

# Fundamentals of Data Engineering

---

Week 06 - sync session

**datascience@berkeley**

## While we're getting started

- Review your Assignment 05
- Get ready to share

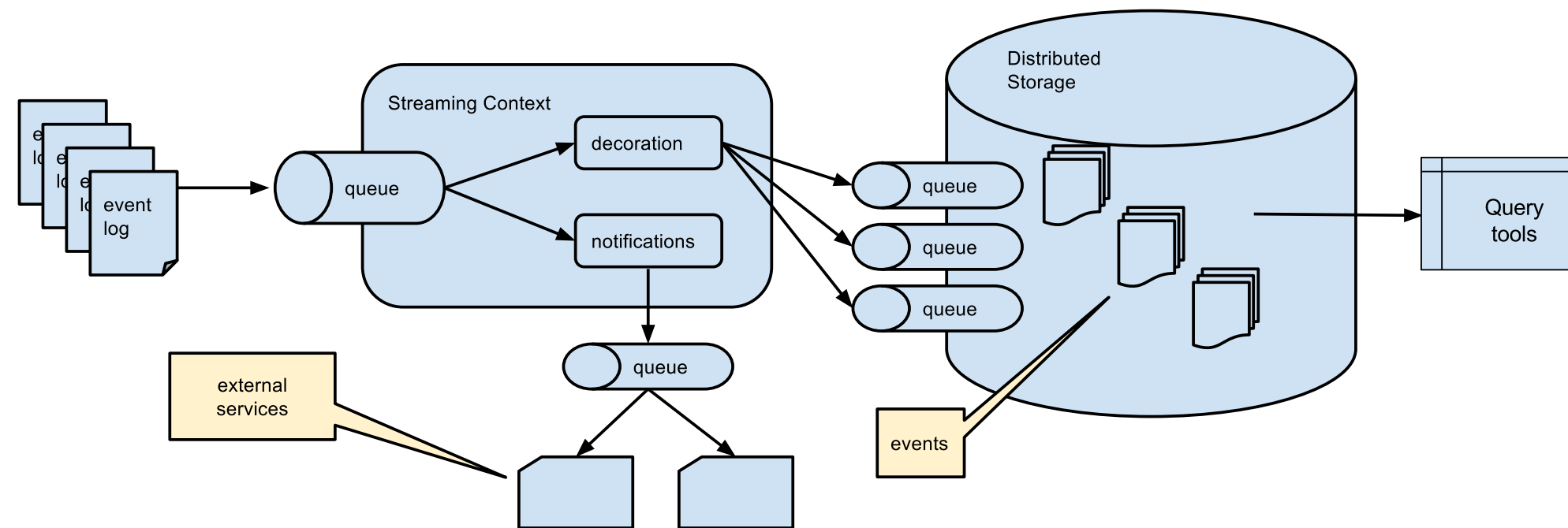
Groups present notebooks

Due Friday (PR)

# Pipes

```
cat junk.csv | sort | uniq | wc -l
```

Where are we in the pipeline



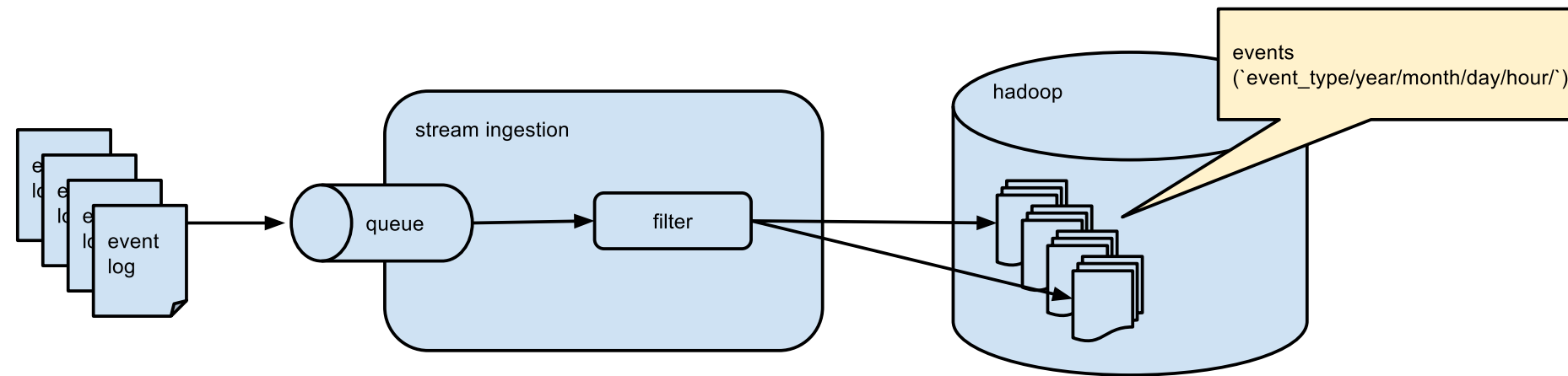
# Starting into Project 2: Tracking User Activity

