

Project Milestone 2

1. What is EDA? What are its advantages and disadvantages?

EDA stands for event driven architecture. It is when loosely coupled microservices communicate with each other through production/consumption of events.

Some advantages

- Loose coupling-enables asynchronous communication as event broker will keep all messages until its read by the target service
- Fault tolerance-faults are isolated to individual services since services are decoupled from each other in EDA
- EDA allows individual services to operate independently even when in the same application which reduces dependencies between services

Some disadvantages are:

- Duplicated events-A single event can trigger many of the same messages across services
- Disorganization-When a service or broker is alerted to a certain event, every step in a workflow is triggered which results in lack of workflow order
- Error handling/troubleshooting-a app can have a lot of message broker/services which would require constant pass and receive events. EDA would require monitoring tools that provide visibility into the flow of events.

2. In Kafka, what's meant by cluster, broker, topic, replica, partition, zookeeper, controller, leader, consumer, producer, and consumer group?

Cluster

- Contains one or more kafka brokers running kafka. Kafka brokers form a cluster
- Single broker can handle thousands of partitions

Broker

- A kafka server
- Used by producer and consumer to exchange message services
- Kafka brokers contain topic log partitions

- Each broker has a unique ID

Topic

- Events are organized and stored in topics
- Can be broken down into partitions

Replica

- The partition may be assigned to multiple brokers
- Which will result in the partition being replicated
- Results in redundancy of messages so another broker can take over if there's a broker failure
- All consumers/producers operating on that partition must connect to the leader
- To make your data fault tolerant and have high availability every topic can be replicated

Partition

- Topics are partitions
- Partitioning takes single topic logs and breaks them into multiple logs
- Guarantees ordering if there's one partition
- Easy scaling

Zookeeper

- Used to coordinate brokers/clusters

Controller

- In clusters there's always one broker responsible for cluster controllers
- Responsible for admin operations
- Assigning partitions
- Monitoring for broker failures

Leader

- A partition is always owned by a single broker in the cluster called the leader of the partition

Consumer

- Subscribe to read/process events that are written by producers
- Read in the same order its produced

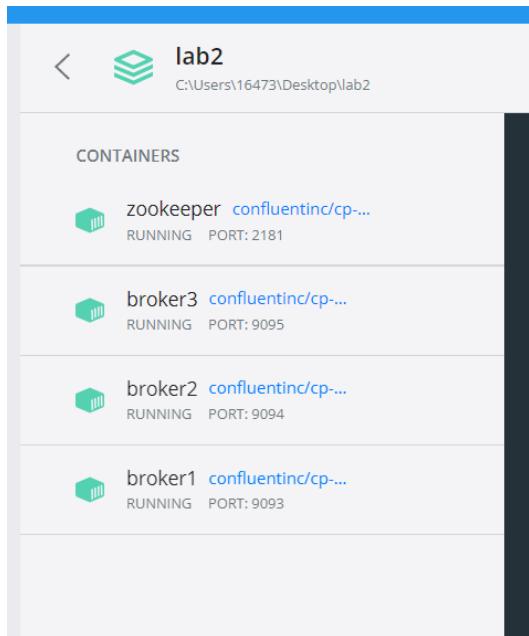
Producer

- Client applications that write events to kafka
- Usually under applications producing data

Consumer group

- Consumers belong to a specific consumer group
- Consumer groups make sure each partition is consumed by one member of a consumer group, so it can be scaled horizontally

