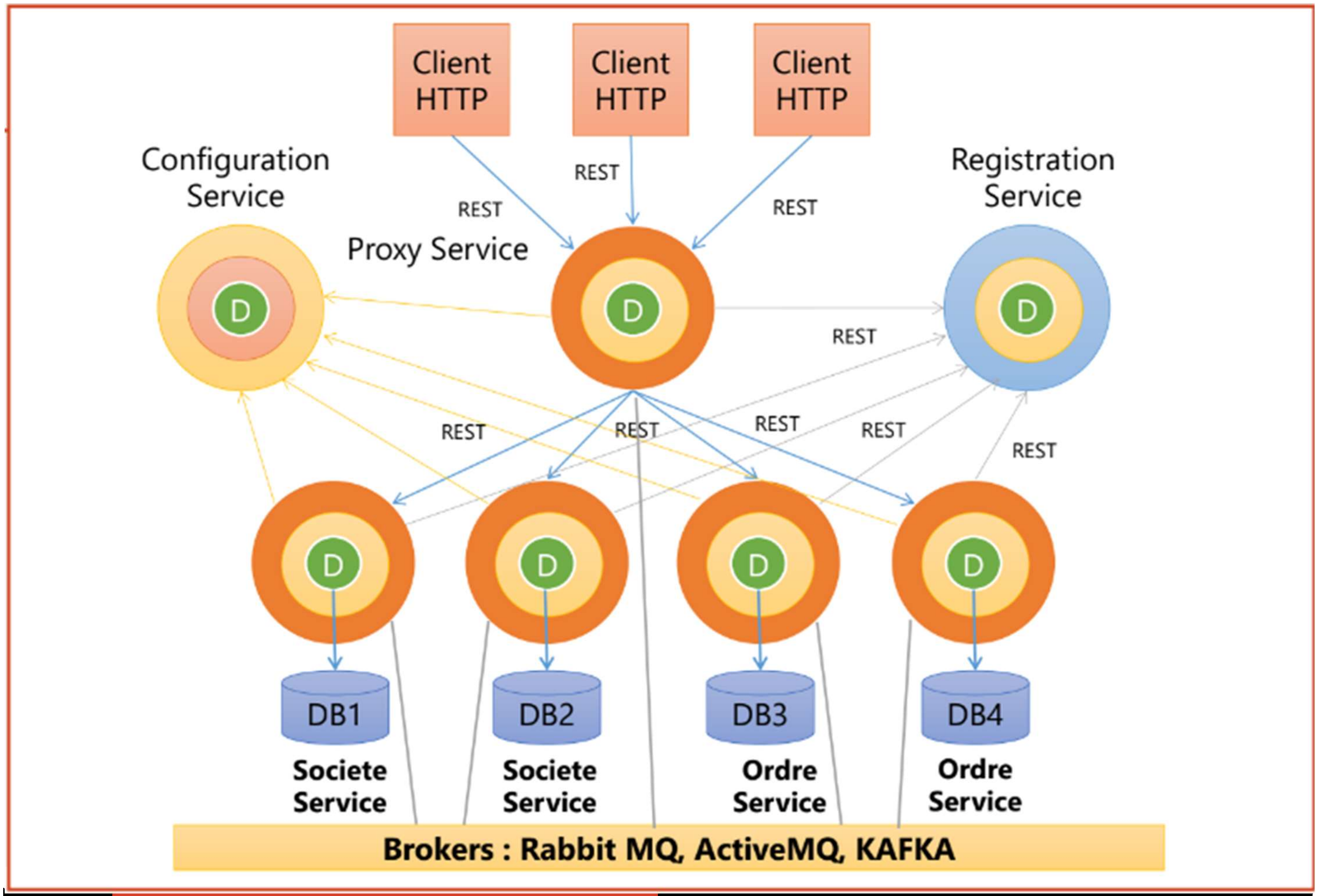
kafka

ENSET
ECOLE NORMALE SUPÉRIEURE DE L'ENSEIGNEMENT
TECHNIQUE DE MOHAMMEDIA
UNIVERSITÉ HASSAN II DE CASABLANCA



ACTIVITE PRATIQUE N° 1

EVENT DRIVEN ARCHITECTURE

ABDERRAHMANE ETTOUNANI → IIBDCC-3 2023/2024

ENONCE

1.

- Télécharger Kafka
- Démarrer Zookeeper
- Démarrer Kafka-server
- Tester avec Kafka-console-producer et kafka-console-consumer

2.

Avec Docker (voir https://developer.confluent.io/quickstart/kafka-docker/)
https://www.youtube.com/watch?v=9O1Kuk2xXO8

- Créer le fichier docker-compose.yml
- Démarrer les conteneurs docker : zookeeper et kafka-broker
- Tester avec Kafka-console-producer et kafka-console-consumer

3.

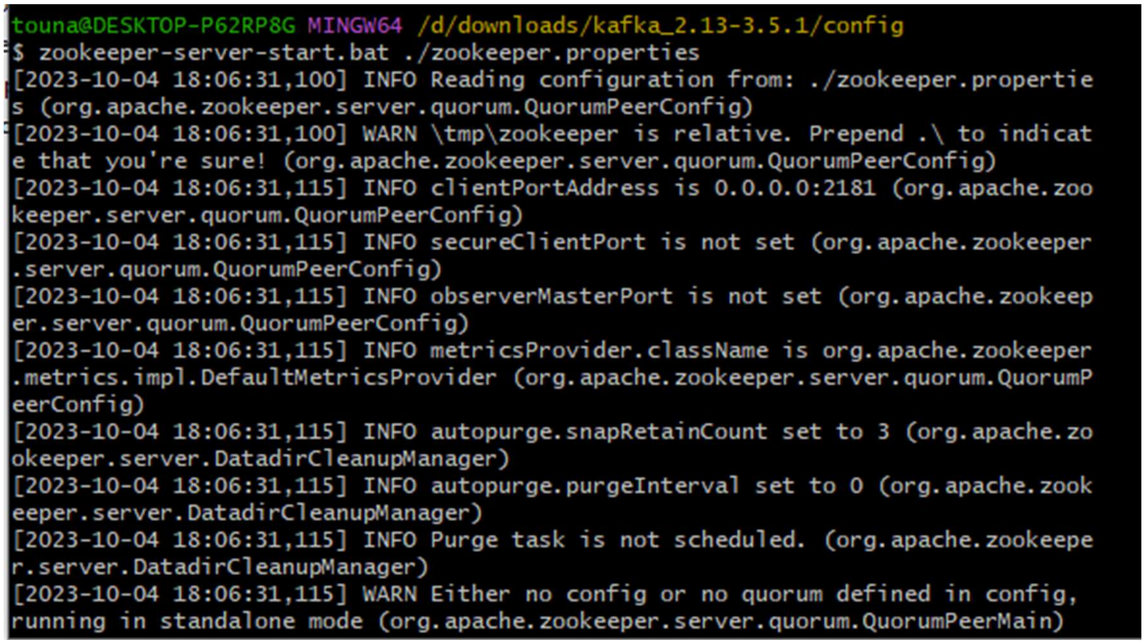
En Utilisant KAFKA et Stpring Cloud Streams, Créer :

- Un Service Producer KAFKA via un Rest Controler
- Un Service Consumer KAFKA
- Un Service Supplier KAFKA
- Un Service de Data Analytics Real Time Stream Processing avec Kaflka Streams
- Une application Web qui permet d'afficher les résultats du Stream Data Analytics en temps réel