- In this project, you work at an ed tech firm.
- You've created a service that delivers assessments.
- Now lots of different customers (e.g., Pearson) want to publish their assessments on it.
- You need to get ready for data scientists who work for these customers to run queries on the data.



## Project 2 activities

- Through 3 different activities, you will spin up existing containers and prepare the infrastructure to land the data in the form and structure it needs to be queried.
  1. Publish and consume messages with kafka.
  2. Use spark to transform the messages.
  3. Use spark to transform the messages so that you can land them in hdfs.



Stand alone kafka

# Update your course content repo in w205

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

## Docker compose .yml file

- `cd w205`
- `mkdir kafka`
- save `docker-compose.yml` from recently pulled  
~/w205/course-content to recently created  
~/w205/kafka directory

## Docker compose spin things up

- `cd ~/w205/kafka`
- `docker-compose up -d`
- `docker-compose ps`

Can check with

- `docker-compose ps`

Should see something like  
which should show something like

Name	Command	State	Ports
-----			
kafkasinglenode_kafka_1	/etc/confluent/docker/run	Up	
kafkasinglenode_zookeeper_1	/etc/confluent/docker/run	Up	



# Check zookeeper

```
docker-compose logs zookeeper | grep -i binding
```

Should see something like

A screenshot of a terminal window with a light gray background. It displays a single log line: 'zookeeper\_1 | [2016-07-25 03:26:04,018] INFO binding to port 0.0.0.0'. Below the text is a horizontal scrollbar with a light gray track and a darker gray slider.

```
zookeeper_1 | [2016-07-25 03:26:04,018] INFO binding to port 0.0.0.0
```

# Check the kafka broker

```
docker-compose logs kafka | grep -i started
```

# Should see something like

```
kafka_1      | [2017-08-31 00:31:40,244] INFO [Socket Server on Broke  
kafka_1      | [2017-08-31 00:31:40,426] INFO [Replica state machine  
kafka_1      | [2017-08-31 00:31:40,436] INFO [Partition state machi  
kafka_1      | [2017-08-31 00:31:40,540] INFO [Kafka Server 1], star
```



# Create a Topic foo

```
docker-compose exec kafka \  
  kafka-topics \  
    --create \  
    --topic foo \  
    --partitions 1 \  
    --replication-factor 1 \  
    --if-not-exists \  
    --zookeeper localhost:32181
```

# Should see something like

```
Created topic "foo".
```

# Check the topic

```
docker-compose exec kafka \  
  kafka-topics \  
    --describe \  
    --topic foo \  
    --zookeeper localhost:32181
```

# Should see something like

```
Topic:foo  PartitionCount:1    ReplicationFactor:1 Configs:  
Topic: foo  Partition: 0      Leader: 1      Replicas: 1  Isr: 1
```



# Publish Messages

```
docker-compose exec kafka \  
  bash -c "seq 42 | kafka-console-producer \  
    --request-required-acks 1 \  
    --broker-list localhost:29092 \  
    --topic foo && echo 'Produced 42 messages.'"
```

# Should see something like

```
Produced 42 messages.
```

# Consume Messages

```
docker-compose exec kafka \  
  kafka-console-consumer \  
    --bootstrap-server localhost:29092 \  
    --topic foo \  
    --from-beginning \  
    --max-messages 42
```