5. Kafka Cluster Introduction Video



```

C:\ Command Prompt
9b9chc4e490c: Already exists
>f732f1ba78a: Already exists
e06c925589f1: Already exists
3a498372ace6: Already exists
2ea0fcfa7e4d4: Already exists
c3dc6c0781fc: Already exists
45f1197956c6: Pull complete
1dec6fb6396: Pull complete
Digest: sha256:dee82c02cd/d36ceaa8d3369f181f47412adecf1001c10bbd4b4959610868df
f5
Status: Downloaded newer image for confluentinc/cp-kafka:latest
Creating zookeeper ... done
Creating broker3 ... done
Creating broker2 ... done
Creating broker1 ... done

C:\Users\16473\Desktop\lab2>docker exec broker1 kafka-topics --list --bootstrap-server broker1:9092
topic
topic2

C:\Users\16473\Desktop\lab2>docker exec broker2 kafka-console-consumer --bootstrap-server broker1:9092 --topic topic --from-beginning
0.0
2.5
5.0
7.5
10.0
value1
value
temp=20
20
C:\Users\16473\Desktop\lab2>docker exec broker2 kafka-console-consumer --bootstrap-server broker1:9092 --topic topic --from-beginning --max-messages 5
0.0
2.5
5.0
7.5
10.0
Processed a total of 5 messages

C:\Users\16473\Desktop\lab2>docker exec broker1 kafka-console-consumer --bootstrap-server broker1:9092,broker2:9092,broker3:9092 --topic topic2 --from-beginning
temp=30, pressure=1000, humidity=0.10
temp=35, pressure=1001, humidity=0.7
>>>
C:\Users\16473\Desktop\lab2>docker-compose down
Stopping broker1 ... done
Stopping broker2 ... done
Stopping broker3 ... done
Stopping zookeeper ... done
Removing broker1 ... done
Removing broker2 ... done
Removing broker3 ... done
Removing zookeeper ... done
Removing network kafka_Network

```

```

C:\Users\16473\Desktop\lab2>docker-compose -f docker-compose.yml up -d
zookeeper is up-to-date
broker2 is up-to-date
broker3 is up-to-date
broker1 is up-to-date

C:\Users\16473\Desktop\lab2>docker exec -it kafka /bin/sh
Error: No such container: kafka

C:\Users\16473\Desktop\lab2>docker ps
CONTAINER ID IMAGE NAMES COMMAND CREATED STATUS PORTS
00771da8efba confluentinc/cp-kafka " /etc/confluent/docker... " 24 hours ago Up 24 hours 9092/tcp, 0.0.0.0:9093->9093/tcp, 3888/tcp zookeeper
863497d942d6 confluentinc/cp-kafka " /etc/confluent/docker... " 24 hours ago Up 24 hours 9092/tcp, 0.0.0.0:9095->9095/tcp, 3888/tcp broker3
4302ca2283b7 confluentinc/cp-kafka " /etc/confluent/docker... " 24 hours ago Up 24 hours 9092/tcp, 0.0.0.0:9094->9094/tcp, 3888/tcp broker2
0ffa20101796 confluentinc/cp-zookeeper " /etc/confluent/docker... " 24 hours ago Up 24 hours 2888/tcp, 0.0.0.0:2181->2181/tcp, 3888/tcp broker1

C:\Users\16473\Desktop\lab2>

```

6. NodeJS video

```

C:\Users\16473\Desktop>cd javascript
The system cannot find the path specified.

C:\Users\16473\Desktop>cd javascript
C:\Users\16473\Desktop>cd javascript_playground
C:\Users\16473\Desktop>javascript\javascript_playground>cd kafka
C:\Users\16473\Desktop>javascript\javascript_playground>kafka>node consumer.js
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:03:03.583Z", "logger": "kafkajs", "message": "[Consumer] Starting", "groupId": "test"}
{"level": "INFO", "timestamp": "2022-02-14T19:03:08.228Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "isLeader": false, "memberAssignment": {"Users": [1]}, "groupProtocol": "RoundRobinAssigner", "duration": 6464}
RVD Msg bala on partition 1
RVD Msg byn on partition 1
RVD Msg john on partition 1
RVD Msg bill on partition 1
C:\Users\16473\Desktop>javascript\javascript_playground>kafka>cd Desktop
okce: "localhost:9093" "clientId": "myapp", "error": "The group is rebalancing, so a rejoin is needed", "correlationId": 154, "size": 108
("Something bad happened ${ex}")
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:05:34.160Z", "logger": "kafkajs", "message": "[Runner] The group is rebalancing, re-joining", "groupId": "test", "memberId": "myapp-8cb3baa-b3e2-4fc9-aa95-bc5e3c1eb47", "error": "The group is rebalancing, so a rejoin is needed", "retryCount": 0, "retryTime": 327}
{"level": "INFO", "timestamp": "2022-02-14T19:05:34.182Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-8cb3baa-b3e2-4fc9-aa95-bc5e3c1eb47", "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "isLeader": false, "memberAssignment": {"Users": [1]}, "groupProtocol": "RoundRobinAssigner", "duration": 20}
C:\Users\16473\Desktop>javascript\javascript_playground>kafka>node consumer.js
2-02-14T19:07:14.377Z", "logger": "kafkajs", "message": "[Consumer] Starting", "groupId": "test"
{"level": "INFO", "timestamp": "2022-02-14T19:07:14.405Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "isLeader": false, "memberAssignment": {"Users": [1]}, "groupProtocol": "RoundRobinAssigner", "duration": 2480
C:\Users\16473\Desktop>javascript\javascript_playground>kafka>cd Desktop
okce: "localhost:9093" "clientId": "myapp", "error": "The group is rebalancing, so a rejoin is needed", "correlationId": 111, "size": 22
("Something bad happened ${ex}")
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:07:11.924Z", "logger": "kafkajs", "message": "[Consumer] Starting", "groupId": "test"}
{"level": "INFO", "timestamp": "2022-02-14T19:07:14.405Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "isLeader": false, "memberAssignment": {"Users": [1]}, "groupProtocol": "RoundRobinAssigner", "duration": 2480
C:\Users\16473\Desktop>javascript\javascript_playground>kafka>cd Desktop
okce: "localhost:9093" "clientId": "myapp", "error": "The group is rebalancing, so a rejoin is needed", "correlationId": 111, "size": 22
("Something bad happened ${ex}")
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:07:14.399Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "isLeader": true, "memberAssignment": {"Users": [0]}, "groupProtocol": "RoundRobinAssigner", "duration": 22}

