

Code Logic - Retail Data Analysis

PySpark Code Logic

Step 1: Importing the required modules - *System dependencies for CDH* and declaring PySpark environment variables

importing the modules - System dependencies for CDH

```
from pyspark.sql import SparkSession
from pyspark.sql.functions import *
from pyspark.sql.types import *
from pyspark.sql.functions import from_json
from pyspark.sql.window import Window
```

Step 2: Creating Initial Spark Session

Initializing Spark Session

```
spark = SparkSession \
    .builder \
    .appName("RetailDataAnalysis") \
    .getOrCreate()
spark.sparkContext.setLogLevel('ERROR')
```

Step 3: Reading the Input from Kafka

Read Input from kafka

```
rawOrder = spark \
    .readStream \
    .format("kafka") \
    .option("kafka.bootstrap.servers","18.211.252.152:9092") \
    .option("startingOffsets", "latest") \
    .option("subscribe","real-time-project") \
    .load()
```

Step 4: Defining the schema for incoming data JSON file data

Defining the Schema

```
jsonSchema = StructType() \
    .add("invoice_no", LongType()) \
    .add("country", StringType()) \
    .add("timestamp", TimestampType()) \
    .add("type", StringType()) \
    .add("items", ArrayType(StructType([
        StructField("SKU", StringType()),
        StructField("title", StringType()),
        StructField("unit_price", DoubleType()),
        StructField("quantity", IntegerType())
    ])))
```

Step 5: Creating dataframe from incoming data

Creating dataframe from input data after applying the schema

```
orderStream = orderRaw.select(from_json(col("value").cast("string"),
jsonSchema).alias("data")).select("data.*")
```

Step 6: Defining UDF functions (total items, total cost, is order, is return), conversion to UDF types and calculating columns

UDF for calculating total_items

```
def items_TotalCount(items):
    total_count = 0
    for item in items:
        total_count = total_count + item['quantity']
    return total_count
```

UDF for calculating order type

```
def is_order(type):  
    if type=="ORDER":  
        return 1  
    else:  
        return 0
```

UDF for calculating return type

```
def is_return(type):  
    if type=="RETURN":  
        return 1  
    else:  
        return 0
```

UDF for calculating total_cost

```
def TotalCostSum (items,type):\n    total_sum = 0  
    for item in items:  
        total_sum = total_sum + item['unit_price'] * item['quantity']  
    if type=="RETURN":  
        return total_sum * (-1)  
    else:  
        return total_sum
```

Converting to UDF's with the utility functions

```
isorder = udf(is_order, IntegerType())  
isreturn = udf(is_return, IntegerType())  
totalcount = udf(items_TotalCount, IntegerType())  
totalcost = udf(TotalCostSum, DoubleType())
```

Calculating columns(total_cost, total_items, is_order, is_return)

```
order_stream = orderStream \  
    .withColumn("total_cost", totalcost(orderStream.items, orderStream.type)) \  
    .withColumn("total_items", totalcount(orderStream.items)) \  
    .withColumn("is_order", isorder(orderStream.type)) \  
    .withColumn("is_return", isreturn(orderStream.type))
```

Step 7: Writing intermediate dataset to console with 1 Minute Interval

```
orderStreamOutput = order_stream \  
    .select("invoice_no", "country",  
    "timestamp", "total_items", "total_cost", "is_order", "is_return") \  
    .writeStream \  
    .outputMode("append") \  
    .format("console") \  
    .option("truncate", "false") \  
    .trigger(processingTime="1 minute") \  
    .start()
```

Step 8: Calculating time-based KPIs using with Watermark and groupBy

Calculating time based KPIs

```
timeBasedKPIs = order_stream \  
    .withWatermark("timestamp", "1 minute") \  
    .groupby(window("timestamp", "1 minute", "1 minute")) \  
    .agg(count("invoice_no").alias("OPM"),  
        sum("total_cost").alias("total_sales_volume"),  
        avg("total_cost").alias("average_transaction_size"),  
        avg("is_return").alias("rate_of_return")) \  
    .select("window", "OPM", "total_sales_volume", "average_transaction_size",  
    "rate_of_return")
```

write stream for time based KPIs

```
timeBasedKPIsOutput = timeBasedKPIs \
    .writeStream \
    .outputMode("append") \
    .format("json") \
    .option("format","append") \
    .option("truncate", "false") \
    .option("path", "time-wise-kpi") \
    .option("checkpointLocation", "time-kpi") \
    .trigger(processingTime="1 minute") \
    .start()
```