# Should see something like

```
1  
....  
42  
Processed a total of 42 messages
```

# Tearing things down

```
docker-compose down
```

# Kafka with “real” messages

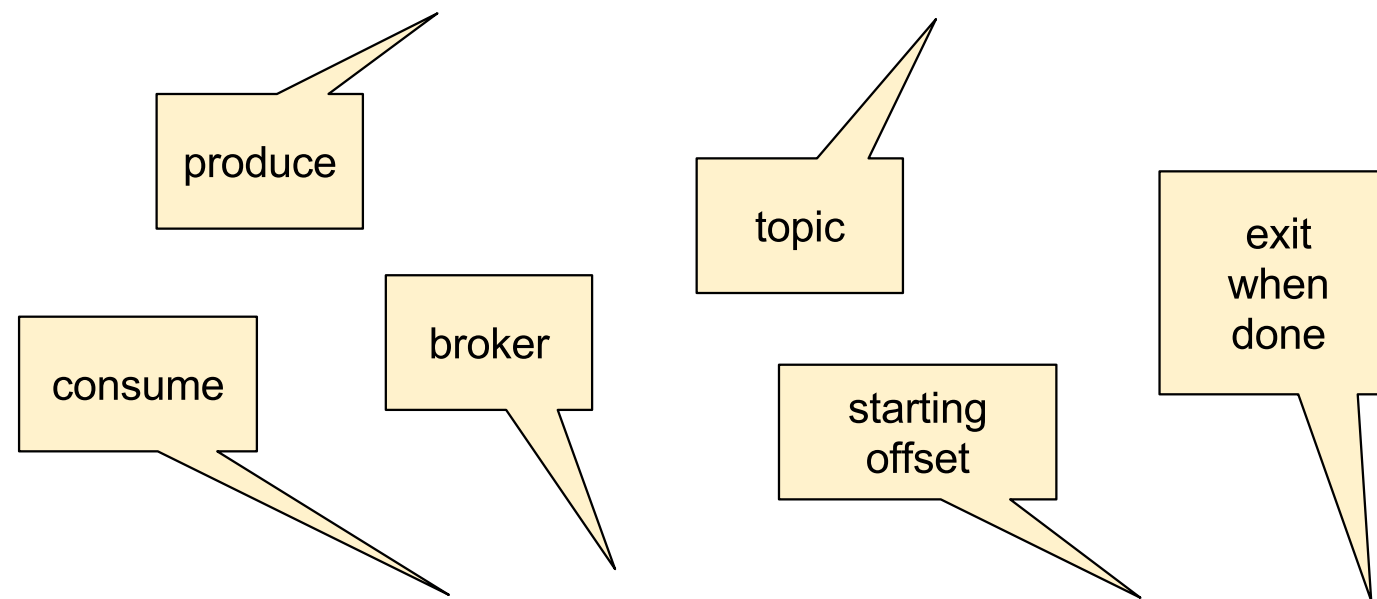
- We'll deal with json for the project

## Kafka with json example

- To address json, we'll need kafkacat

kafkacat





# docker-compose.yml file

```
---
version: '2'
services:
  zookeeper:
    image: confluentinc/cp-zookeeper:latest
    environment:
      ZOOKEEPER_CLIENT_PORT: 32181
      ZOOKEEPER_TICK_TIME: 2000
    expose:
      - "2181"
      - "2888"
      - "32181"
      - "3888"
    #ports:
      #- "32181:32181"
    extra_hosts:
```

# Pull data

```
curl -L -o github-example-large.json https://goo.gl/WewtYn
```

# Spin up the cluster

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

# Watch it come up

```
docker-compose logs -f kafka
```

- Detach with Ctrl-C

use it

# create a topic

```
docker-compose exec kafka \  
kafka-topics \  
  --create \  
  --topic foo \  
  --partitions 1 \  
  --replication-factor 1 \  
  --if-not-exists \  
  --zookeeper zookeeper:32181
```

# Should see something like

```
Created topic "foo".
```



# Check the topic

```
docker-compose exec kafka \  
  kafka-topics \  
    --describe \  
    --topic foo \  
    --zookeeper zookeeper:32181
```

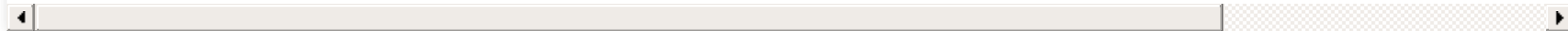
# Should see something like

```
Topic:foo    PartitionCount:1    ReplicationFactor:1 Configs:  
Topic: foo   Partition: 0       Leader: 1      Replicas: 1  Isr: 1
```

