First Round Done – Need some find tuning

Date : 23th Oct 2022.

https://docs.confluent.io/current/ksql/docs/tutorials/examples.html#ksql-examples

1. Prerequisite

JDk : 1.11
Confluent : 7.3.3
Kafka : 3.11
Registry & KSQL DB

```
# Download the archive and its signature
```

```
curl http://ksqldb-packages.s3.amazonaws.com/archive/0.23/confluent-ksqldb-0.23.1.tar.gz --output confluent-ksqldb-0.23.1.tar.gz
```

Confugure Kafka confluent and kafka cluster

2. Install KSQL DB – 60 Minutes(D)

Prerequisite: Kafka Node installation.

And kafka registry, required for Avro integration.

Update kafka server.properties with the following entries.

```
#vi /opt/kafka/config/server.properties

transaction.state.log.replication.factor=1
transaction.state.log.min.isr=1
offsets.topic.replication.factor=1
```

Restart the kafka broker.

Get standalone ksqlDB

Since ksqlDB runs natively on Apache Kafka®, you'll need to have a Kafka cluster that ksqlDB is configured to use. Use the steps to the right to install the latest release of ksqlDB.

```
# Extract the tarball to the directory of your choice

#tar -xf confluent-ksqldb-0.23.1.tar.gz -C /opt/
```

```
#mv confluent-ksq* ksqldb
```

Configure ksqlDB server

Ensure your ksqlDB server has network connectivity to Kafka.

Edit the highlighted line in `/opt/ksqldb/etc/ksqldb/ksql-server.properties` to match your Kafka hostname and port.

```
#------ Kafka -------

# The set of Kafka brokers to bootstrap Kafka cluster information from:
bootstrap.servers=kafka0:9092

# Enable snappy compression for the Kafka producers
compression.type=snappy
```

To enable Schema Registry Add the following line at the end of the configuration file.

#------ Schema Registry -------

Uncomment and complete the following to enable KSQL's integration to the Confluent Schema Registry:

ksql.schema.registry.url=http://kafka0:8081

Start ksqlDB's server

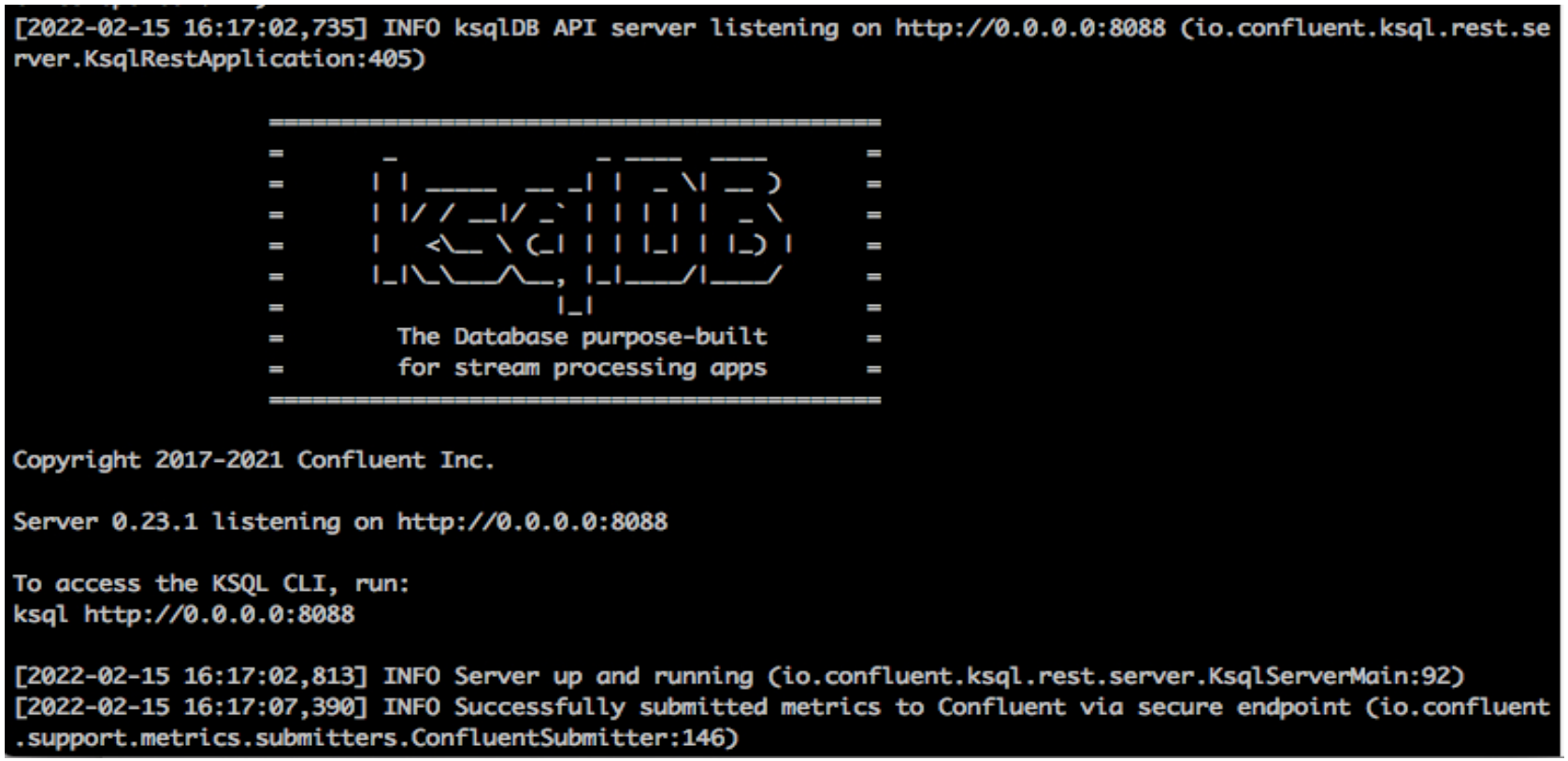
ksqlDB is packaged with a startup script for development use. We'll use that here.
When you're ready to run it as a service, you'll want to manage ksqlDB with something like `systemd`.

```
#/opt/ksqldb/bin/ksql-server-start /opt/ksqldb/etc/ksqldb/ksql-server.properties
```

if any issue in start up because of jar.

Download and store in the following folder.