Step 9: Calculating time-based and country-based KPIs using watermark and groupBy

Calculating time-based and country-based KPIs

```
timeAndCountryBasedKPIs = order_stream \
    .withWatermark("timestamp", "1 minute") \
    .groupBy(window("timestamp", "1 minute", "1 minute"), "country") \
    .agg(count("invoice_no").alias("OPM"),
        sum("total_cost").alias("total_sales_volume"),
        avg("is_return").alias("rate_of_return")) \
    .select("window", "country", "OPM", "total_sales_volume", "rate_of_return")
```

write stream for time and country based KPIs

```
timeAndCountryBasedKPIsOutput = timeAndCountryBasedKPIs \
    .writeStream \
    .outputMode("Append") \
    .format("json") \
    .option("format","append") \
    .option("truncate", "false") \
    .option("path", "time-country-wise-kpi") \
    .option("checkpointLocation", "time-country-kpi") \
```

```
.trigger(processingTime="1 minute") \  
.start()
```

Step 10: Waiting for the termination of stream infinitely

Waiting infinitely to read the data

```
timeAndCountryBasedKPIsOutput.awaitTermination()
```

Console Commands and Analysis

Spark Submit Command and too Console-output file

```
Spark2-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 spark-streaming.py  
18.211.252.152 9092 real-time-project > Console-output
```

Mkdir command to make directory

```
mkdir time-wise-kpi  
mkdir time-country-wise-kpi
```

command to check json files generated

```
hadoop fs -ls
```

```
hadoop fs -ls time-wise-kpi  
hadoop fs -ls time-country-wise-kpi
```

```
hadoop fs -cat time-wise-kpi/part-00198-21224b93-1ac7-4748-806b-d39e02d0b82a-c000/  
hadoop fs -cat time-country-wise-kpi/part-00185-ffa2a99d-0618-41c2-abab-cb73865996b7-  
c000/
```

Transfer of data from HDFS to Local using

- `hadoop fs -get /user/hadoop/time-wise-kpi ./time-wise-kpi`
- `hadoop fs -get /user/hadoop/time-country-wise-kpi ./time-country-wise-kpi`
- WinSCP used to copy the files to local machine