Publish some stuff to kafka

# Check out our messages

```
docker-compose exec mids bash -c "cat /w205/github-example-large.json  
docker-compose exec mids bash -c "cat /w205/github-example-large.json  
docker-compose exec mids bash -c "cat /w205/github-example-large.json
```



Publish some test messages to that topic with the kafka console producer

```
docker-compose exec mids bash -c "cat /w205/github-example-large.json"
```

# Should see something like

```
Produced 100 messages.
```

Consume the messages

# We can either do what we did before

```
docker-compose exec kafka \  
  kafka-console-consumer \  
    --bootstrap-server kafka:29092 \  
    --topic foo \  
    --from-beginning \  
    --max-messages 42
```



or

```
docker-compose exec mids bash -c "kafkacat -C -b kafka:29092 -t foo
```

and maybe

```
docker-compose exec mids bash -c "kafkacat -C -b kafka:29092 -t foo
```

# Down

```
docker-compose down
```

# Assignment 06

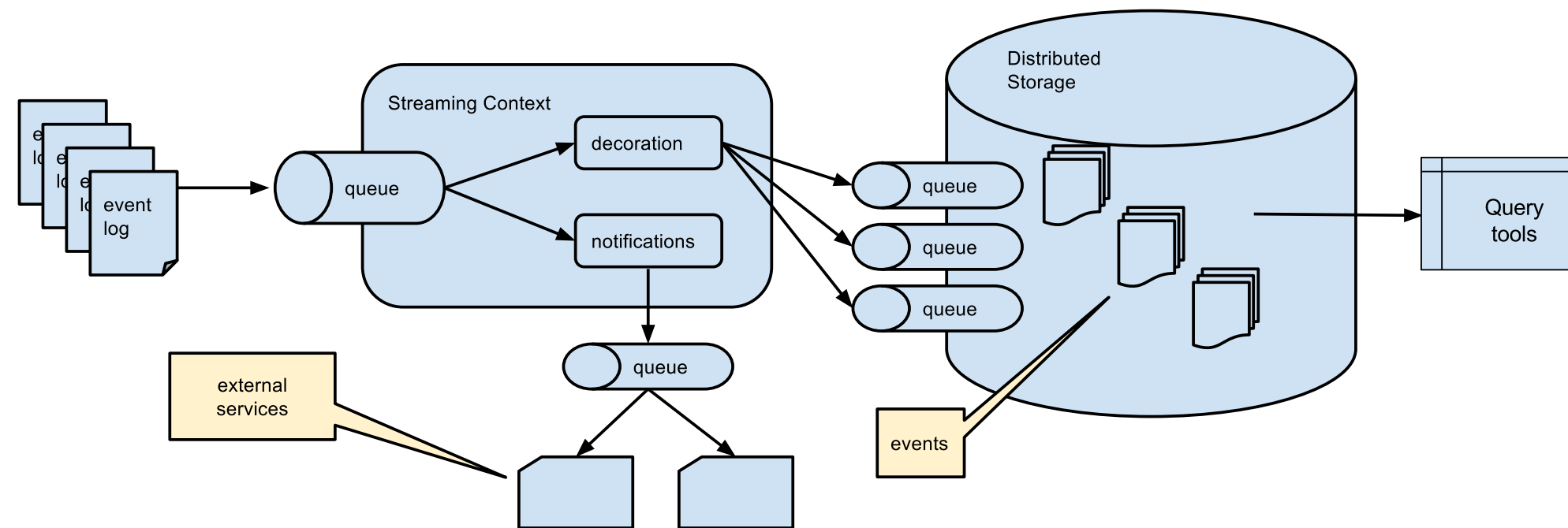
- Step through this process using the Project 2 data
- What you turn in:
- In your /assignment-05-<user-name> repo:
  - your docker-compose.yml
  - once you've run the example on your terminal
    - Run `history > <user-name>-history.txt`
    - Save the relevant portion of your history as `<user-name>-annotations.md`
    - Annotate the file with explanations of what you were doing at each point (See `htmartin-annotations.md`)

# Summary

- Test that we can spin up containers, publish & consume messages with simple numbers messages.
- Work through some actual data from github
- Prep for assignment

# Berkeley

SCHOOL OF  
INFORMATION



cool pics