#cd /opt/ksqldb/share/java/ksqldb
#wget https://repo1.maven.org/maven2/io/netty/netty-all/4.1.30.Final/netty-all-4.1.30.Final.jar

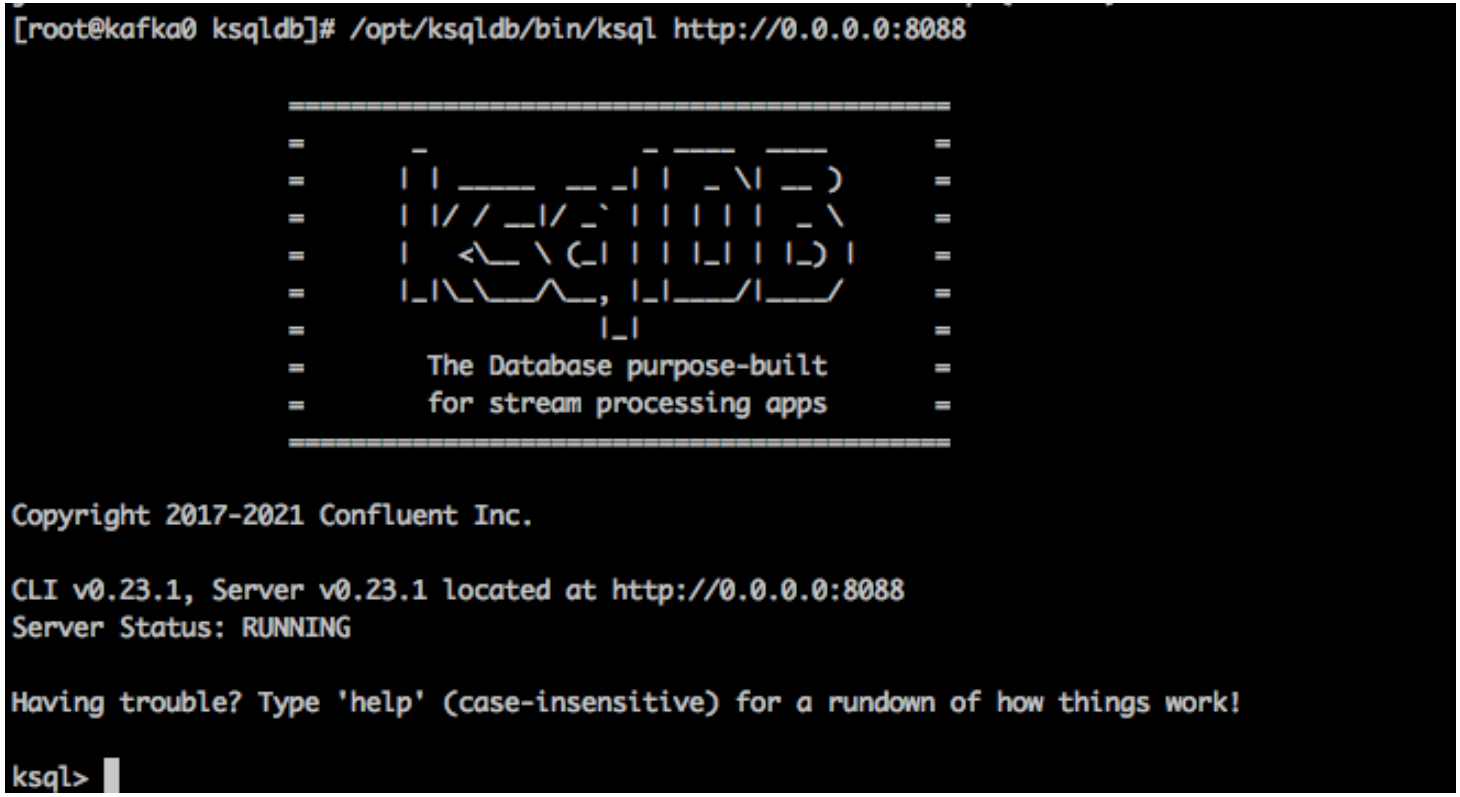


Start ksqlDB's interactive CLI

ksqlDB runs as a server which clients connect to in order to issue queries.

Run this command to connect to the ksqlDB server and enter an interactive command-line interface (CLI) session.

`#/opt/ksqldb/bin/ksql http://0.0.0.0:8088`


[root@kafka0 ksqldb]# /opt/ksqldb/bin/ksql http://0.0.0.0:8088
The Database purpose-built
for stream processing apps
Copyright 2017-2021 Confluent Inc.
CLI v0.23.1, Server v0.23.1 located at http://0.0.0.0:8088
Server Status: RUNNING
Having trouble? Type 'help' (case-insensitive) for a rundown of how things work!
ksql>

#show topics;

```
ksql> show topics;

 Kafka Topic                 | Partitions | Partition Replicas
-------------------------------------------------------------
 default_ksql_processing_log | 1          | 1
 test                        | 1          | 1
 topic1                      | 2          | 1
-------------------------------------------------------------
```

----------Lab Ends Here ----------

4. Workflow using KSQL - CLI – 90 Minutes(D)

Following features will be demonstrated.

- Create Topics and Produce Data
- Create and produce data to the Kafka topics pageviews and users.
- Inspect Kafka Topics by Using SHOW and PRINT Statements
- Create a Stream and Table
- Write Queries

This tutorial demonstrates a simple workflow using KSQL to write streaming queries against messages in Kafka.

To get started, you must start a Kafka cluster, including ZooKeeper and a Kafka broker.

Start Schema Registry

KSQL will then query messages from this Kafka cluster.

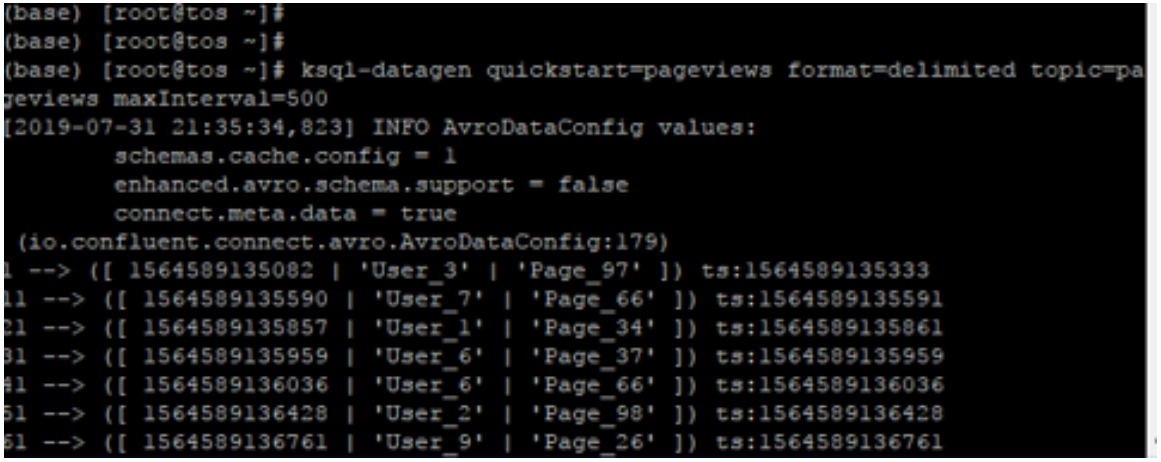
KSQL is installed in the Confluent Platform by default.