Output Screens Summarized Console Output

```
hadoop@ip-172-31-6-228:~
Batch: 0
-----+-----+-----+-----+-----+-----+
|invoice_no|country|timestamp|total_cost|total_items|is_order|is_return|
|-----+-----+-----+-----+-----+-----+
Batch: 1
-----+-----+-----+-----+-----+-----+
|invoice_no|country|timestamp|total_cost|total_items|is_order|is_return|
|-----+-----+-----+-----+-----+-----+
|154132549897430|United Kingdom|2022-06-15 16:01:00|45.54|24|1|0|
|154132549897431|United Kingdom|2022-06-15 16:01:01|3.9000000000000004|4|1|0|
|154132549897432|United Kingdom|2022-06-15 16:01:06|-16.26|18|0|1|
|154132549897433|France|2022-06-15 16:01:08|528.64|128|1|0|
|154132549897434|United Kingdom|2022-06-15 16:01:13|8.32|4|1|0|
|154132549897435|United Kingdom|2022-06-15 16:01:18|54.13|20|1|0|
|154132549897436|United Kingdom|2022-06-15 16:01:31|56.350000000000001|19|1|0|
|154132549897437|United Kingdom|2022-06-15 16:01:32|42.55|21|1|0|
|154132549897438|United Kingdom|2022-06-15 16:01:35|196.40999999999997|53|1|0|
|154132549897439|United Kingdom|2022-06-15 16:01:42|-278.40000000000003|53|0|1|
|154132549897440|United Kingdom|2022-06-15 16:01:42|4.95|1|1|0|
|154132549897441|United Kingdom|2022-06-15 16:01:54|214.570000000000002|177|1|0|
|-----+-----+-----+-----+-----+-----+
Batch: 2
-----+-----+-----+-----+-----+-----+
|invoice_no|country|timestamp|total_cost|total_items|is_order|is_return|
|-----+-----+-----+-----+-----+-----+
|154132549897442|United Kingdom|2022-06-15 16:01:57|89.110000000000001|44|1|0|
|154132549897443|United Kingdom|2022-06-15 16:02:04|44.48|10|1|0|
|154132549897444|United Kingdom|2022-06-15 16:02:05|83.67|43|1|0|
|154132549897445|United Kingdom|2022-06-15 16:02:21|258.33999999999999|108|1|0|
|154132549897446|United Kingdom|2022-06-15 16:02:47|31.9|16|1|0|
|154132549897447|United Kingdom|2022-06-15 16:02:51|165.06999999999996|122|1|0|
|-----+-----+-----+-----+-----+-----+
Batch: 3
-----+-----+-----+-----+-----+-----+
|invoice_no|country|timestamp|total_cost|total_items|is_order|is_return|
|-----+-----+-----+-----+-----+-----+
|154132549897448|United Kingdom|2022-06-15 16:02:52|13.629999999999999|4|1|0|
|154132549897449|United Kingdom|2022-06-15 16:03:09|16.580000000000002|13|1|0|
|154132549897450|Netherlands|2022-06-15 16:03:22|19.349999999999998|14|1|0|
|154132549897451|United Kingdom|2022-06-15 16:03:22|38.410000000000004|15|1|0|
|154132549897452|United Kingdom|2022-06-15 16:03:24|24.55|11|1|0|
|154132549897453|United Kingdom|2022-06-15 16:03:33|9.84|4|1|0|
|154132549897454|United Kingdom|2022-06-15 16:03:34|46.68|42|1|0|
|154132549897455|United Kingdom|2022-06-15 16:03:35|6.76|4|1|0|
|154132549897456|United Kingdom|2022-06-15 16:03:40|24.78|15|1|0|
|154132549897457|United Kingdom|2022-06-15 16:03:45|70.63|19|1|0|
|154132549897458|United Kingdom|2022-06-15 16:03:46|4.97|13|1|0|
|154132549897459|United Kingdom|2022-06-15 16:03:46|-30.5|10|0|1|
|154132549897460|United Kingdom|2022-06-15 16:03:46|148.82999999999998|56|1|0|
|154132549897461|United Kingdom|2022-06-15 16:03:50|30.0|12|1|0|
|-----+-----+-----+-----+-----+-----+
Batch: 4
```

```

-----
Batch: 15
-----
+-----+-----+-----+-----+-----+-----+
|invoice_no|country|timestamp|total_cost|total_items|is_order|is_return|
+-----+-----+-----+-----+-----+-----+
|154132549897584|United Kingdom|2022-06-15 16:14:42|32.480000000000004|6|1|0|
|154132549897585|United Kingdom|2022-06-15 16:14:49|29.52|12|1|0|
|154132549897586|United Kingdom|2022-06-15 16:14:51|4.92|2|1|0|
|154132549897587|United Kingdom|2022-06-15 16:15:02|18.2|2|1|0|
|154132549897588|United Kingdom|2022-06-15 16:15:04|165.18|146|1|0|
|154132549897589|United Kingdom|2022-06-15 16:15:07|102.75|82|1|0|
|154132549897590|United Kingdom|2022-06-15 16:15:09|55.599999999999994|34|1|0|
|154132549897591|United Kingdom|2022-06-15 16:15:13|60.690000000000005|26|1|0|
|154132549897592|United Kingdom|2022-06-15 16:15:18|33.0|20|1|0|
|154132549897593|United Kingdom|2022-06-15 16:15:18|105.28|38|1|0|
|154132549897594|United Kingdom|2022-06-15 16:15:23|10.0|7|1|0|
|154132549897595|United Kingdom|2022-06-15 16:15:26|20.16|6|1|0|
|154132549897596|EIRE|2022-06-15 16:15:27|15.0|12|1|0|
|154132549897597|United Kingdom|2022-06-15 16:15:30|2.89|1|1|0|
+-----+-----+-----+-----+-----+-----+

^CTraceback (most recent call last):
  File "/home/hadoop/spark-streaming.py", line 161, in <module>
    timeAndCountryBasedKPIsOutput.awaitTermination()
  File "/usr/lib/spark/python/lib/pyspark.zip/pyspark/sql/streaming.py", line 103, in awaitTermination
  File "/usr/lib/spark/python/lib/py4j-0.10.7-src.zip/py4j/java_gateway.py", line 1255, in __call__
  File "/usr/lib/spark/python/lib/py4j-0.10.7-src.zip/py4j/java_gateway.py", line 985, in send_command
  File "/usr/lib/spark/python/lib/py4j-0.10.7-src.zip/py4j/java_gateway.py", line 1152, in send_command
  File "/usr/lib64/python3.7/socket.py", line 589, in readinto
    return self._sock.recv_into(b)
  File "/usr/lib/spark/python/lib/pyspark.zip/pyspark/context.py", line 278, in signal_handler
KeyboardInterrupt
22/06/15 16:19:02 ERROR FileFormatWriter: Aborting job 3351862a-e8d6-4fea-b8b8-06b89f0f5d85.
org.apache.spark.SparkException: Job 63 cancelled as part of cancellation of all jobs
    at org.apache.spark.scheduler.DAGScheduler.org$apache$spark$scheduler$DAGScheduler$$failJobAndIndependentStages(DAGScheduler.scala:2043)
    at org.apache.spark.scheduler.DAGScheduler.handleJobCancellation(DAGScheduler.scala:1978)
    at org.apache.spark.scheduler.DAGScheduler$$anonfun$doCancelAllJobs$1.apply$mcV$fp(DAGScheduler.scala:871)
    at org.apache.spark.scheduler.DAGScheduler$$anonfun$doCancelAllJobs$1.apply(DAGScheduler.scala:871)
    at org.apache.spark.scheduler.DAGScheduler$$anonfun$doCancelAllJobs$1.apply(DAGScheduler.scala:871)
    at scala.collection.mutable.HashSet.foreach(HashSet.scala:78)
    at org.apache.spark.scheduler.DAGScheduler.doCancelAllJobs(DAGScheduler.scala:871)
    at org.apache.spark.scheduler.DAGSchedulerEventProcessLoop.doOnReceive(DAGScheduler.scala:2236)