1

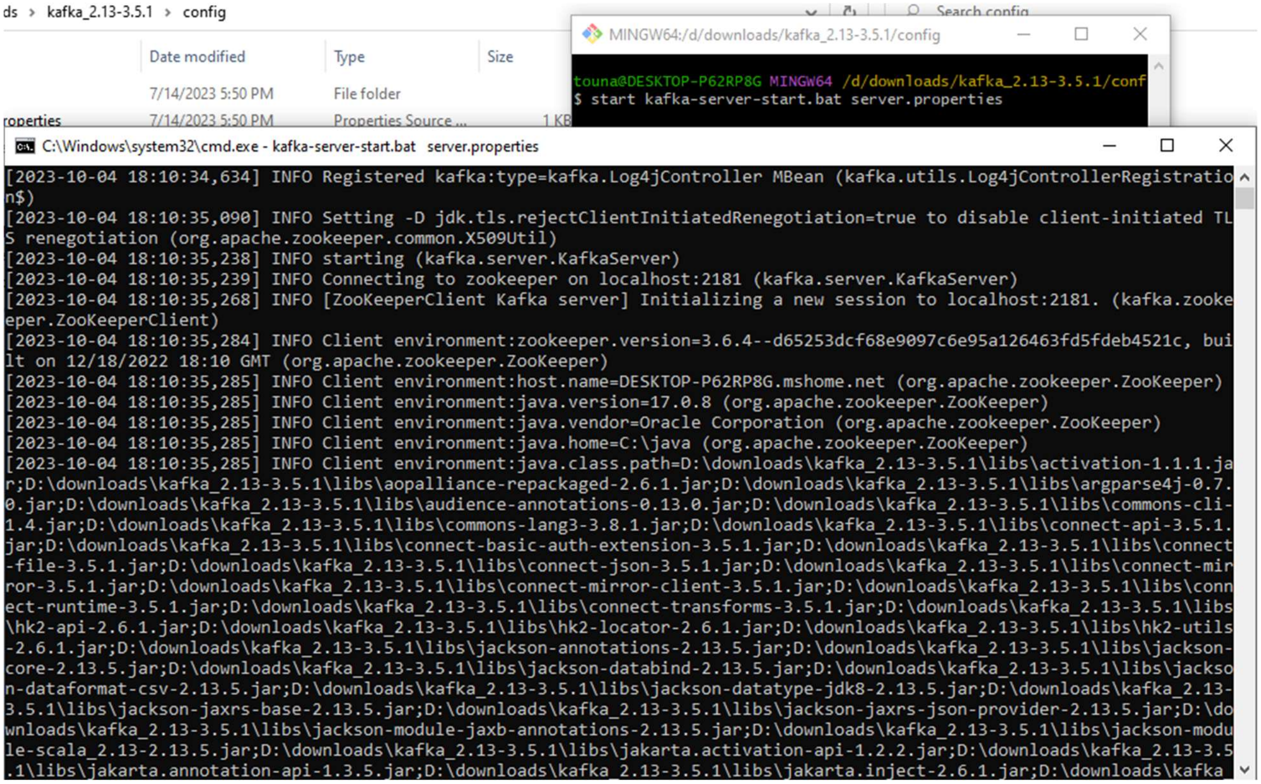
Téléchargement de Kafka : https://kafka.apache.org/downloads

Démarrage de Zookeeper



```
touna@DESKTOP-P62RP8G MINGW64 /d/downloads/kafka_2.13-3.5.1/config
$ zookeeper-server-start.bat ./zookeeper.properties
[2023-10-04 18:06:31,100] INFO Reading configuration from: ./zookeeper.propertie
s (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2023-10-04 18:06:31,100] WARN \tmp\zookeeper is relative. Prepend .\ to indicat
e that you're sure! (org.apache.zookeeper.server.quorum.QuorumPeerConfig)
[2023-10-04 18:06:31,115] INFO clientPortAddress is 0.0.0.0:2181 (org.apache.zoo
keeper.server.quorum.QuorumPeerConfig)
[2023-10-04 18:06:31,115] INFO secureClientPort is not set (org.apache.zookeeper
.server.quorum.QuorumPeerConfig)
[2023-10-04 18:06:31,115] INFO observerMasterPort is not set (org.apache.zookeep
er.server.quorum.QuorumPeerConfig)
[2023-10-04 18:06:31,115] INFO metricsProvider.className is org.apache.zookeeper
.metrics.impl.DefaultMetricsProvider (org.apache.zookeeper.server.quorum.QuorumP
eerConfig)
[2023-10-04 18:06:31,115] INFO autopurge.snapRetainCount set to 3 (org.apache.zo
okeeper.server.DatadirCleanupManager)
[2023-10-04 18:06:31,115] INFO autopurge.purgeInterval set to 0 (org.apache.zook
eeper.server.DatadirCleanupManager)
[2023-10-04 18:06:31,115] INFO Purge task is not scheduled. (org.apache.zookeepe
r.server.DatadirCleanupManager)
[2023-10-04 18:06:31,115] WARN Either no config or no quorum defined in config,
running in standalone mode (org.apache.zookeeper.server.quorum.QuorumPeerMain)
```