Create Topics and Produce Data

Create and produce data to the Kafka topics pageviews and users. These steps use the KSQL datagen that is included with Confluent Platform.

1. Create the pageviews topic and produce data using the data generator. The following example continuously generates data with a value in DELIMITED format.

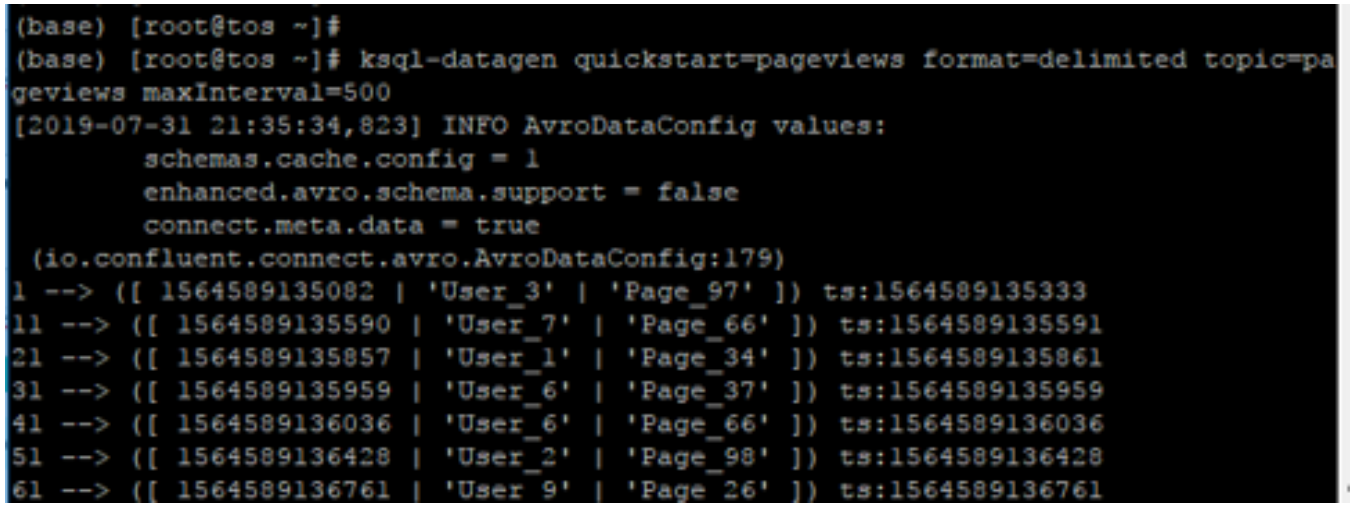
```
ksql-datagen bootstrap-server=kafka0:9092 quickstart=pageviews format=json topic=pageviews
maxInterval=500
```



2. Produce Kafka data to the users topic using the data generator. The following example continuously generates data with a value in JSON format.

```
$ ksql-datagen bootstrap-server=kafka0:9092 quickstart=users format=json topic=users
maxInterval=100
```

.



Launch the KSQL CLI

To launch the CLI, run the following command. It will route the CLI logs to the `./ksql_logs` directory, relative to your current directory. By default, the CLI will look for a KSQL Server running at `http://localhost:8088`.

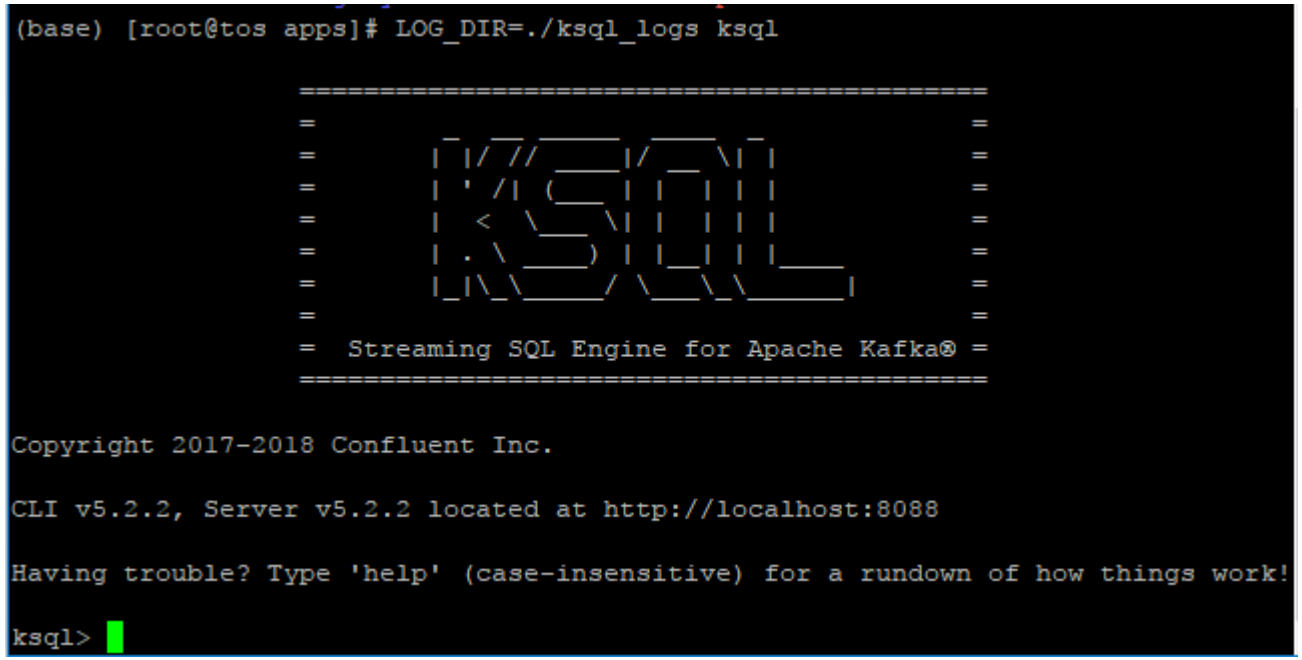
```
$ LOG_DIR=./ksql_logs ksql
```

Important

By default KSQL attempts to store its logs in a directory called `logs` that is relative to the location of the `ksql` executable. For example, if `ksql` is installed at `/usr/local/bin/ksql`,

then it would attempt to store its logs in `/usr/local/logs`. If you are running `ksql` from the default Confluent Platform location, `<path-to-confluent>/bin`, you must override this default behavior by using the `LOG_DIR` variable.

