Fundamentals of Data Engineering

Week 05 - sync session

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Project Review

Where are we?

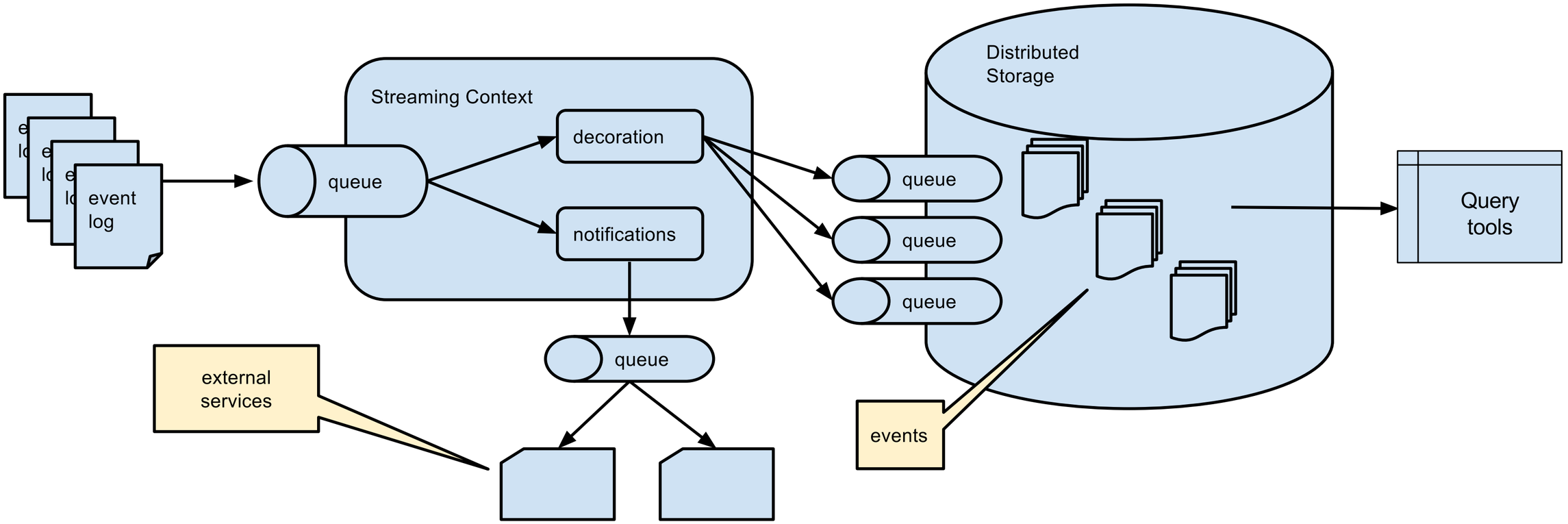
Today

- Wraps up the Query Project
- Creating basic `docker-compose` clusters
- NoSQL store (Redis) with `docker-compose`
- Redis to track state

Class 6

- Start “Tracking User Activity” Project 2

Where are we in the pipeline?


event log
queue
Streaming Context
decoration
notifications
queue
external services
queue
queue
queue
Distributed Storage
events
Query tools

Docker

Docker

Let’s play with Redis

spin it up

```
docker run redis
```

```
docker run -d redis
```

```
docker run -d --name redis redis
```

```
docker run -d --name redis -p 6379:6379 redis
```

Docker compose

- helps manage options easily
- manage multiple containers at once

Update your course content repo in w205

```
cd ~/w205/course-content
git pull --all
```

Install Docker Compose

```
sudo apt update
sudo apt install docker-compose
```

Docker compose .yml file

```
mkdir ~/w205/redis-standalone
cd ~/w205/redis-standalone
cp ../course-content/05-Storing-Data-II/example-0-docker-compose.yml
```

i.e.,

```
---
version: '2'
services:
  redis:
    image: redis
    expose:
      - "6379"
    ports:
      - "6379:6379"
```

Spinup

Start up the cluster

```
docker-compose up -d
```

Check stuff

```
docker-compose ps
```

Peek at the logs

```
docker-compose logs redis
```

Should see log output ending in

```
Ready to accept connections
```

Run stuff

```
ipython
```

Try out redis

```
import redis
r = redis.Redis(host='localhost', port='6379')
r.keys()
exit
```