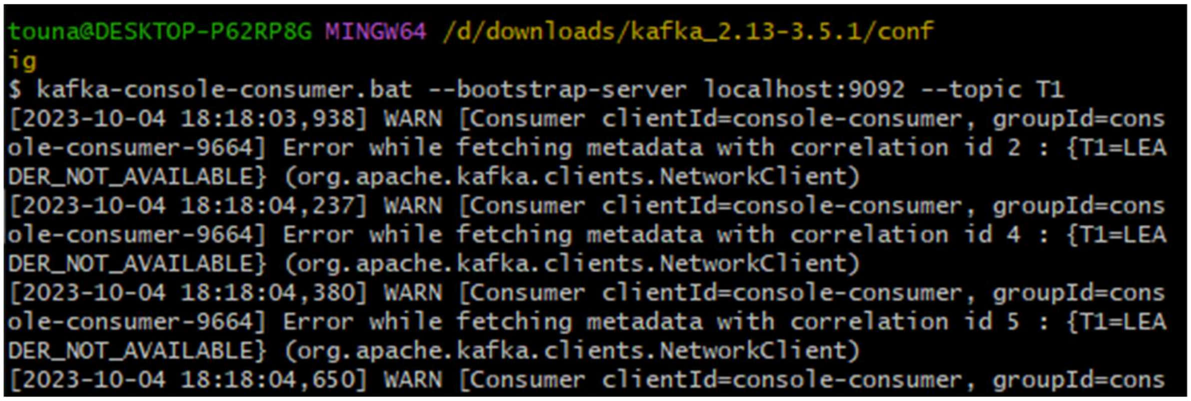
Démarrage de Kafka



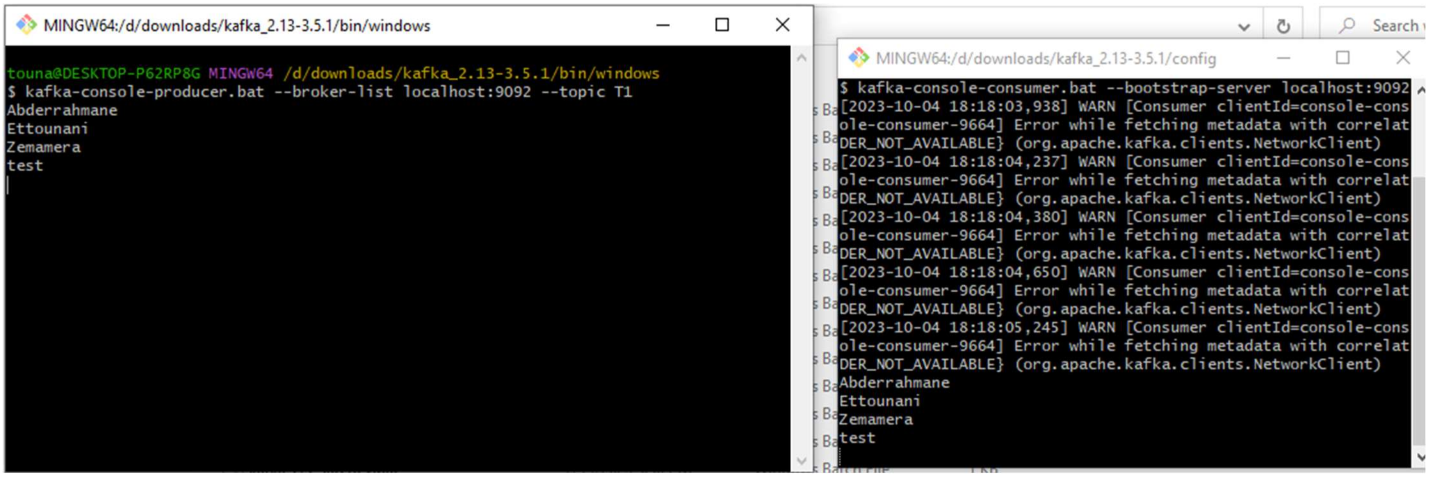
ds › kafka_2.13-3.5.1 › config
Search config
Date modified
Type
Size
7/14/2023 5:50 PM
File folder
roperties
7/14/2023 5:50 PM
Properties Source ...
1 KB
MINGW64:/d/downloads/kafka_2.13-3.5.1/config
C:\Windows\system32\cmd.exe - kafka-server-start.bat server.properties

```
touna@DESKTOP-P62RP8G MINGW64 /d/downloads/kafka_2.13-3.5.1/conf
$ start kafka-server-start.bat server.properties
```

```
[2023-10-04 18:10:34,634] INFO Registered kafka:type=kafka.Log4jController MBean (kafka.utils.Log4jControllerRegistratio
n$)
[2023-10-04 18:10:35,090] INFO Setting -D jdk.tls.rejectClientInitiatedRenegotiation=true to disable client-initiated TL
S renegotiation (org.apache.zookeeper.common.X509Util)
[2023-10-04 18:10:35,238] INFO starting (kafka.server.KafkaServer)
[2023-10-04 18:10:35,239] INFO Connecting to zookeeper on localhost:2181 (kafka.server.KafkaServer)
[2023-10-04 18:10:35,268] INFO [ZooKeeperClient Kafka server] Initializing a new session to localhost:2181. (kafka.zooke
eper.ZooKeeperClient)
[2023-10-04 18:10:35,284] INFO Client environment:zookeeper.version=3.6.4--d65253dcf68e9097c6e95a126463fd5fdeb4521c, bui
lt on 12/18/2022 18:10 GMT (org.apache.zookeeper.ZooKeeper)
[2023-10-04 18:10:35,285] INFO Client environment:host.name=DESKTOP-P62RP8G.mshome.net (org.apache.zookeeper.ZooKeeper)
[2023-10-04 18:10:35,285] INFO Client environment:java.version=17.0.8 (org.apache.zookeeper.ZooKeeper)
[2023-10-04 18:10:35,285] INFO Client environment:java.vendor=Oracle Corporation (org.apache.zookeeper.ZooKeeper)
[2023-10-04 18:10:35,285] INFO Client environment:java.home=C:\java (org.apache.zookeeper.ZooKeeper)
[2023-10-04 18:10:35,285] INFO Client environment:java.class.path=D:\downloads\kafka_2.13-3.5.1\libs\activation-1.1.1.ja
r;D:\downloads\kafka_2.13-3.5.1\libs\aopalliance-repackaged-2.6.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\argparse4j-0.7.
0.jar;D:\downloads\kafka_2.13-3.5.1\libs\audience-annotations-0.13.0.jar;D:\downloads\kafka_2.13-3.5.1\libs\commons-cli-
1.4.jar;D:\downloads\kafka_2.13-3.5.1\libs\commons-lang3-3.8.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\connect-api-3.5.1.
jar;D:\downloads\kafka_2.13-3.5.1\libs\connect-basic-auth-extension-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\connect
-file-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\connect-json-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\connect-mir
ror-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\connect-mirror-client-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\conn
ect-runtime-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\connect-transforms-3.5.1.jar;D:\downloads\kafka_2.13-3.5.1\libs
\hk2-api-2.6.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\hk2-locator-2.6.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\hk2-utils
-2.6.1.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackson-annotations-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackson-
core-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackson-databind-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackso
n-dataformat-csv-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackson-datatype-jdk8-2.13.5.jar;D:\downloads\kafka_2.13-
3.5.1\libs\jackson-jaxrs-base-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackson-jaxrs-json-provider-2.13.5.jar;D:\do
wnloads\kafka_2.13-3.5.1\libs\jackson-module-jaxb-annotations-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jackson-modu
le-scala_2.13-2.13.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jakarta.activation-api-1.2.2.jar;D:\downloads\kafka_2.13-3.5
.1\libs\jakarta.annotation-api-1.3.5.jar;D:\downloads\kafka_2.13-3.5.1\libs\jakarta.inject-2.6.1.jar;D:\downloads\kafka
```



```
touna@DESKTOP-P62RP8G MINGW64 /d/downloads/kafka_2.13-3.5.1/conf
ig
$ kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic T1
[2023-10-04 18:18:03,938] WARN [Consumer clientId=console-consumer, groupId=cons
ole-consumer-9664] Error while fetching metadata with correlation id 2 : {T1=LEA
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:04,237] WARN [Consumer clientId=console-consumer, groupId=cons
ole-consumer-9664] Error while fetching metadata with correlation id 4 : {T1=LEA
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:04,380] WARN [Consumer clientId=console-consumer, groupId=cons
ole-consumer-9664] Error while fetching metadata with correlation id 5 : {T1=LEA
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:04,650] WARN [Consumer clientId=console-consumer, groupId=cons
```



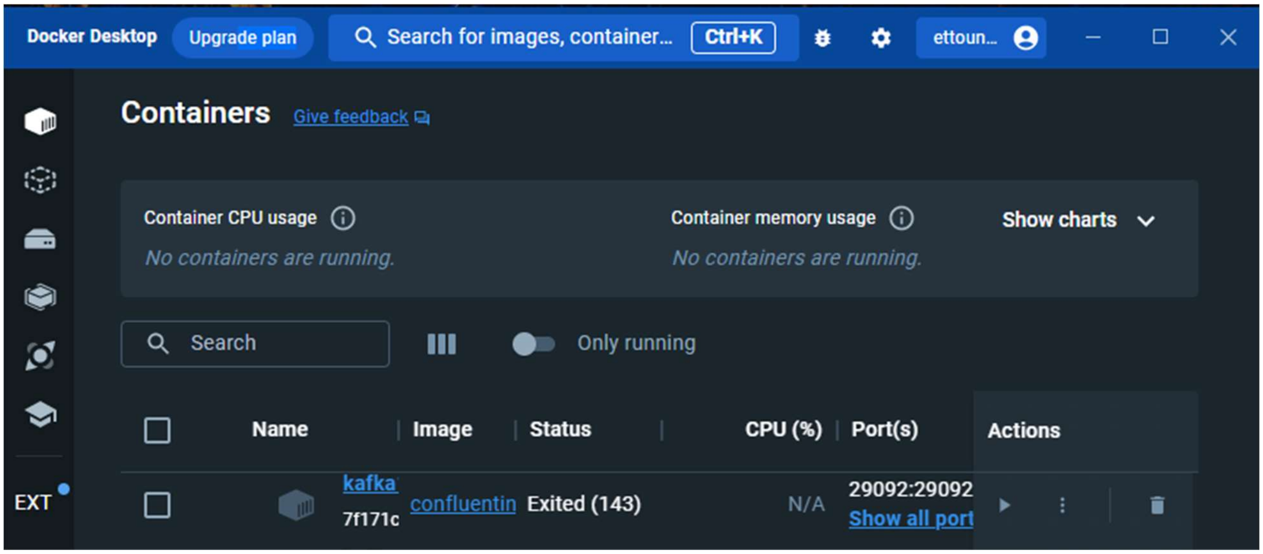
MINGW64:/d/downloads/kafka_2.13-3.5.1/bin/windows
MINGW64:/d/downloads/kafka_2.13-3.5.1/config
Search

```
touna@DESKTOP-P62RP8G MINGW64 /d/downloads/kafka_2.13-3.5.1/bin/windows
$ kafka-console-producer.bat --broker-list localhost:9092 --topic T1
Abderrahmane
Ettounani
Zemamera
test
```

```
$ kafka-console-consumer.bat --bootstrap-server localhost:9092
[2023-10-04 18:18:03,938] WARN [Consumer clientId=console-cons
ole-consumer-9664] Error while fetching metadata with correlat
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:04,237] WARN [Consumer clientId=console-cons
ole-consumer-9664] Error while fetching metadata with correlat
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:04,380] WARN [Consumer clientId=console-cons
ole-consumer-9664] Error while fetching metadata with correlat
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:04,650] WARN [Consumer clientId=console-cons
ole-consumer-9664] Error while fetching metadata with correlat
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-04 18:18:05,245] WARN [Consumer clientId=console-cons
ole-consumer-9664] Error while fetching metadata with correlat
DER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
Abderrahmane
Ettounani
Zemamera
test
```