After KSQL is started, your terminal should resemble this.



Inspect Kafka Topics By Using SHOW and PRINT Statements

KSQL enables inspecting Kafka topics and messages in real time.

- Use the SHOW TOPICS statement to list the available topics in the Kafka cluster.
- Use the PRINT statement to see a topic's messages as they arrive.

In the KSQL CLI, run the following statement:

SHOW TOPICS;

Your output should resemble:

```
 Kafka Topic       | Registered | Partitions | Partition Replicas | Consumers | ConsumerGroups
-------------------------------------------------------------------------------------------------
 _confluent-metrics | false     | 12         | 1                  | 0         | 0
 _schemas           | false     | 1          | 1                  | 0         | 0
 pageviews          | false     | 1          | 1                  | 0         | 0
 users              | false     | 1          | 1                  | 0         | 0
-------------------------------------------------------------------------------------------------
```

Inspect the `users` topic by using the PRINT statement:

```
PRINT 'users';
```

Your output should resemble:

```
Format:JSON
{"ROWTIME":1540254230041,"ROWKEY":"User_1","registertime":1516754966866,"userid":"User_1","regionid":"Region_9","gender":"MALE"}
{"ROWTIME":1540254230081,"ROWKEY":"User_3","registertime":1491558386780,"userid":"User_3","regionid":"Region_2","gender":"MALE"}
```

```
{"ROWTIME":1540254230091,"ROWKEY":"User_7","registertime":1514374073235,"userid":"User_7","regionid":"Region_2","gender":"OTHER"}
^C{"ROWTIME":1540254232442,"ROWKEY":"User_4","registertime":1510034151376,"userid":"User_4","regionid":"Region_8","gender":"FEMALE"}
Topic printing ceased
```

Press CTRL+C to stop printing messages.

Inspect the `pageviews` topic by using the PRINT statement:

```
PRINT 'pageviews';
```

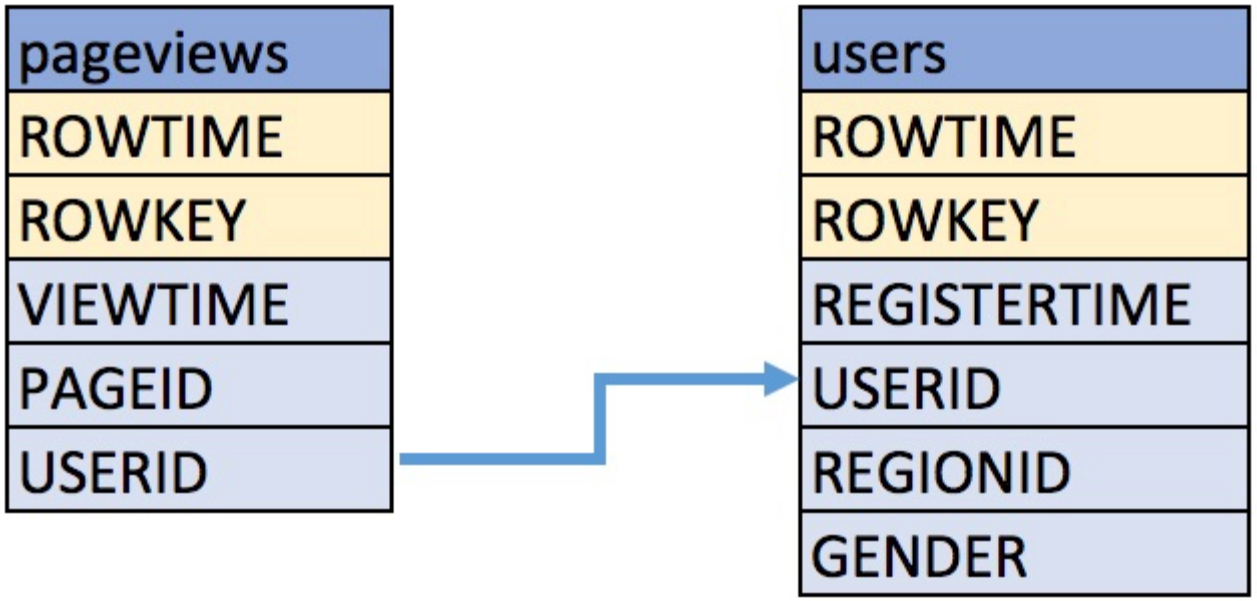
Your output should resemble:

```
Format:STRING
10/23/18 12:24:03 AM UTC , 9461 , 1540254243183,User_9,Page_20
10/23/18 12:24:03 AM UTC , 9471 , 1540254243617,User_7,Page_47
10/23/18 12:24:03 AM UTC , 9481 , 1540254243888,User_4,Page_27
^C10/23/18 12:24:05 AM UTC , 9521 , 1540254245161,User_9,Page_62
Topic printing ceased
ksql>
```

Press CTRL+C to stop printing messages.