```

```

C:\Users\16473\Desktop>cd javascript\javascript_playground\kafka>node producer.js
user.js Hello
Connecting....
Connected!
Send Successfully! [{"topicName": "Users", "partition": 0, "errorCode": 0, "baseOffset": "5", "logAppendTime": "-1", "logStartOffset": "0"}]
8:
C:\Users\16473\Desktop>javascript\javascript_playground\kafka>node producer.js
user.js john
Connecting....
Connected!
Send Successfully! [{"topicName": "Users", "partition": 1, "errorCode": 0, "baseOffset": "20", "logAppendTime": "-1", "logStartOffset": "0"}]
C:\Users\16473\Desktop>javascript\javascript_playground\kafka>node producer.js
user.js bala
Connecting....
Connected!
Send Successfully! [{"topicName": "Users", "partition": 1, "errorCode": 0, "baseOffset": "21", "logAppendTime": "-1", "logStartOffset": "0"}]
C:\Users\16473\Desktop>javascript\javascript_playground\kafka>node producer.js
user.js jerry
Connecting....
Connected!
Send Successfully! [{"topicName": "Users", "partition": 1, "errorCode": 0, "baseOffset": "22", "logAppendTime": "-1", "logStartOffset": "0"}]
C:\Users\16473\Desktop>javascript\javascript_playground\kafka>node consumer.js
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:07:11.924Z", "logger": "kafkajs", "message": "[Consumer] Starting", "groupId": "test"}
{"level": "INFO", "timestamp": "2022-02-14T19:07:14.405Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "isLeader": false, "memberAssignment": {"Users": [1]}, "groupProtocol": "RoundRobinAssigner", "duration": 2480
RVD Msg test on partition 1
RVD Msg jerry on partition 1
RVD Msg bala on partition 1
RVD Msg john on partition 1
RVD Msg hello on partition 0
okce: "localhost:9093" "clientId": "myapp", "error": "The group is rebalancing, so a rejoin is needed", "correlationId": 8453-895188a07e65, "leaderId": "myapp-d64eb51f-a26d-43f1-b59b-51255bb57ced", "error": "The group is rebalancing, so a rejoin is needed", "retryCount": 0, "retryTime": 260
("Something bad happened ${ex}")
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:08:33.874Z", "logger": "kafkajs", "message": "[Consumer] Starting", "groupId": "test", "memberId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "leaderId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "isLeader": false, "memberAssignment": {"Users": [1]}, "groupProtocol": "RoundRobinAssigner", "duration": 43
("Something bad happened ${ex}")
Connecting.....
Connected!
{"level": "INFO", "timestamp": "2022-02-14T19:08:33.921Z", "logger": "kafkajs", "message": "[ConsumerGroup] Consumer has joined the group", "groupId": "test", "memberId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "leaderId": "myapp-fcc442c-669e-46b3-a43c-557de5a925c", "isLeader": false, "memberAssignment": {}, "groupProtocol": "RoundRobinAssigner", "duration": 43

```

Python-Kafka-could not get this to run

7.