2

Téléchargement du Docker : https://docs.docker.com/desktop/install/windows-install/

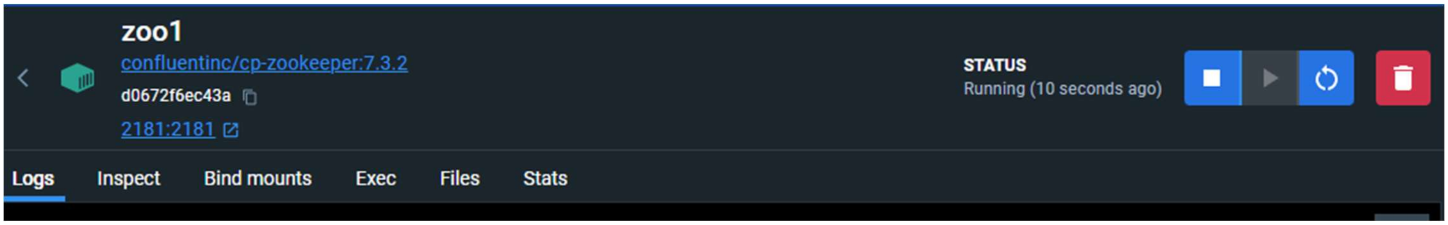


Container CPU usage ⓘ
No containers are running.

Container memory usage ⓘ
No containers are running.

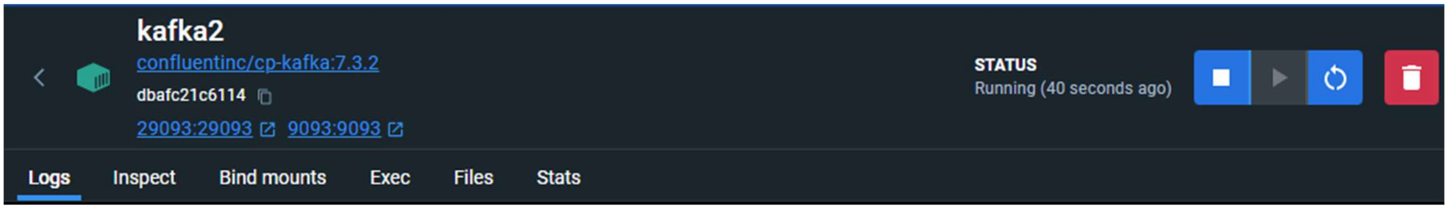
□	Name	Image	Status	CPU (%)	Port(s)	Actions
□	kafka 7f171c	confluentin	Exited (143)	N/A	29092:29092 Show all port	

Démarrage de zookeeper et kafka-broker



zoo1
confluentinc/cp-zookeeper:7.3.2
d0672f6ec43a
2181:2181

STATUS
Running (10 seconds ago)

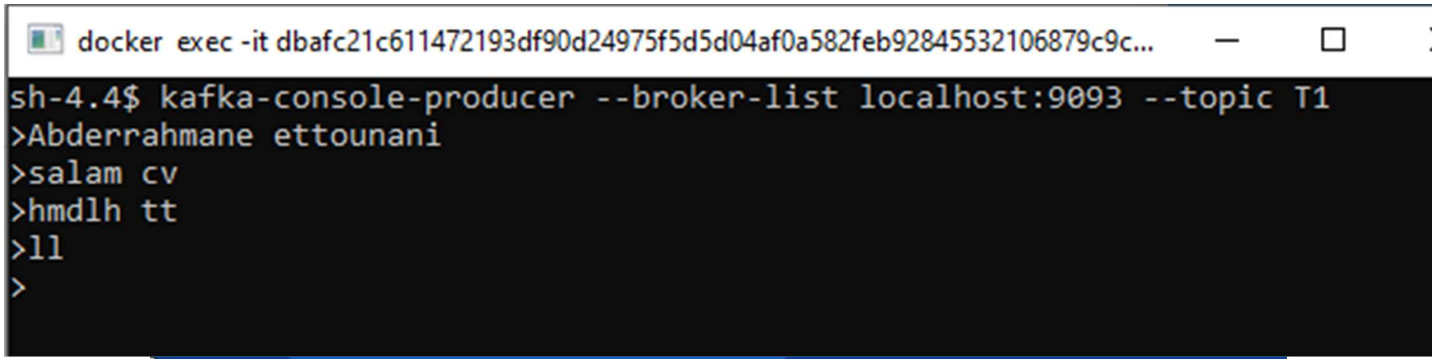


kafka2
confluentinc/cp-kafka:7.3.2
dbafc21c6114
29093:29093 9093:9093

STATUS
Running (40 seconds ago)

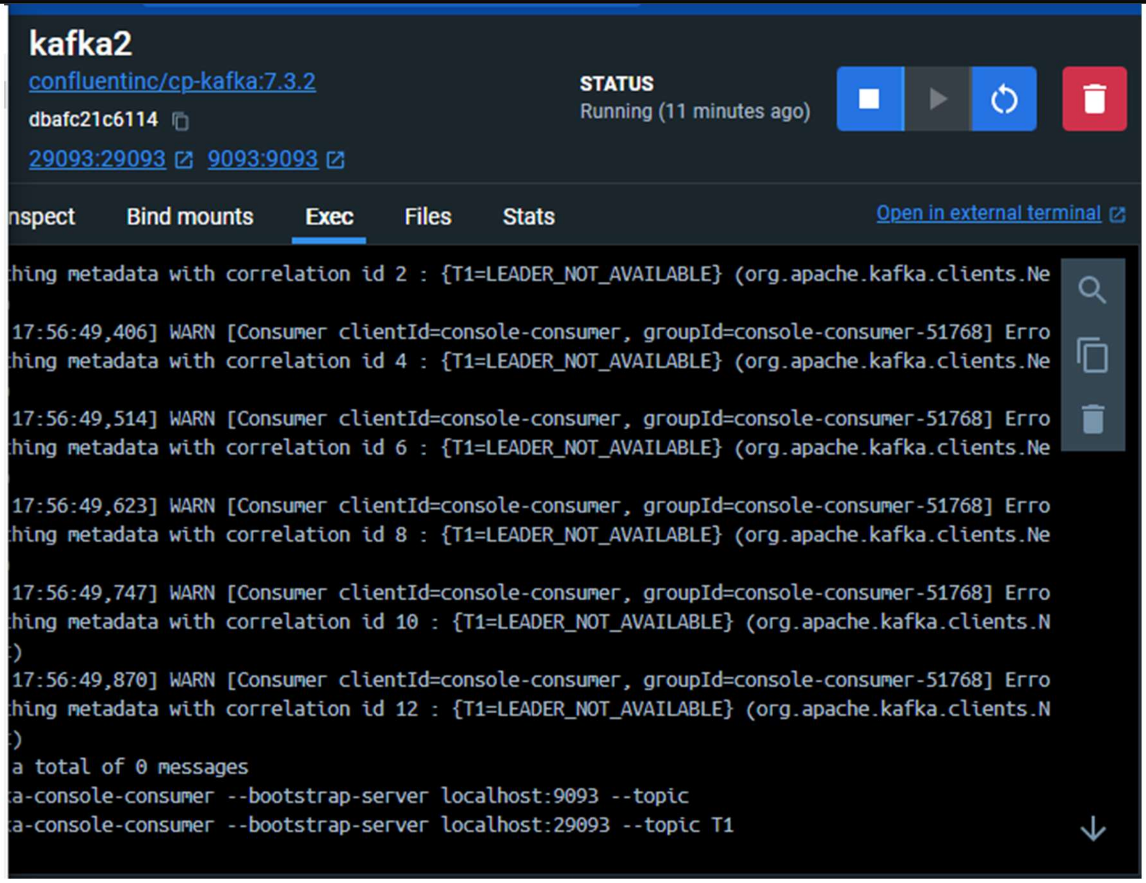
Le fichier docker-compose.yml

```
version: '3'
services:
zookeeper:
image: confluentinc/cp-zookeeper:7.3.0
container_name: zookeeper
environment:
ZOOKEEPER_CLIENT_PORT: 2181
ZOOKEEPER_TICK_TIME: 2000

broker:
image: confluentinc/cp-kafka:7.3.0
container_name: broker
ports:
# To learn about configuring Kafka for access across networks see
# https://www.confluent.io/blog/kafka-client-cannot-connect-to-broker-on-aws-on-docker-etc/
- "9092:9092"
depends_on:
- zookeeper
environment:
KAFKA_BROKER_ID: 1
KAFKA_ZOOKEEPER_CONNECT: 'zookeeper:2181'
KAFKA_LISTENER_SECURITY_PROTOCOL_MAP:
PLAINTEXT:PLAINTEXT,PLAINTEXT_INTERNAL:PLAINTEXT
KAFKA_ADVERTISED_LISTENERS:
PLAINTEXT://localhost:9092,PLAINTEXT_INTERNAL://broker:29092
KAFKA_OFFSETS_TOPIC_REPLICATION_FACTOR: 1
KAFKA_TRANSACTION_STATE_LOG_MIN_ISR: 1
KAFKA_TRANSACTION_STATE_LOG_REPLICATION_FACTOR: 1
```