Create a Stream and Table

These examples query messages from Kafka topics called `pageviews` and `users` using the following schemas:



1. Create a stream, named `pageviews_original`, from the `pageviews` Kafka topic, specifying the `value_format` of `DELIMITED`.

```
CREATE STREAM pageviews_original (viewtime bigint, userid varchar, pageid varchar) WITH (kafka_topic='pageviews', value_format='JSON');
```

Your output should resemble:

```
---------------------------------------
ksql> CREATE STREAM pageviews_original (viewtime bigint, userid varchar, pageid varchar) WITH
>(kafka_topic='pageviews', value_format='DELIMITED');
>

 Message
----------------
 Stream created
----------------
ksql>
```

Tip

You can run `DESCRIBE pageviews_original;` to see the schema for the stream. Notice that KSQL created two additional columns, named `ROWTIME`, which corresponds with the Kafka message timestamp, and `ROWKEY`, which corresponds with the Kafka message key.

```
ksql> DESCRIBE pageviews_original;

Name                 : PAGEVIEWS_ORIGINAL
 Field    | Type
-------------------------------------
 ROWTIME  | BIGINT           (system)
 ROWKEY   | VARCHAR(STRING)  (system)
 VIEWTIME | BIGINT
 USERID   | VARCHAR(STRING)
 PAGEID   | VARCHAR(STRING)
-------------------------------------
For runtime statistics and query details run: DESCRIBE EXTENDED <Stream,Table>;
ksql>
```

2. Create a table, named `users_original`, from the `users` Kafka topic, specifying the `value_format` of `JSON`.

```
CREATE TABLE users_original (registertime BIGINT, gender VARCHAR, regionid VARCHAR, userid VARCHAR PRIMARY KEY) WITH
(kafka_topic='users', value_format='JSON');
```

Your output should resemble:

```
 Message
---------------
 Table created
---------------
```

Tip

You can run `DESCRIBE users_original;` to see the schema for the Table.

3. Optional: Show all streams and tables.

```
ksql> SHOW STREAMS;
```

```
 Stream Name            | Kafka Topic            | Format
-----------------------------------------------------------------
 PAGEVIEWS_ORIGINAL     | pageviews              | DELIMITED

ksql> SHOW TABLES;

 Table Name       | Kafka Topic      | Format    | Windowed
-------------------------------------------------------------
 USERS_ORIGINAL   | users            | JSON      | false
```

Write Queries

```
SET 'auto.offset.reset'='earliest';
```

These examples write queries using KSQL.

Note: By default KSQL reads the topics for streams and tables from the latest offset.

1. Use `SELECT` to create a query that returns data from a STREAM. This query includes the `LIMIT` keyword to limit the number of rows returned in the query result. Note that exact data output may vary because of the randomness of the data generation.

```
SELECT pageid FROM pageviews_original EMIT changes LIMIT 3;
```

   Your output should resemble:

```
Page_24
Page_73
Page_78
LIMIT reached
Query terminated
```

2. Create a persistent query by using the `CREATE STREAM` keywords to precede the `SELECT` statement. The results from this query are written to the `PAGEVIEWS_ENRICHED` Kafka topic. The following query enriches the `pageviews_original` STREAM by doing a `LEFT JOIN` with the `users_original` TABLE on the user ID.

```
CREATE STREAM pageviews_enriched AS
SELECT users_original.userid AS userid, pageid, regionid, gender
FROM pageviews_original
```

```
JOIN users_original
  ON pageviews_original.userid = users_original.userid
Emit changes;
```

Your output should resemble:

```
 Message
----------------------------
 Stream created and running
----------------------------
```

Tip

You can run `DESCRIBE pageviews_enriched;` to describe the stream.

3. Use `SELECT` to view query results as they come in. To stop viewing the query results, press `<ctrl-c>`. This stops printing to the console but it does not terminate the actual query. The query continues to run in the underlying KSQL application.

```
SELECT * FROM pageviews_enriched Emit Changes;
```

Your output should resemble:

|User_9	|Page_92	|Region_2	|MALE
|User_2	|Page_66	|Region_6	|MALE
|User_3	|Page_10	|Region_7	|MALE
|User_5	|Page_30	|Region_3	|OTHER
|User_2	|Page_85	|Region_6	|MALE
|User_1	|Page_46	|Region_7	|OTHER
|User_6	|Page_56	|Region_3	|FEMALE
|User_8	|Page_13	|Region_2	|MALE
|User_4	|Page_19	|Region_4	|FEMALE
|User_3	|Page_44	|Region_7	|MALE
|User_8	|Page_57	|Region_2	|MALE
|User_8	|Page_39	|Region_2	|MALE
|User_9	|Page_15	|Region_2	|MALE
|User_9	|Page_71	|Region_2	|MALE
|User_7	|Page_69	|Region_8	|MALE

4. Create a new persistent query where a condition limits the streams content, using `WHERE`. Results from this query are written to a Kafka topic called `PAGEVIEWS_FEMALE`.

```
CREATE STREAM pageviews_female AS
SELECT * FROM pageviews_enriched
WHERE gender = 'FEMALE';
```

Your output should resemble:

```
 Message
----------------------------
 Stream created and running
----------------------------
```

Tip

You can run `DESCRIBE pageviews_female;` to describe the stream.

5. Create a new persistent query where another condition is met, using `LIKE`. Results from this query are written to the `pageviews_enriched_r8_r9` Kafka topic.

```
CREATE STREAM pageviews_female_like_89
  WITH (kafka_topic='pageviews_enriched_r8_r9') AS
SELECT * FROM pageviews_female
WHERE regionid LIKE '%_8' OR regionid LIKE '%_9';
```

Your output should resemble:

```
 Message
----------------------------
 Stream created and running
----------------------------
```

6. Verify the above 2 streams:

```
select * from PAGEVIEWS_FEMALE_LIKE_89 emit changes limit 6;
select * from PAGEVIEWS_FEMALE emit changes limit 3;
```

```
ksql> select * from PAGEVIEWS_FEMALE_LIKE_89 emit changes limit 6;
+----------------------+----------------------+----------------------+----------------------+
|USERID                |PAGEID                |REGIONID              |GENDER                |
+----------------------+----------------------+----------------------+----------------------+
|User_9                |Page_15               |Region_9              |FEMALE                |
|User_9                |Page_17               |Region_8              |FEMALE                |
|User_9                |Page_66               |Region_8              |FEMALE                |
|User_9                |Page_62               |Region_8              |FEMALE                |
|User_9                |Page_71               |Region_8              |FEMALE                |
|User_6                |Page_31               |Region_8              |FEMALE                |
Limit Reached
Query terminated
ksql> select * from PAGEVIEWS_FEMALE emit changes limit 3;
+----------------------+----------------------+----------------------+----------------------+
|USERID                |PAGEID                |REGIONID              |GENDER                |
+----------------------+----------------------+----------------------+----------------------+
|User_1                |Page_30               |Region_8              |FEMALE                |
|User_3                |Page_23               |Region_6              |FEMALE                |
|User_1                |Page_81               |Region_8              |FEMALE                |
Limit Reached
Query terminated
ksql>
```

7. Create a new persistent query that counts the pageviews for each region combination in a tumbling window of 30 seconds when the count is greater than one. Results from this query are written to the PAGEVIEWS_REGIONS Kafka topic in the Avro format. KSQL

will register the Avro schema with the configured Schema Registry when it writes the first message to the `PAGEVIEWS_REGIONS` topic.

```
CREATE TABLE pageviews_regions
  WITH (
KAFKA_TOPIC = 'pageviews_regions',VALUE_FORMAT='AVRO'
) AS
SELECT   regionid , COUNT(*) AS numusers
FROM pageviews_enriched
  WINDOW TUMBLING (size 30 second)
GROUP BY  regionid
HAVING COUNT(*) > 1 emit changes;
```

Your output should resemble:

```
 Message
----------------------------
 Table created and running
----------------------------
```

Tip

You can run `DESCRIBE pageviews_regions;` to describe the table.

