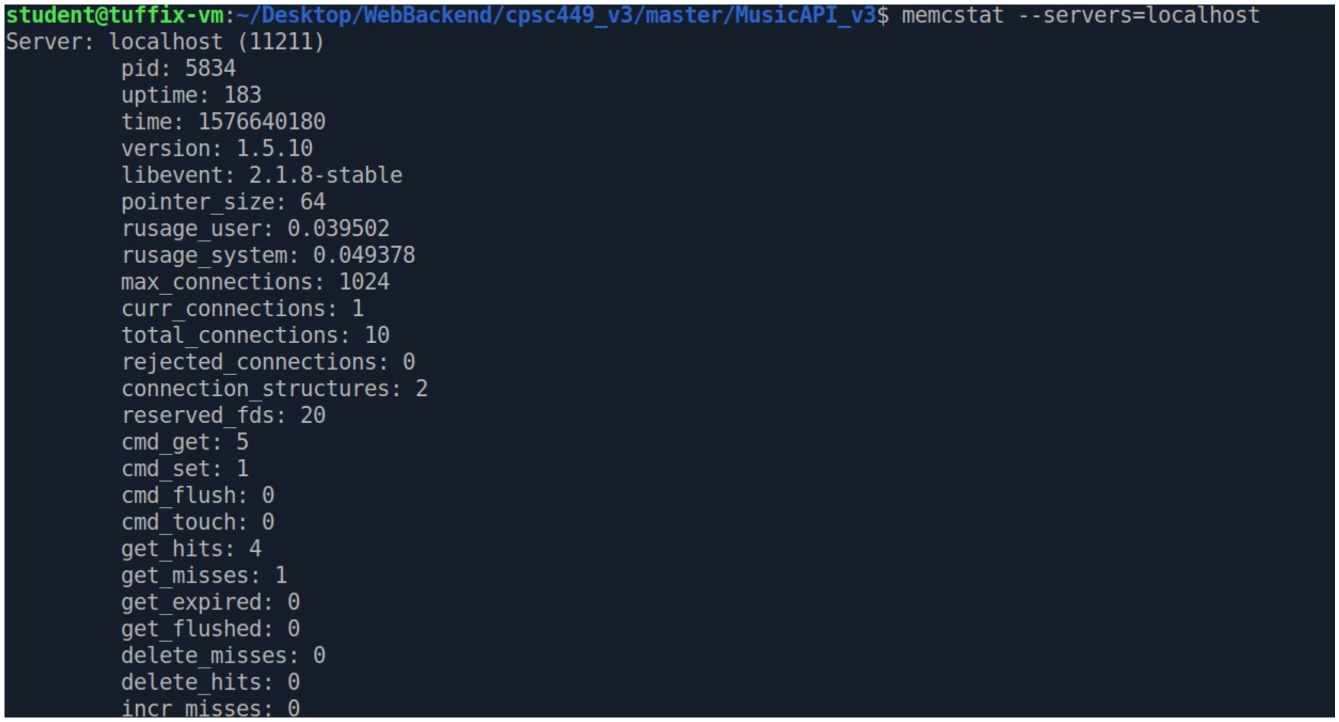
266 ms

Result after Cache

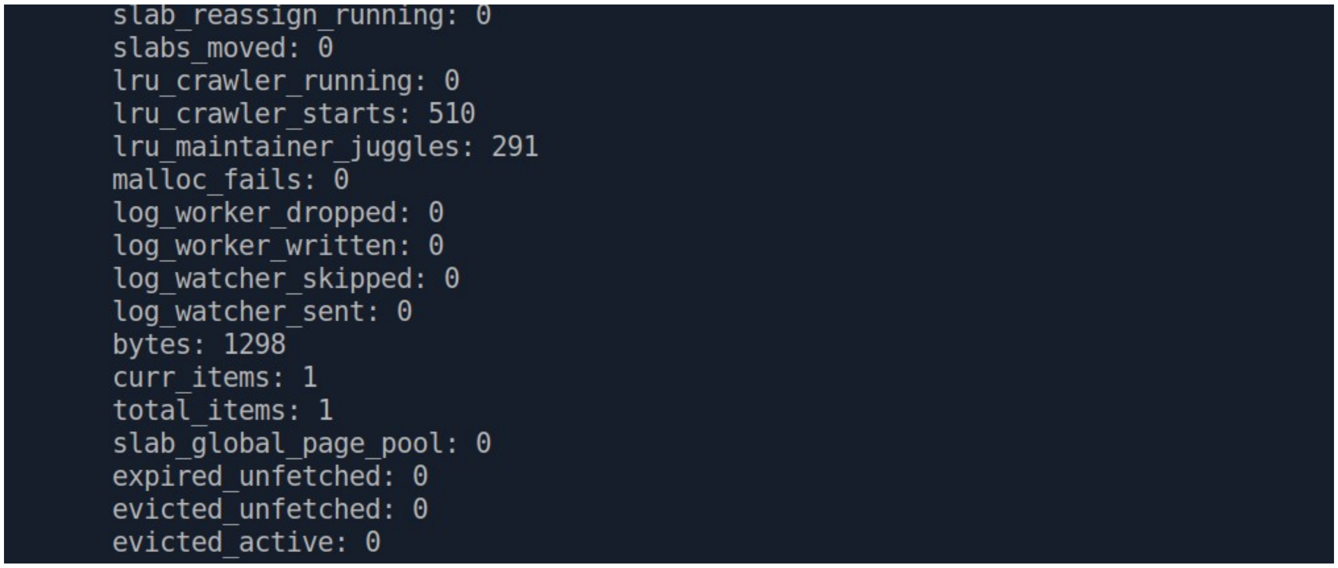


Status	Method	Domain	File	Cause	Type	Transferred	Size	0 ms
200	GET	127.0.0.1:5400	music.xspf?playlist_id=a1f9d26f-acbd-48cd-b6e5-7b52caae73e7	document	xspf	1.41 KB	1.25 KB	4 ms

Statistics after memchahe



```
student@tuffix-vm:~/Desktop/WebBackend/cpsc449_v3/master/MusicAPI_v3$ memcstat --servers=localhost
Server: localhost (11211)
         pid: 5834
         uptime: 183
         time: 1576640180
         version: 1.5.10
         libevent: 2.1.8-stable
         pointer_size: 64
         rusage_user: 0.039502
         rusage_system: 0.049378
         max_connections: 1024
         curr_connections: 1
         total_connections: 10
         rejected_connections: 0
         connection_structures: 2
         reserved_fds: 20
         cmd_get: 5
         cmd_set: 1
         cmd_flush: 0
         cmd_touch: 0
         get_hits: 4
         get_misses: 1
         get_expired: 0
         get_flushed: 0
         delete_misses: 0
         delete_hits: 0
         incr_misses: 0
```



```
      slab_reassign_running: 0
      slabs_moved: 0
      lru_crawler_running: 0
      lru_crawler_starts: 510
      lru_maintainer_juggles: 291
      malloc_fails: 0
      log_worker_dropped: 0
      log_worker_written: 0
      log_watcher_skipped: 0
      log_watcher_sent: 0
      bytes: 1298
      curr_items: 1
      total_items: 1
      slab_global_page_pool: 0
      expired_unfetched: 0
      evicted_unfetched: 0
      evicted_active: 0
```

11) Run Tavern files

Please run "FLASK_APP=user flask init" and follow the exact order .

```
py.test test_user.tavern.yaml -v
py.test test_descriptions.tavern.yaml -v

py.test test_tracks.tavern.yaml -v
py.test test_playlist.tavern.yaml -v


* Please use  FLASK_APP=user flask init to reinitialize the data
```