docker exec -it dbafc21c611472193df90d24975f5d5d04af0a582feb92845532106879c9c...

```
sh-4.4$ kafka-console-producer --broker-list localhost:9093 --topic T1
>Abderrahmane ettounani
>salam cv
>hmdlh tt
>ll
>
```

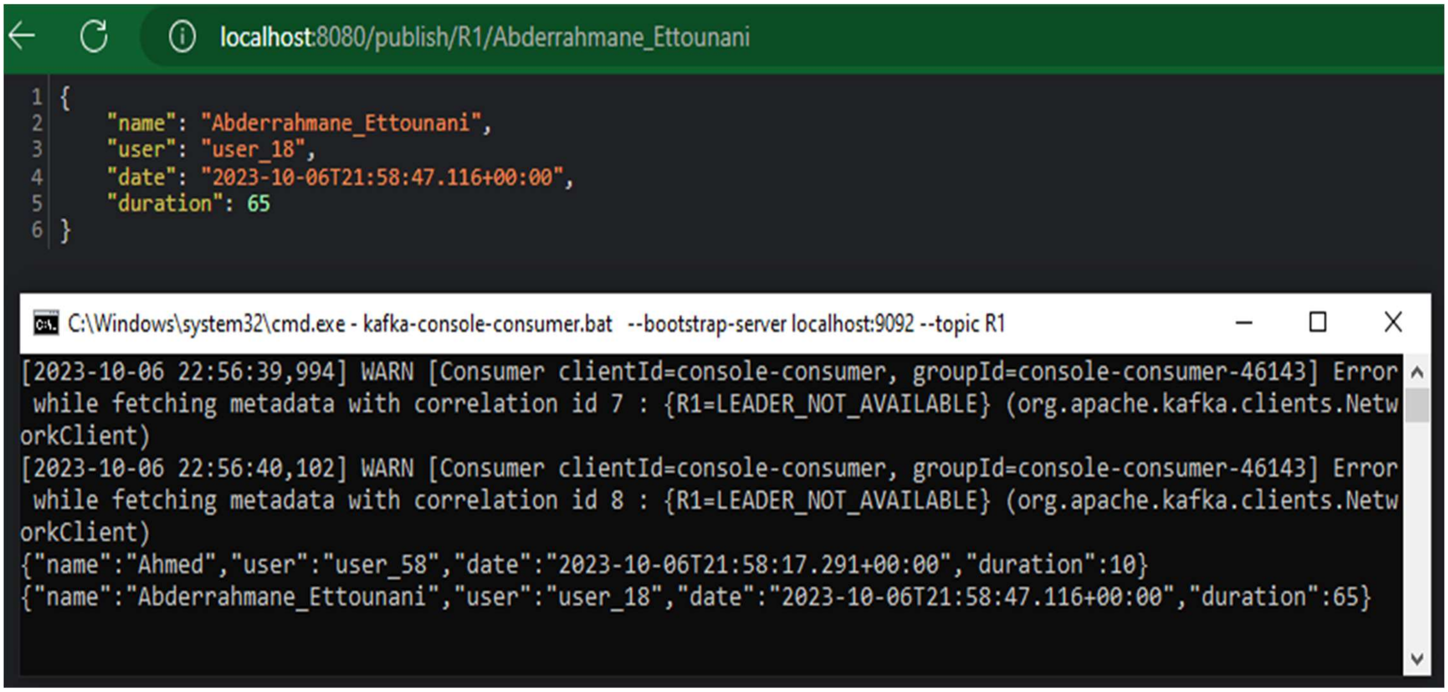


```
hing metadata with correlation id 2 : {T1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.Ne

17:56:49,406] WARN [Consumer clientId=console-consumer, groupId=console-consumer-51768] Erro
hing metadata with correlation id 4 : {T1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.Ne

17:56:49,514] WARN [Consumer clientId=console-consumer, groupId=console-consumer-51768] Erro
hing metadata with correlation id 6 : {T1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.Ne

17:56:49,623] WARN [Consumer clientId=console-consumer, groupId=console-consumer-51768] Erro
hing metadata with correlation id 8 : {T1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.Ne

17:56:49,747] WARN [Consumer clientId=console-consumer, groupId=console-consumer-51768] Erro
hing metadata with correlation id 10 : {T1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.N
)
17:56:49,870] WARN [Consumer clientId=console-consumer, groupId=console-consumer-51768] Erro
hing metadata with correlation id 12 : {T1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.N
)
a total of 0 messages
a-console-consumer --bootstrap-server localhost:9093 --topic
a-console-consumer --bootstrap-server localhost:29093 --topic T1
```

3

Un Service Producer KAFKA via un Rest Contrôler

```
@RestController
public class PageEventRestController {

    @Autowired
    private StreamBridge streamBridge;

    // publish method
    @GetMapping("/publish/{topic}/{name}")
    public PageEvent publishEvent(@PathVariable String topic, @PathVariable String
name) {
        PageEvent pageEvent = new PageEvent(name, "user_" + new Random().nextInt(100),
new Date(),
                10 + new Random().nextInt(100));
        streamBridge.send(
                topic,
                pageEvent);
        return pageEvent;
    }

}
```



localhost:8080/publish/R1/Abderrahmane_Ettounani

```
{
    "name": "Abderrahmane_Ettounani",
    "user": "user_18",
    "date": "2023-10-06T21:58:47.116+00:00",
    "duration": 65
}
```

C:\Windows\system32\cmd.exe - kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic R1