8. Optional: View results from the above queries using `SELECT`.

```
SELECT regionid, numusers FROM pageviews_regions emit changes LIMIT 5;
```

Your output should resemble:

```
ksql> SELECT regionid, numusers FROM pageviews_regions emit changes LIMIT 5;
+------------------------------------------------+------------------------------------------------+
|REGIONID                                        |NUMUSERS                                        |
+------------------------------------------------+------------------------------------------------+
|Region_2                                        |221                                             |
|Region_3                                        |6169                                            |
|Region_5                                        |10659                                           |
|Region_2                                        |11476                                           |
|Region_9                                        |2259                                            |
Limit Reached
Query terminated
```

9. Optional: Show all persistent queries.

```
SHOW QUERIES;
```

Your output should resemble:

```
Query ID                | Kafka Topic          | Query String
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------------------
-----
```

```
CSAS_PAGEVIEWS_FEMALE_1       | PAGEVIEWS_FEMALE       | CREATE STREA
M pageviews_female AS      SELECT * FROM pageviews_enriched      WHERE gender =
'FEMALE';
CTAS_PAGEVIEWS_REGIONS_3      | PAGEVIEWS_REGIONS      | CREATE TABLE
pageviews_regions       WITH (VALUE_FORMAT='avro') AS      SELECT gender, region
id , COUNT(*) AS numusers      FROM pageviews_enriched       WINDOW TUMBLING
(size 30 second)      GROUP BY gender, regionid      HAVING COUNT(*) > 1;
CSAS_PAGEVIEWS_FEMALE_LIKE_89_2 | PAGEVIEWS_FEMALE_LIKE_89 | CRE
ATE STREAM pageviews_female_like_89       WITH (kafka_topic='pageviews_enriche
d_r8_r9') AS      SELECT * FROM pageviews_female      WHERE regionid LIKE '%_8' O
R regionid LIKE '%_9';
CSAS_PAGEVIEWS_ENRICHED_0      | PAGEVIEWS_ENRICHED      | CREATE STR
EAM pageviews_enriched AS      SELECT users_original.userid AS userid, pageid, regio
nid, gender      FROM pageviews_original      LEFT JOIN users_original       ON pagevie
ws_original.userid = users_original.userid;
-------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------
-----
For detailed information on a Query run: EXPLAIN <Query ID>;
```

10. Optional: Examine query run-time metrics and details. Observe that information including the target Kafka topic is available, as well as throughput figures for the messages being processed.

```
DESCRIBE PAGEVIEWS_REGIONS EXTENDED;
```

Your output should resemble:

```
Name                 : PAGEVIEWS_REGIONS
Type                 : TABLE
Key field            : KSQL_INTERNAL_COL_0|+|KSQL_INTERNAL_COL_1
Key format           : STRING
Timestamp field      : Not set - using <ROWTIME>
Value format         : AVRO
Kafka topic          : PAGEVIEWS_REGIONS (partitions: 4, replication: 1)

Field    | Type
-----------------------------------
ROWTIME  | BIGINT          (system)
ROWKEY   | VARCHAR(STRING)  (system)
GENDER   | VARCHAR(STRING)
REGIONID | VARCHAR(STRING)
NUMUSERS | BIGINT
-----------------------------------

Queries that write into this TABLE
-----------------------------------
CTAS_PAGEVIEWS_REGIONS_3 : CREATE TABLE pageviews_regions       WITH (val
ue_format='avro') AS      SELECT gender, regionid , COUNT(*) AS numusers      FROM
```

```
pageviews_enriched        WINDOW TUMBLING (size 30 second)      GROUP BY gender,
regionid      HAVING COUNT(*) > 1;

For query topology and execution plan please run: EXPLAIN <QueryId>

Local runtime statistics
------------------------
messages-per-sec:      3.06   total-messages:      1827     last-message: 7/19/18 4:17:55 PM
UTC
failed-messages:        0 failed-messages-per-sec:        0      last-failed:       n/a
(Statistics of the local KSQL server interaction with the Kafka topic PAGEVIEWS_REGI
ONS)
ksql>
```

---------- Lab Ends Here ----------

https://ksqldb.io/quickstart.html?_ga=2.53841192.1438767497.1642131382-2002989446.1641377120&_gac=1.255954681.1642171371.CjwKCAiA24SPBhB0EiwAjBgkhg1qFCOJ-Ohq2cWlGrT9c3232dWfPKKpOG6zXpZrNXjqUelgasqp5BoCTE0QAvD_BwE

Any issues related to minimum config clean the zookeeper/kafka-logs and restart the services.

5. Errors

I. LEADER_NOT_AVAILABLE

{test=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)

```
[2018-05-15 23:46:40,132] WARN [Producer clientId=console-producer] Error while
fetching metadata with correlation id 14 : {test=LEADER_NOT_AVAILABLE} (org.apac
he.kafka.clients.NetworkClient)
[2018-05-15 23:46:40,266] WARN [Producer clientId=console-producer] Error while
fetching metadata with correlation id 15 : {test=LEADER_NOT_AVAILABLE} (org.apac
he.kafka.clients.NetworkClient)
^C[2018-05-15 23:46:40,394] WARN [Producer clientId=console-producer] Error whil
e fetching metadata with correlation id 16 : {test=LEADER_NOT_AVAILABLE} (org.ap
ache.kafka.clients.NetworkClient)
[root@tos opt]#  {test=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkCl
ient)
bash: syntax error near unexpected token `org.apache.kafka.clients.NetworkClient
'
```