<https://drive.google.com/file/d/1hfOYYh8zWDMK6qNrWGPGxF-INHdEsMK5/view?usp=sharing>

8.

To make the YAML file persistent for data you would have to add volume to the zookeeper and broker options. This solves the problem because kafka and zookeeper need volume in the event a container has stopped running or is restarted. Kafka uses volumes for log data and zookeeper uses volume for transaction logs. Volume does not increase the size of the container.

Ex. docker will create the volume in the folder, it will be created outside of the docker compose and this way you won't lose data inside the data-volume event.

services:

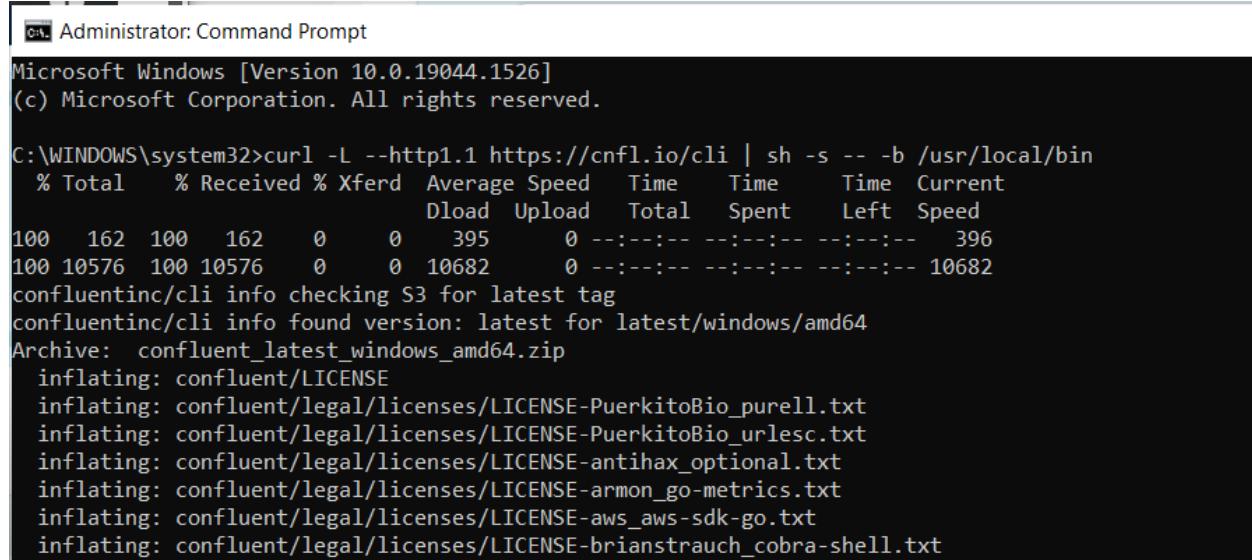
db:

```
image: postgres
volumes:
  - data:/var/lib/postgresql/data
```

Volumes:

```
data:
  external: true
```

9.



The screenshot shows a Windows Command Prompt window titled "Administrator: Command Prompt". The command entered is "curl -L --http1.1 https://cnfl.io/cli | sh -s -- -b /usr/local/bin". The output shows the progress of the download and extraction of the Confluent CLI binary. The progress bar indicates 100% completion for two files: "162" and "10576". The command then proceeds to check S3 for the latest tag, finds the version "latest" for "windows/amd64", and extracts the archive "confluent_latest_windows_amd64.zip". The extracted files include "LICENSE", "PuerkitoBio_purell.txt", "PuerkitoBio_urlesc.txt", "antihax_optional.txt", "armon_go-metrics.txt", "aws_aws-sdk-go.txt", and "brianstrauch_cobra-shell.txt".

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.19044.1526]
(c) Microsoft Corporation. All rights reserved.