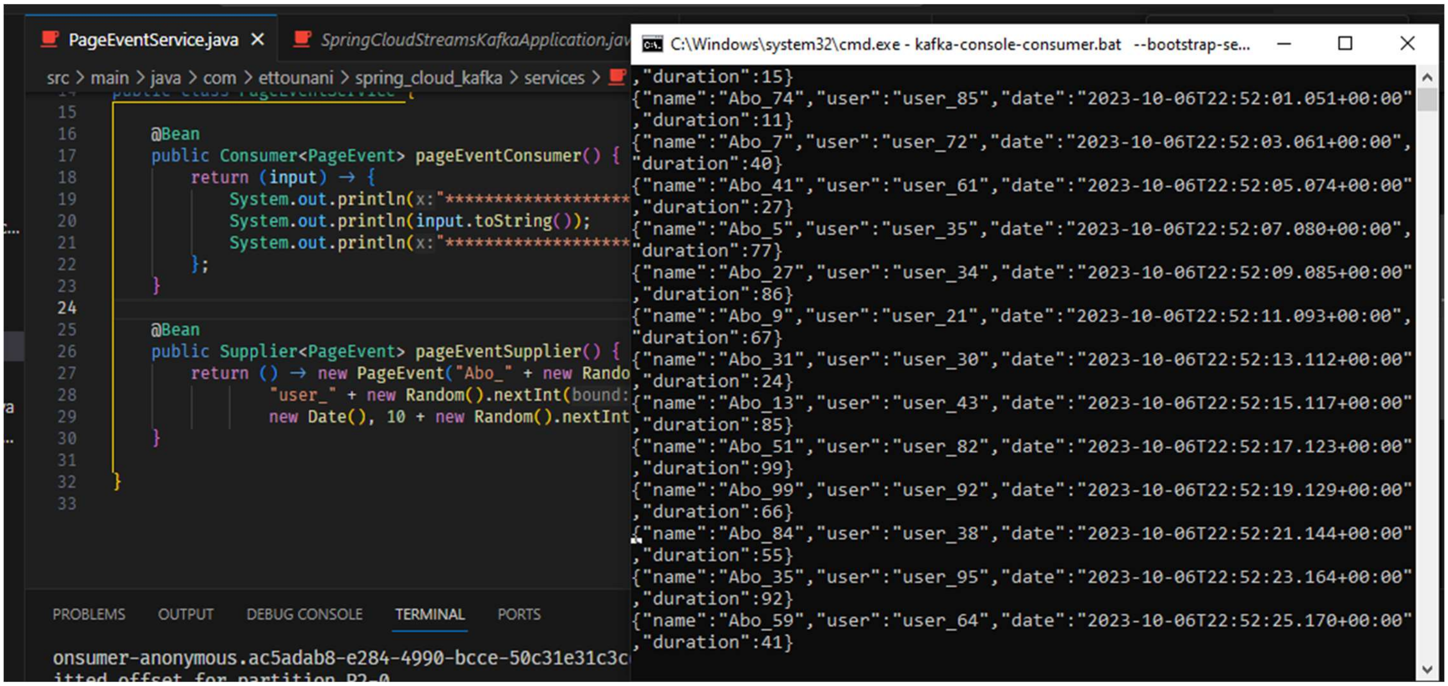
```
[2023-10-06 22:56:39,994] WARN [Consumer clientId=console-consumer, groupId=console-consumer-46143] Error
 while fetching metadata with correlation id 7 : {R1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.Netw
orkClient)
[2023-10-06 22:56:40,102] WARN [Consumer clientId=console-consumer, groupId=console-consumer-46143] Error
 while fetching metadata with correlation id 8 : {R1=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.Netw
orkClient)
{"name":"Ahmed","user":"user_58","date":"2023-10-06T21:58:17.291+00:00","duration":10}
{"name":"Abderrahmane_Ettounani","user":"user_18","date":"2023-10-06T21:58:47.116+00:00","duration":65}
```

Un Service Consumer KAFKA

```
@Service
public class PageEventService {

    // Consumer
    @Bean
    public Consumer<PageEvent> pageEventConsumer() {
        return (input) -> {
            System.out.println("***************************");
            System.out.println(input.toString());
            System.out.println("***************************");
        };
    }}
```

Un Service Supplier KAFKA

```
@Service
public class PageEventService {

    // Supplier
    @Bean
    public Supplier<PageEvent> pageEventSupplier() {
        return () -> new PageEvent("Abo_" + new Random().nextInt(100),
                "user_" + new Random().nextInt(100),
                new Date(), 10 + new Random().nextInt(100));
    }
```



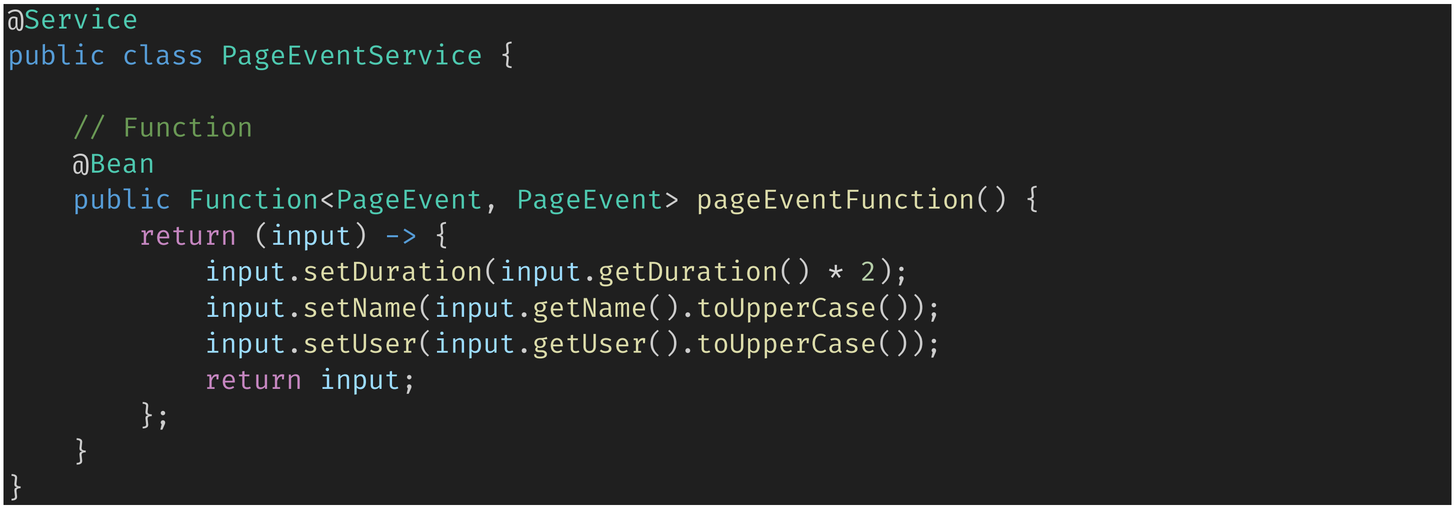
PageEventService.java ×
SpringCloudStreamsKafkaApplication.jav
src > main > java > com > ettounani > spring_cloud_kafka > services >
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
C:\Windows\system32\cmd.exe - kafka-console-consumer.bat --bootstrap-se...

```
    @Bean
    public Consumer<PageEvent> pageEventConsumer() {
        return (input) → {
            System.out.println(x:"******************
            System.out.println(input.toString());
            System.out.println(x:"******************
        };
    }

    @Bean
    public Supplier<PageEvent> pageEventSupplier() {
        return () → new PageEvent("Abo_" + new Rando
                "user_" + new Random().nextInt(bound:
                new Date(), 10 + new Random().nextInt
    }

}
```