Solutions: /opt/kafka/config/server.properties

Update the following information.

```
# it uses the value for "listeners" if configured.  Otherwise, it will use the v
alue
# returned from java.net.InetAddress.getCanonicalHostName().
advertised.listeners=PLAINTEXT://localhost:9092

# Maps listener names to security protocols, the default is for them to be the s
```

java.util.concurrent.ExecutionException:

org.apache.kafka.common.errors.TimeoutException: Expiring 1 record(s) for my-kafka-topic-6: 30037 ms has passed since batch creation plus linger time

at org.apache.kafka.clients.producer.internals.FutureRecordMetadata.valueOrError(FutureRecordMetadata.java:94)

at org.apache.kafka.clients.producer.internals.FutureRecordMetadata.get(FutureRecordMetadata.java:64)

at org.apache.kafka.clients.producer.internals.FutureRecordMetadata.get(FutureRecordMetadata.java:29)

at com.tos.kafka.MyKafkaProducer.runProducer(MyKafkaProducer.java:97)

at com.tos.kafka.MyKafkaProducer.main(MyKafkaProducer.java:18)

Caused by: org.apache.kafka.common.errors.TimeoutException: Expiring 1 record(s) for my-kafka-topic-6: 30037 ms has passed since batch creation plus linger time.

Solution:

Update the following in all the server properties: /opt/kafka/config/server.properties

```
#     listeners = PLAINTEXT://your.host.name:9092
listeners=PLAINTEXT://tos.master.com:9093

# Hostname and port the broker will advertise to producers and consumers. If not
 set,
# it uses the value for "listeners" if configured.  Otherwise, it will use the v
alue
# returned from java.net.InetAddress.getCanonicalHostName().
advertised.listeners=PLAINTEXT://tos.master.com:9093

# Maps listener names to security protocols, the default is for them to be the s
ame. See the config documentation for more details
#listener.security.protocol.map=PLAINTEXT:PLAINTEXT,SSL:SSL,SASL_PLAINTEXT:SASL_
PLAINTEXT,SASL_SSL:SASL_SSL
```

Its should be updated with your hostname and restart the broker

Changes in the following file, if the hostname is to be changed.

//kafka/ Server.properties and control center

/apps/confluent/etc/confluent-control-center/control-center-dev.properties

/apps/confluent/etc/ksql/ksql-server.properties

/tmp/confluent.8A2Ii7O4/connect/connect.properties

Update localhost to resolve to the ip in /etc/hosts.

In case the hostname doesn’t started, updated with ip address and restart the broker.

6. Annexure Code:

II. DumplogSegment

```
/opt/kafka/bin/kafka-run-class.sh kafka.tools.DumpLogSegments --deep-iteration --print-data-log --files \

/tmp/kafka-logs/my-kafka-connect-0/00000000000000000000.log | head -n 4
```

```
[root@tos test-topic-0]# more 00000000000000000000.log
[root@tos test-topic-0]# cd ../
[root@tos kafka-logs]# cd my-kafka-connect-0/
[root@tos my-kafka-connect-0]# ls
00000000000000000000.index      00000000000000000011.snapshot
00000000000000000000.log        leader-epoch-checkpoint
00000000000000000000.timeindex
[root@tos my-kafka-connect-0]# more *log
\▒▒▒▒▒▒▒▒afka Connector.--More--(53%)

[root@tos my-kafka-connect-0]# pwd
/tmp/kafka-logs/my-kafka-connect-0
[root@tos my-kafka-connect-0]# /opt/kafka/bin/kafka-run-class.sh kafka.tools.Dum
pLogSegments --deep-iteration --print-data-log --files \
> /tmp/kafka-logs/my-kafka-connect-0/00000000000000000000.log | head -n 4
Dumping /tmp/kafka-logs/my-kafka-connect-0/00000000000000000000.log
Starting offset: 0
offset: 0 position: 0 CreateTime: 1530552634675 isvalid: true keysize: -1 values
ize: 31 magic: 2 compresscodec: NONE producerId: -1 producerEpoch: -1 sequence:
-1 isTransactional: false headerKeys: [] payload: This Message is from Test File
.
offset: 1 position: 0 CreateTime: 1530552634677 isvalid: true keysize: -1 values
ize: 43 magic: 2 compresscodec: NONE producerId: -1 producerEpoch: -1 sequence:
-1 isTransactional: false headerKeys: [] payload: It will be consumed by the Kaf
ka Connector.
[root@tos my-kafka-connect-0]#
```

III. Data Generator – JSON

Streaming Json Data Generator

Downloading the generator

You can always find the most recent release over on github where you can download the bundle file that contains the runnable application and example configurations. Head there now and download a release to get started!

Configuration

The generator runs a Simulation which you get to define. The Simulation can specify one or many Workflows that will be run as part of your Simulation. The Workflows then generates Events and these Events are then sent somewhere. You will also need to define Producers that are used to send the Events generated by your Workflows to some destination. These destinations could be a log file, or something more complicated like a Kafka Queue.

You define the configuration for the json-data-generator using two configuration files. The first is a Simulation Config. The Simulation Config defines the Workflows that should be run and different Producers that events should be sent to. The second is a Workflow configuration (of which you can have multiple). The Workflow defines the frequency of Events and Steps that the Workflow uses to generate the Events. It is the Workflow that defines the format and content of your Events as well.

For our example, we are going to pretend that we have a programmable Jackie Chan robot. We can command Jackie Chan though a programmable interface that happens to take json as an input via a Kafka queue and you can command him to perform different fighting moves in different martial arts styles. A Jackie Chan command might look like this:

```
{
 "timestamp":"2015-05-20T22:05:44.789Z",
 "style":"DRUNKEN_BOXING",
 "action":"PUNCH",
 "weapon":"CHAIR",
 "target":"ARMS",
 "strength":8.3433
}
```

view rawexampleJackieChanCommand.json hosted with by **GitHub**

Now, we want to have some fun with our awesome Jackie Chan robot, so we are going to make him do random moves using our json-data-generator! First we need to define a Simulation Config and then a Workflow that Jackie will use.

SIMULATION CONFIG

Let's take a look at our example Simulation Config:

```
{
  "workflows": [{
      "workflowName": "jackieChan",
      "workflowFilename": "jackieChanWorkflow.json"
    }],
  "producers": [{
    "type": "kafka",
    "broker.server": "192.168.59.103",
    "broker.port": 9092,
    "topic": "jackieChanCommand",
    "flatten": false,
    "sync": false

  }]
```

```
}
```

view rawjackieChanSimConfig.json hosted with by GitHub

As you can see, there are two main parts to the Simulation Config. The Workflows name and list the workflow configurations you want to use. The Producers are where the Generator will send the events to. At the time of writing this, we have three supported Producers:

- A Logger that sends events to log files
- A Kafka Producer that will send events to your specified Kafka Broker
- A Tranquility Producer that will send events to a Druid cluster.

