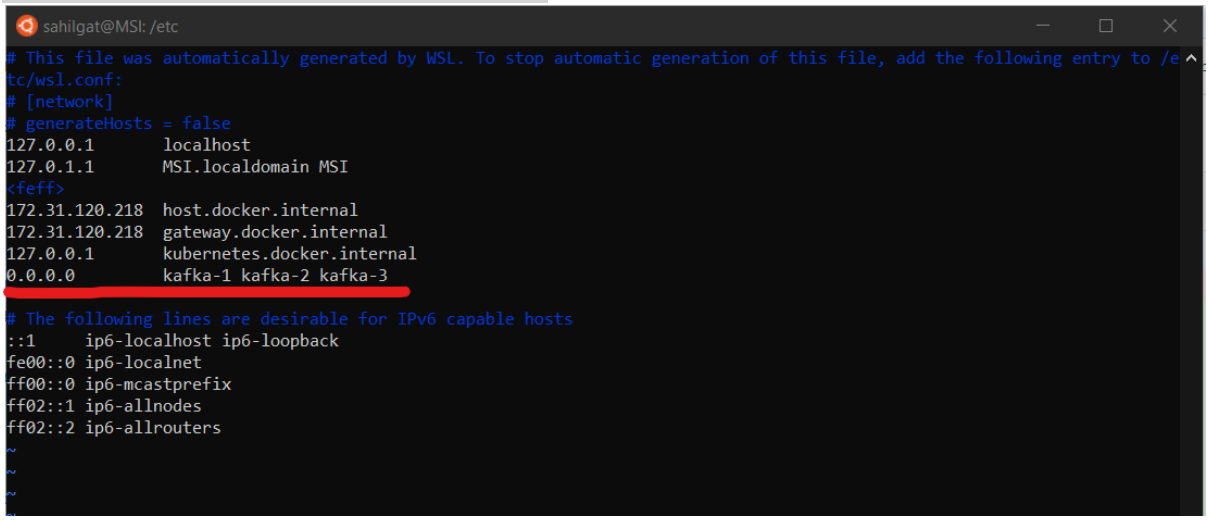
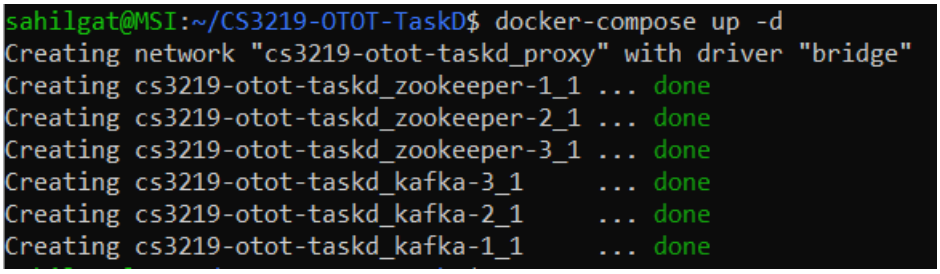
Set-up instructions:

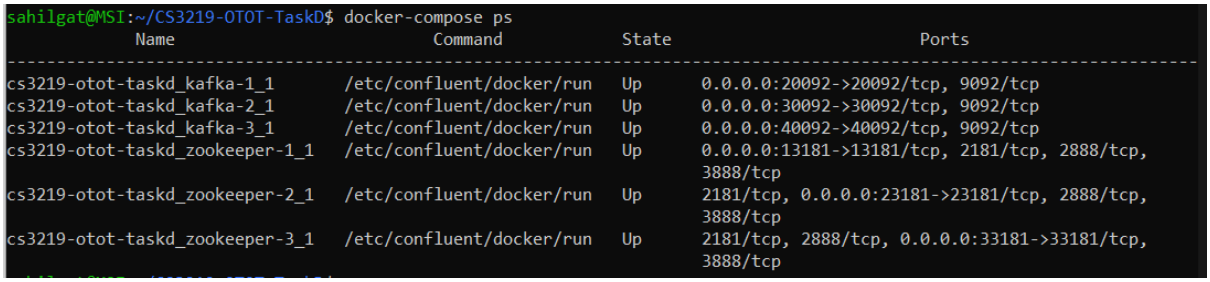
1) Ensure you have docker and docker-compose installed
2) Ensure you have kafkacat installed. You can use the command below for installation:
   `sudo apt-get install kafkacat`
3) Edit the /etc/hosts file and add the following line:
   `0.0.0.0 kafka-1 kafka-2 kafka-3`



4) Navigate to the root folder after cloning and run:
   `sudo docker-compose up -d`



5) Use the following command to ensure all services are running:
   `docker-compose ps`



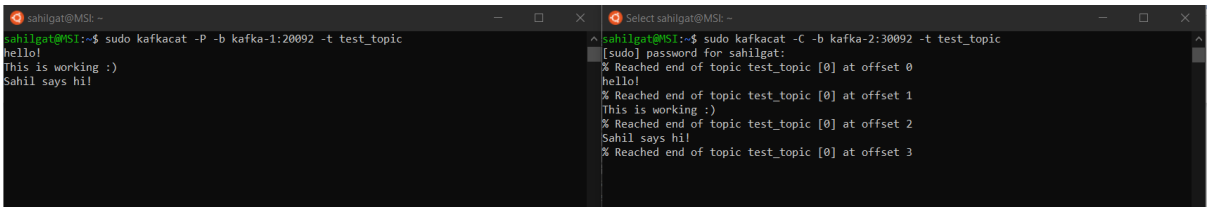
6) Identify a controller using any of the following commands:
   `sudo kafkacat -L -b kafka-1:20092`
   `sudo kafkacat -L -b kafka-2:30092`
   `sudo kafkacat -L -b kafka-3:40092`

```
sahilgat@MSI:~/CS3219-OTOT-TaskD$ sudo kafkacat -L -b kafka-1:20092
Metadata for all topics (from broker 1: kafka-1:20092/1):
 3 brokers:
  broker 2 at kafka-2:30092
  broker 3 at kafka-3:40092
  broker 1 at kafka-1:20092
 0 topics:
```