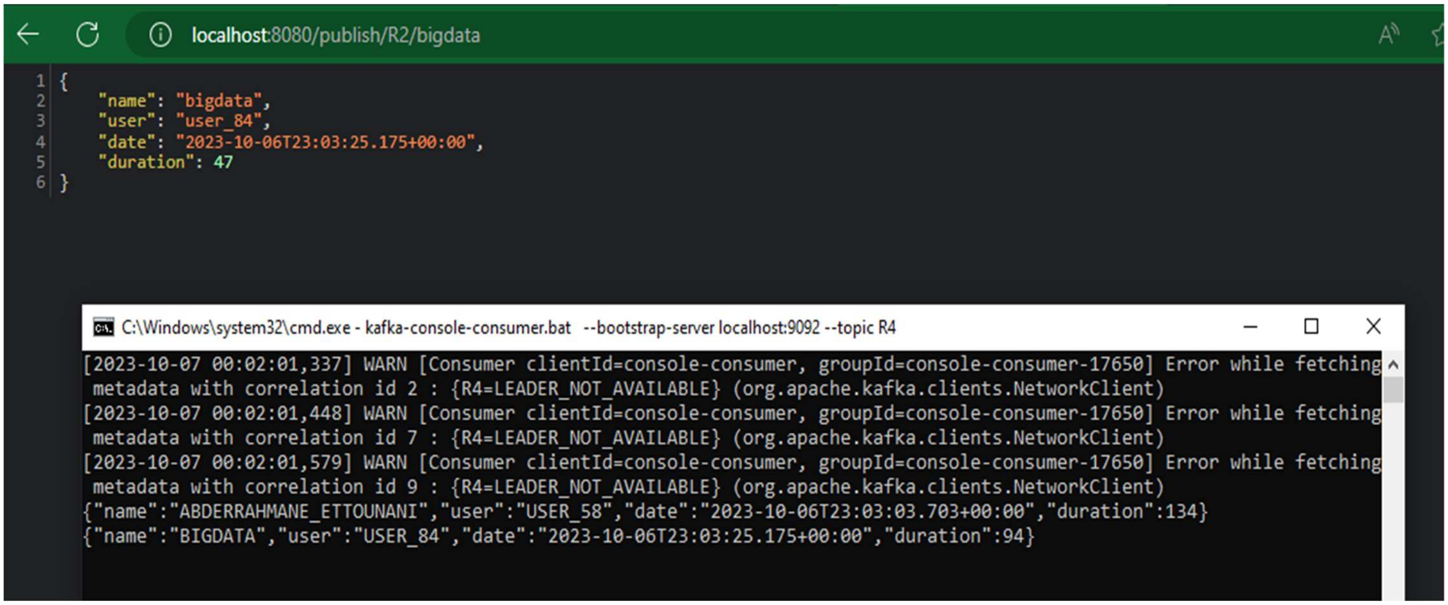
```
onsumer-anonymous.ac5adab8-e284-4990-bcce-50c31e31c3c
itted offset for partition R2-0
```

```
,"duration":15}
{"name":"Abo_74","user":"user_85","date":"2023-10-06T22:52:01.051+00:00"
,"duration":11}
{"name":"Abo_7","user":"user_72","date":"2023-10-06T22:52:03.061+00:00",
"duration":40}
{"name":"Abo_41","user":"user_61","date":"2023-10-06T22:52:05.074+00:00"
,"duration":27}
{"name":"Abo_5","user":"user_35","date":"2023-10-06T22:52:07.080+00:00",
"duration":77}
{"name":"Abo_27","user":"user_34","date":"2023-10-06T22:52:09.085+00:00"
,"duration":86}
{"name":"Abo_9","user":"user_21","date":"2023-10-06T22:52:11.093+00:00",
"duration":67}
{"name":"Abo_31","user":"user_30","date":"2023-10-06T22:52:13.112+00:00"
,"duration":24}
{"name":"Abo_13","user":"user_43","date":"2023-10-06T22:52:15.117+00:00"
,"duration":85}
{"name":"Abo_51","user":"user_82","date":"2023-10-06T22:52:17.123+00:00"
,"duration":99}
{"name":"Abo_99","user":"user_92","date":"2023-10-06T22:52:19.129+00:00"
,"duration":66}
{"name":"Abo_84","user":"user_38","date":"2023-10-06T22:52:21.144+00:00"
,"duration":55}
{"name":"Abo_35","user":"user_95","date":"2023-10-06T22:52:23.164+00:00"
,"duration":92}
{"name":"Abo_59","user":"user_64","date":"2023-10-06T22:52:25.170+00:00"
,"duration":41}
```

Un Service de Data Analytics Real Time Stream Processing avec Kaflka Streams



```java
@Service
public class PageEventService {

    // Function
    @Bean
    public Function<PageEvent, PageEvent> pageEventFunction() {
        return (input) -> {
            input.setDuration(input.getDuration() * 2);
            input.setName(input.getName().toUpperCase());
            input.setUser(input.getUser().toUpperCase());
            return input;
        };
    }
}
```

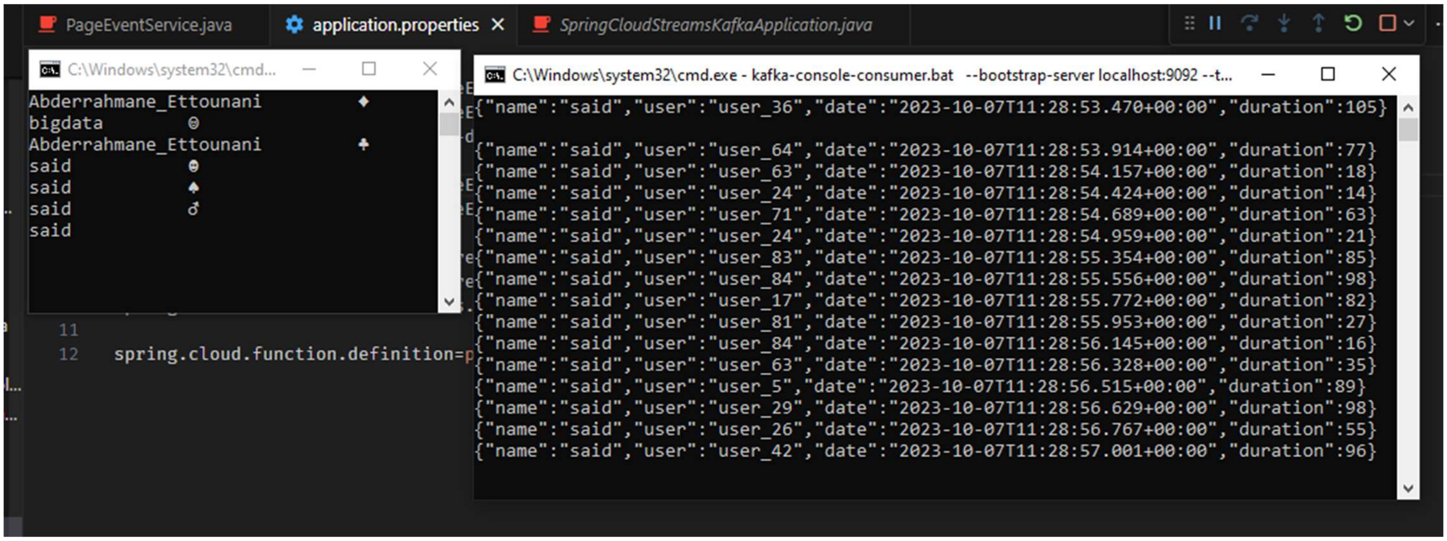


localhost:8080/publish/R2/bigdata

```
{
    "name": "bigdata",
    "user": "user_84",
    "date": "2023-10-06T23:03:25.175+00:00",
    "duration": 47
}
```

C:\Windows\system32\cmd.exe - kafka-console-consumer.bat --bootstrap-server localhost:9092 --topic R4

```
[2023-10-07 00:02:01,337] WARN [Consumer clientId=console-consumer, groupId=console-consumer-17650] Error while fetching
 metadata with correlation id 2 : {R4=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-07 00:02:01,448] WARN [Consumer clientId=console-consumer, groupId=console-consumer-17650] Error while fetching
 metadata with correlation id 7 : {R4=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
[2023-10-07 00:02:01,579] WARN [Consumer clientId=console-consumer, groupId=console-consumer-17650] Error while fetching
 metadata with correlation id 9 : {R4=LEADER_NOT_AVAILABLE} (org.apache.kafka.clients.NetworkClient)
{"name":"ABDERRAHMANE_ETTOUNANI","user":"USER_58","date":"2023-10-06T23:03:03.703+00:00","duration":134}
{"name":"BIGDATA","user":"USER_84","date":"2023-10-06T23:03:25.175+00:00","duration":94}
```



PageEventService.java
application.properties
SpringCloudStreamsKafkaApplication.java
C:\Windows\system32\cmd...

```
Abderrahmane_Ettounani        ♦
bigdata         ☻
Abderrahmane_Ettounani        ♣
said            ☻
said            ♠
said            ♂
said
```

```
spring.cloud.function.definition=p
```

C:\Windows\system32\cmd.exe - kafka-console-consumer.bat --bootstrap-server localhost:9092 --t...