You can find the full configuration options for each on the github page. We used a Kafka producer because that is how you command our Jackie Chan robot.

WORKFLOW CONFIG

The Simulation Config above specifies that it will use a Workflow called jackieChanWorkflow.json. This is where the meat of your configuration would live. Let's take a look at the example Workflow config and see how we are going to control Jackie Chan:

```
{
  "eventFrequency": 400,
```

```
"varyEventFrequency": true,
"repeatWorkflow": true,
"timeBetweenRepeat": 1500,
"varyRepeatFrequency": true,
"steps": [{
    "config": [{
        "timestamp": "now()",
        "style": "random('KUNG_FU','WUSHU','DRUNKEN_BOXING')",
        "action": "random('KICK','PUNCH','BLOCK','JUMP')",
        "weapon": "random('BROAD_SWORD','STAFF','CHAIR','ROPE')",
        "target": "random('HEAD','BODY','LEGS','ARMS')",
        "strength": "double(1.0,10.0)"
      }
    ],
    "duration": 0
  }]
```

```
}
```

view rawjackieChanWorkflow.json hosted with by GitHub

The Workflow defines many things that are all defined on the github page, but here is a summary:

- At the top are the properties that define how often events should be generated and if / when this workflow should be repeated. So this is like saying we want Jackie Chan to do a martial arts move every 400 milliseconds (he's FAST!), then take a break for 1.5 seconds, and do another one.
- Next, are the Steps that this Workflow defines. Each Step has a config and a duration. The duration specifies how long to run this step. The config is where it gets interesting!

WORKFLOW STEP CONFIG

The Step Config is your specific definition of a json event. This can be any kind of json object you want. In our example, we want to generate a Jackie Chan command message that will be sent to his control unit via Kafka. So we define the command message in our config, and since we want this to be fun, we are going to randomly generate what kind of style, move, weapon, and target he will use.

You'll notice that the values for each of the object properties look a bit funny. These are special Functions that we have created that allow us to generate values for each of the properties. For instance, the "random('KICK','PUNCH','BLOCK','JUMP')" function will randomly choose one of the values and output it as the value of the "action" property in the

command message. The "now()" function will output the current date in an ISO8601 date formatted string. The "double(1.0,10.0)" will generate a random double between 1 and 10 to determine the strength of the action that Jackie Chan will perform. If we wanted to, we could make Jackie Chan perform combo moves by defining a number of Steps that will be executed in order.

There are many more Functions available in the generator with everything from random string generation, counters, random number generation, dates, and even support for randomly generating arrays of data. We also support the ability to reference other randomly generated values. For more info, please check out the full documentation on the github page.

Once we have defined the Workflow, we can run it using the json-data-generator. To do this, do the following:

1. If you have not already, go ahead and download the most recent release of the json-data-generator.
2. Unpack the file you downloaded to a directory.

   (tar -xvf json-data-generator-1.4.0-bin.tar -C /apps)

3. Copy your custom configs into the conf directory
4. Then run the generator like so:
    1. java -jar json-data-generator-1.4.0.jar jackieChanSimConfig.json

You will see logging in your console showing the events as they are being generated. The jackieChanSimConfig.json generates events like these:

{"timestamp":"2015-05-20T22:21:18.036Z","style":"WUSHU","action":"BLOCK","weapon":"CHAIR","target":"BODY","strength":4.7912}

{"timestamp":"2015-05-20T22:21:19.247Z","style":"DRUNKEN_BOXING","action":"PUNCH","weapon":"BROAD_SWORD","target":"ARMS","strength":3.0248}

{"timestamp":"2015-05-20T22:21:20.947Z","style":"DRUNKEN_BOXING","action":"BLOCK","weapon":"ROPE","target":"HEAD","strength":6.7571}

{"timestamp":"2015-05-20T22:21:22.715Z","style":"WUSHU","action":"KICK","weapon":"BROAD_SWORD","target":"ARMS","strength":9.2062}

{"timestamp":"2015-05-20T22:21:23.852Z","style":"KUNG_FU","action":"PUNCH","weapon":"BROAD_SWORD","target":"HEAD","strength":4.6202}

{"timestamp":"2015-05-20T22:21:25.195Z","style":"KUNG_FU","action":"JUMP","weapon":"ROPE","target":"ARMS","strength":7.5303}

{"timestamp":"2015-05-

20T22:21:26.492Z","style":"DRUNKEN_BOXING","action":"PUNCH","weapon":"STAFF","target":"HEAD","strength":1.1247}

{"timestamp":"2015-05-20T22:21:28.042Z","style":"WUSHU","action":"BLOCK","weapon":"STAFF","target":"ARMS","strength":5.5976}

{"timestamp":"2015-05-20T22:21:29.422Z","style":"KUNG_FU","action":"BLOCK","weapon":"ROPE","target":"ARMS","strength":2.152}

{"timestamp":"2015-05-20T22:21:30.782Z","style":"DRUNKEN_BOXING","action":"BLOCK","weapon":"STAFF","target":"ARMS","strength":6.2686}

{"timestamp":"2015-05-20T22:21:32.128Z","style":"KUNG_FU","action":"KICK","weapon":"BROAD_SWORD","target":"BODY","strength":2.3534}

If you specified to repeat your Workflow, then the generator will continue to output events and send them to your Producer simulating a real world client, or in our case, continue to make Jackie Chan show off his awesome skills. If you also had a Chuck Norris robot, you could add another Workflow config to your Simulation and have the two robots fight it out! Just another example of how you can use the generator to simulate real world situations.

IV. Resources

https://developer.ibm.com/hadoop/2017/04/10/kafka-security-mechanism-saslplain/

https://sharebigdata.wordpress.com/2018/01/21/implementing-sasl-plain/

https://developer.ibm.com/code/howtos/kafka-authn-authz

https://github.com/confluentinc/kafka-streams-examples/tree/4.1.x/

https://github.com/spring-cloud/spring-cloud-stream-samples/blob/master/kafka-streams-samples/kafka-streams-table-join/src/main/java/kafka/streams/table/join/KafkaStreamsTableJoin.java