Tear down your stack

```
docker-compose down
```

Verify

```
docker-compose ps
```

Clusters with docker-compose

Setup

Create a workspace for this other example

```
mkdir ~/w205/redis-cluster
cd ~/w205/redis-cluster
cp ../course-content/05-Storing-Data-II/example-1-docker-compose.yml
```

Save the following to `docker-compose.yml` in that directory

```
---
version: '2'
services:
  redis:
    image: redis:latest
    expose:
      - "6379"

  mids:
    image: midsw205/base:latest
    stdin_open: true
    tty: true
```

Spinup

Start up the cluster

```
docker-compose up -d
```

Check stuff

```
docker-compose ps
```

Should see

```
          Name                        Command               State     P
-------------------------------------------------------------------------
redisexample_midsbase_1   /bin/bash                          Up       88
redisexample_redis_1      docker-entrypoint.sh redis ...     Up       63
```

Peek at the logs

```
docker-compose logs redis
```

Should see log output ending in

```
Ready to accept connections
```

Run stuff

Connect to the mids container

```
docker-compose exec mids bash
```

At the prompt, run

```
ipython
```

Try out redis

```
import redis
r = redis.Redis(host='redis', port='6379')
r.keys()
exit
```

Exit that container

```
exit
```

Tear down your stack

```
docker-compose down
```

Verify

```
docker-compose ps
```

Wrapping Up

Week 5 Videos

- Hadoop
- Some basics. We won’t use Hadoop until later in the project
- Virtualization
- The notion of using docker-compose to bring up clusters of services. This is the core of Project 2.

Extras

Jupyter Notebooks

Change the `docker-compose.yml` file

```
---
version: '2'
services:
  redis:
    image: redis:latest
    expose:
      - "6379"

  mids:
    image: midsw205/base:latest
    stdin_open: true
    tty: true
    expose:
      - "8888"
    ports:
      - "8888:8888"
```

Save that and bring it up

```
docker-compose up -d
```

Start up a notebook

```
docker-compose exec mids jupyter notebook --no-browser --port 8888 --
```

Copy token... should look something like

```
open http://0.0.0.0:8888/?token=<your token>
```

Open a browser

```
http://0.0.0.0:8888
```

Paste token

Drop the cluster when you're done

```
docker-compose down
```

Automate notebook startup

Just for fun,

```
---
version: '2'
services:
  redis:
    image: redis:latest
    expose:
      - "6379"

  mids:
    image: midsw205/base:latest
    stdin_open: true
    tty: true
    expose:
      - "8888"
    ports:
      - "8888:8888"
    command: jupyter notebook --no-browser --port 8888 --ip 0.0.0.0 -
```

Test it out

```
docker-compose up -d
```

Run to get the token

```
docker-compose logs mids
```

Open a browser

```
open http://0.0.0.0:8888/?token=<your token>
```

Open New Python3 Notebook

Try redis

```
import redis
r = redis.Redis(host='redis', port='6379')
r.keys()
```

Add some values

```
r.set('foo', 'bar')
value = r.get('foo')
print(value)
```

Drop cluster

```
docker-compose down
```

Redis to track state

Setup

Download data:

```
cd ~/w205/
curl -L -o trips.csv https://goo.gl/QvHLKe
```

Setup

Add volumes to your `docker-compose.yml`:

```
volumes:
  - ~/w205:/w205
```

```
---
version: '2'
services:
  redis:
    image: redis:latest
    expose:
      - "6379"

  mids:
    image: midsw205/base:latest
    stdin_open: true
    tty: true
    volumes:
      - ~/w205:/w205
    expose:
      - "8888"
    ports:
```

Spin up cluster

```
docker-compose up -d
```

Run to get the token

```
docker-compose logs mids
```

Open a browser

```
open http://0.0.0.0:8888/?token=<your token>
```

Open New Python3 Notebook

```
import redis
import pandas as pd
```

```
trips=pd.read_csv('trips.csv')

date_sorted_trips = trips.sort_values(by='end_date')

date_sorted_trips.head()
```

```
for trip in date_sorted_trips.itertuples():
  print(trip.end_date, '', trip.bike_number, '', trip.end_station_nam
```

```
current_bike_locations = redis.Redis(host='redis', port='6379')
current_bike_locations.keys()
```

Add values

```
for trip in date_sorted_trips.itertuples():
  current_bike_locations.set(trip.bike_number, trip.end_station_name)
```

```
current_bike_locations.keys()
```

Where is bike 92?

```
current_bike_locations.get('92')
```

Drop cluster

```
docker-compose down
```

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