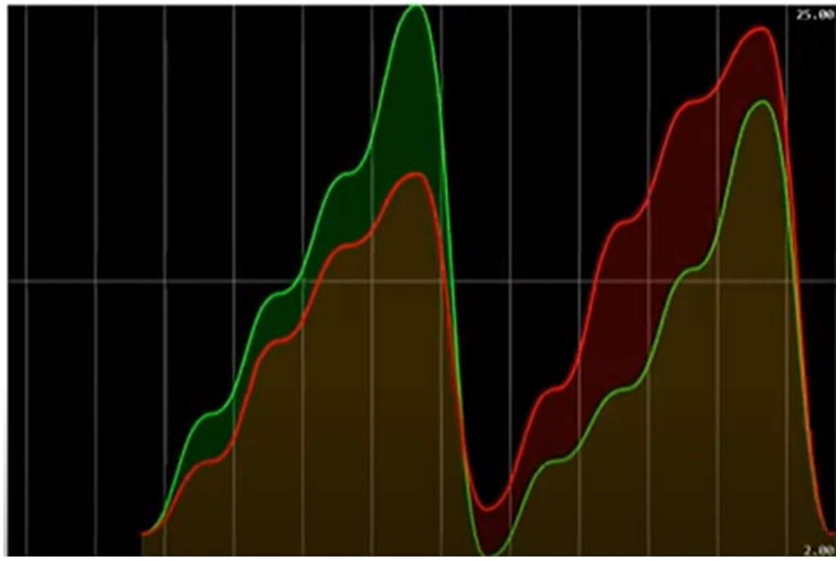
```
{"name":"said","user":"user_36","date":"2023-10-07T11:28:53.470+00:00","duration":105}

{"name":"said","user":"user_64","date":"2023-10-07T11:28:53.914+00:00","duration":77}
{"name":"said","user":"user_63","date":"2023-10-07T11:28:54.157+00:00","duration":18}
{"name":"said","user":"user_24","date":"2023-10-07T11:28:54.424+00:00","duration":14}
{"name":"said","user":"user_71","date":"2023-10-07T11:28:54.689+00:00","duration":63}
{"name":"said","user":"user_24","date":"2023-10-07T11:28:54.959+00:00","duration":21}
{"name":"said","user":"user_83","date":"2023-10-07T11:28:55.354+00:00","duration":85}
{"name":"said","user":"user_84","date":"2023-10-07T11:28:55.556+00:00","duration":98}
{"name":"said","user":"user_17","date":"2023-10-07T11:28:55.772+00:00","duration":82}
{"name":"said","user":"user_81","date":"2023-10-07T11:28:55.953+00:00","duration":27}
{"name":"said","user":"user_84","date":"2023-10-07T11:28:56.145+00:00","duration":16}
{"name":"said","user":"user_63","date":"2023-10-07T11:28:56.328+00:00","duration":35}
{"name":"said","user":"user_5","date":"2023-10-07T11:28:56.515+00:00","duration":89}
{"name":"said","user":"user_29","date":"2023-10-07T11:28:56.629+00:00","duration":98}
{"name":"said","user":"user_26","date":"2023-10-07T11:28:56.767+00:00","duration":55}
{"name":"said","user":"user_42","date":"2023-10-07T11:28:57.001+00:00","duration":96}
```

Une application Web qui permet d'afficher les résultats du Stream Data Analytics en temps réel

```
@RestController
public class PageEventRestController {

    @Autowired
    private StreamBridge streamBridge;

    // publish method
    @GetMapping("/publish/{topic}/{name}")
    public PageEvent publishEvent(@PathVariable String topic, @PathVariable String
name) {
        PageEvent pageEvent = new PageEvent(name, "user_" + new Random().nextInt(100),
new Date(),
                10 + new Random().nextInt(100));
        streamBridge.send(
                topic,
                pageEvent);
        return pageEvent;
    }

     @GetMapping(value = "/analytics",produces = MediaType.TEXT_EVENT_STREAM_VALUE)
    public Flux<Map<String,Long>> analytics(){
        return Flux.interval(Duration.ofSeconds(1))
                .map(seq->{
                    Map<String,Long> map=new HashMap<>();
                    ReadOnlyKeyValueStore<String, Long> stats =
interactiveQueryService.getQueryableStore("count-store",
QueryableStoreTypes.keyValueStore());
                    Instant now=Instant.now();
                    Instant from=now.minusSeconds(5);
                    KeyValueIterator<String, Long> keyValueIterator = stats.all();
                    while (keyValueIterator.hasNext()){
                        KeyValue<String, Long> next = keyValueIterator.next();
                        map.put(next.key,next.value);
                    }
                    return map;
                });
    }
    @GetMapping(value = "/analyticsWindows",produces =
MediaType.TEXT_EVENT_STREAM_VALUE)
    public Flux<Map<String,Long>> analyticsWindows(){
        return Flux.interval(Duration.ofSeconds(1))
                .map(seq->{
                    Map<String,Long> map=new HashMap<>();
                    ReadOnlyWindowStore<String, Long> stats =
interactiveQueryService.getQueryableStore("count-store",
QueryableStoreTypes.windowStore());
                    Instant now=Instant.now();
                    Instant from=now.minusSeconds(30);
                    KeyValueIterator<Windowed<String>, Long>
windowedLongKeyValueIterator = stats.fetchAll(from, now);
                    while (windowedLongKeyValueIterator.hasNext()){
                        KeyValue<Windowed<String>, Long> next =
windowedLongKeyValueIterator.next();
                        map.put(next.key.key(),next.value);
                    }
                    return map;
                });
    }
    @GetMapping(value = "/analyticsAggregate",produces =
MediaType.TEXT_EVENT_STREAM_VALUE)
    public Flux<Map<String,Double>> analyticsAggregate(){
        return Flux.interval(Duration.ofSeconds(1))
                .map(seq->{
                    Map<String,Double> map=new HashMap<>();
                    ReadOnlyWindowStore<String, Double> stats =
interactiveQueryService.getQueryableStore("total-store",
QueryableStoreTypes.windowStore());
                    Instant now=Instant.now();
                    Instant from=now.minusSeconds(30);
                    KeyValueIterator<Windowed<String>, Double>
windowedLongKeyValueIterator = stats.fetchAll(from, now);
                    while (windowedLongKeyValueIterator.hasNext()){
                        KeyValue<Windowed<String>, Double> next =
windowedLongKeyValueIterator.next();
                        map.put(next.key.key(),next.value);
                    }
                    return map;
                });
    }

}
```

Index.html

```
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>Analytics</title>
    <script
src="https://cdnjs.cloudflare.com/ajax/libs/smoothie/1.34.0/smoothie.min.js"></script>
</head>
<body>
<canvas id="chart2" width="600" height="400"></canvas>
<script>    var index = -1;
randomColor = function () {
    ++index;
    if (index >= colors.length) index = 0;
    return colors[index];
}
var pages = ["P1", "P2"];
var colors = [
    {sroke: 'rgba(0, 255, 0, 1)', fill: 'rgba(0, 255, 0, 0.2)'},
    {sroke: 'rgba(255, 0, 0, 1)', fill: 'rgba(255, 0, 0, 0.2)'
}];
var courbe = [];
var smoothieChart = new SmoothieChart({tooltip: true});
smoothieChart.streamTo(document.getElementById("chart2"), 500);
pages.forEach(function (v) {
    courbe[v] = new TimeSeries();
    col = randomColor();
    smoothieChart.addTimeSeries(courbe[v], {strokeStyle: col.sroke, fillStyle:
col.fill, lineWidth: 2});
});
var stockEventSource = new EventSource("/analyticsAggregate");
stockEventSource.addEventListener("message", function (event) {
    pages.forEach(function (v) {
        val = JSON.parse(event.data)[v];
        courbe[v].append(new Date().getTime(), val);
    });
});</script>
</body>
</html></body></html>
```



Application.properties

```
spring.cloud.stream.bindings.pageEventConsumer-in-0.destination=R2
spring.cloud.stream.bindings.pageEventSupplier-out-0.destination=R3
spring.cloud.stream.poller.fixed-delay=2000

spring.cloud.stream.bindings.pageEventFunction-in-0.destination=R2
spring.cloud.stream.bindings.pageEventFunction-out-0.destination=R4

spring.cloud.stream.bindings.kStreamFunction-in-0.destination=R3
spring.cloud.stream.bindings.kStreamFunction-out-0.destination=R5
spring.cloud.stream.kafka.streams.binder.configuration.commit.interval.ms=1000

spring.cloud.function.definition=pageEventSupplier;pageEventConsumer;pageEventFunction;
kStreamFunction
```