C:\WINDOWS\system32>curl -L --http1.1 https://cnfl.io/cli | sh -s -- -b /usr/local/bin
  % Total    % Received % Xferd  Average Speed   Time   Time     Current
          Dload  Upload Total   Spent    Left  Speed
100  162  100  162    0     0  395      0 --:--:-- --:--:-- --:--:--  396
100 10576  100 10576   0     0 10682      0 --:--:-- --:--:-- --:--:-- 10682
confluentinc/cli info checking S3 for latest tag
confluentinc/cli info found version: latest for latest/windows/amd64
Archive: confluent_latest_windows_amd64.zip
  inflating: confluent/LICENSE
  inflating: confluent/legal/licenses/LICENSE-PuerkitoBio_purell.txt
  inflating: confluent/legal/licenses/LICENSE-PuerkitoBio_urlesc.txt
  inflating: confluent/legal/licenses/LICENSE-antihax_optional.txt
  inflating: confluent/legal/licenses/LICENSE-armon_go-metrics.txt
  inflating: confluent/legal/licenses/LICENSE-aws_aws-sdk-go.txt
  inflating: confluent/legal/licenses/LICENSE-brianstrauch_cobra-shell.txt
```

```
C:\Users\16473\bin>ccloud kafka cluster list
The Confluent Cloud CLI is deprecated and will no longer be supported on May 9, 2022. All `ccloud` features have
been moved to the Confluent CLI: https://docs.confluent.io/confluent-cli/current/index.html
To update to the new CLI, run `ccloud update --major`. See the migration guide for more details: https://docs.co
nfluent.io/ccloud-cli/current/migrate.html

Id      | Name     | Type    | Provider | Region   | Availability | Status
-----+-----+-----+-----+-----+-----+-----+
lkc-1ggq3 | Kafka 101 | BASIC | gcp       | us-west4 | single-zone | UP
```

```
If the API secret is incorrect, override with `ccloud api-key store IQPH5ZBJV4BP6OCB --resource lkc-1ggq3 --force` .
Finally, ensure the API key being used was not deleted by another user or via the UI (check with `ccloud api-key list`).

C:\Users\16473\bin>ccloud kafka topic consume --from-beginning poems
The Confluent Cloud CLI is deprecated and will no longer be supported on May 9, 2022. All `ccloud` features have been moved to the Confluent
CLI: https://docs.confluent.io/confluent-cli/current/index.html
To update to the new CLI, run `ccloud update --major`. See the migration guide for more details: https://docs.confluent.io/ccloud-cli/curren
t/migrate.html
```

```
ccloud v1.43.1 windows_amd64>ccloud kafka topic consume --from-beginning poems
Operable program or batch file.

Suggestions:
For recently created Kafka clusters and API keys, it may take a few minutes before the resources
are ready. Otherwise, verify that for Kafka cluster "lkc-0xrr5p" the active API key "IQPH5ZBJV4BP6OCB" used
is the right one. Also verify that the correct API secret is stored for the API key.
If the API secret is incorrect, override with `ccloud api-key store IQPH5ZBJV4BP6OCB --resource lkc-0xrr5p --force` .
Finally, ensure the API key being used was not deleted by another user or via the UI (check with `ccloud api-key list`).

Error: unable to connect to Kafka cluster

Suggestions:
For recently created Kafka clusters and API keys, it may take a few minutes before the resources
are ready. Otherwise, verify that for Kafka cluster "lkc-0xrr5p" the active API key "IQPH5ZBJV4BP6OCB" used
is the right one. Also verify that the correct API secret is stored for the API key.
If the API secret is incorrect, override with `ccloud api-key store IQPH5ZBJV4BP6OCB --resource lkc-0xrr5p --force` .
Finally, ensure the API key being used was not deleted by another user or via the UI (check with `ccloud api-key list`).

C:\Users\16473\Downloads>ccloud v1.43.1 windows_amd64>ccloud kafka topic consume --from-beginning poems
The Confluent Cloud CLI is deprecated and will no longer be supported on May 9, 2022. All `ccloud` features have been moved to the Confluent CLI: https://docs.confluent.io/confluent-cli/current/index.html
'ccloud' is not recognized as an internal or external command,
operable program or batch file.

C:\Users\16473\Downloads>ccloud v1.43.1 windows_amd64>ccloud kafka topic consume --from-beginning poems
The Confluent Cloud CLI is deprecated and will no longer be supported on May 9, 2022. All `ccloud` features have been moved to the Confluent CLI: https://docs.confluent.io/confluent-cli/current/index.html
To update to the new CLI, run `ccloud update --major`. See the migration guide for more details: https://docs.confluent.io/ccloud-cli/curren
t/migrate.html
```



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