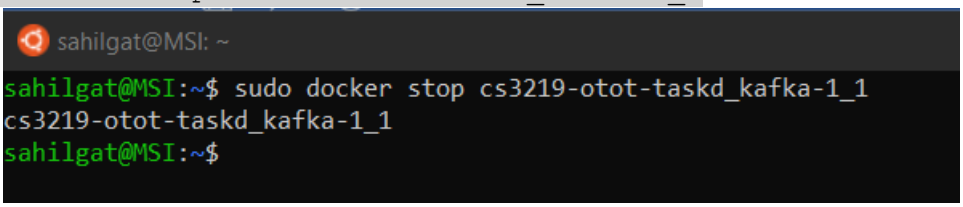
7) Opening another terminal, set the controller you selected as a producer using the following command (change respectively):
`sudo kafkacat -P -b kafka-1:20092 -t test_topic`

8) Opening another terminal, set any other cluster as a consumer. For example:
`sudo kafkacat -C -b kafka-2:30092 -t test_topic`

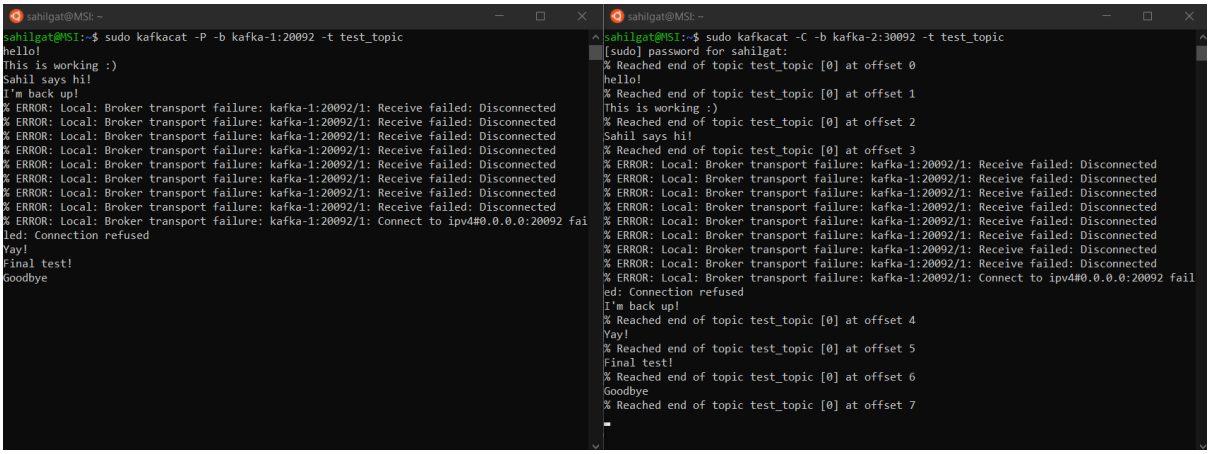
9) Test the Pub-Sub messaging feature through the two terminals.



10) In the control terminal, stop the controller terminal using the following command (change respectively):
`sudo docker stop cs3219-otot-taskd_kafka-1_1`



11) Test the Pub-Sub feature through the two terminals again to ensure it is still working. Note that you may have to press return in the consumer terminal to refresh it.



12) This can be verified by running any of the following commands and observing the new appointed controller cluster:
`sudo kafkacat -L -b kafka-1:20092`
`sudo kafkacat -L -b kafka-2:30092`
`sudo kafkacat -L -b kafka-3:40092`

```
sahilgat@MSI: ~
sahilgat@MSI:~$ sudo kafkacat -L -b kafka-1:20092
% ERROR: Failed to acquire metadata: Local: Broker transport failure
sahilgat@MSI:~$
```

Note the failure above since the original controller was shut down.

```
sahilgat@MSI:~$ sudo kafkacat -L -b kafka-2:30092
Metadata for all topics (from broker 2: kafka-2:30092/2):
 2 brokers:
  broker 2 at kafka-2:30092
  broker 3 at kafka-3:40092
 1 topics:
  topic "test_topic" with 1 partitions:
    partition 0, leader 3, replicas: 3, isrs: 3
sahilgat@MSI:~$
```

13) Clean up everything with the following command:
`docker-compose down`

```
sahilgat@MSI:~/CS3219-OTOT-TaskD$ docker-compose down
Stopping cs3219-otot-taskd_kafka-3_1     ... done
Stopping cs3219-otot-taskd_kafka-2_1     ... done
Stopping cs3219-otot-taskd_zookeeper-3_1 ... done
Stopping cs3219-otot-taskd_zookeeper-2_1 ... done
Stopping cs3219-otot-taskd_zookeeper-1_1 ... done
Removing cs3219-otot-taskd_kafka-1_1     ... done
Removing cs3219-otot-taskd_kafka-3_1     ... done
Removing cs3219-otot-taskd_kafka-2_1     ... done
Removing cs3219-otot-taskd_zookeeper-3_1 ... done
Removing cs3219-otot-taskd_zookeeper-2_1 ... done
Removing cs3219-otot-taskd_zookeeper-1_1 ... done
Removing network cs3219-otot-taskd_proxy
```