```

```

[hadoop@ip-172-31-6-228 ~]$ ls
spark-streaming.py
[hadoop@ip-172-31-6-228 ~]$
[hadoop@ip-172-31-6-228 ~]$ mkdir time-wise-kpi
[hadoop@ip-172-31-6-228 ~]$ mkdir time-country-wise-kpi
[hadoop@ip-172-31-6-228 ~]$
[hadoop@ip-172-31-6-228 ~]$
[hadoop@ip-172-31-6-228 ~]$
[hadoop@ip-172-31-6-228 ~]$
[hadoop@ip-172-31-6-228 ~]$ spark-submit --packages org.apache.spark:spark-sql-kafka-0-10_2.11:2.4.5 spark-streaming.py 18.211.252.152 9092 real-time-project

```

```

[hadoop@ip-172-31-6-228 ~]$ hadoop fs -ls
Found 5 items
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:19 .sparkStaging
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:04 time-country-kpi
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:18 time-country-wise-kpi
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:04 time-kpi
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:19 time-wise-kpi
[hadoop@ip-172-31-6-228 ~]$

```



```
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -ls
Found 5 items
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:19 .sparkStaging
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:04 time-country-kpi
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:18 time-country-wise-kpi
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:04 time-kpi
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:19 time-wise-kpi
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -ls time-wise-kpi
Found 28 items
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:18 time-wise-kpi/_spark_metadata
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:14 time-wise-kpi/part-00000-021e69bd-3cea-4d04-b150-3e0555fceb7b-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:15 time-wise-kpi/part-00000-041ea273-20ce-458d-b1d1-8cdaa8de5684-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:08 time-wise-kpi/part-00000-044b7eed-e577-40a7-8ce0-049ad71f3231-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:05 time-wise-kpi/part-00000-18a9fa97-1fcb-45dc-9758-285d16f62bc0-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:07 time-wise-kpi/part-00000-1ff10c56-1736-438e-bc2a-dc033d55c4d-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:11 time-wise-kpi/part-00000-461e169e-a761-410c-aa8b-7c39ba3219f9-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:19 time-wise-kpi/part-00000-4c57f2bd-1d14-4682-bb54-5282456c30e7-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:06 time-wise-kpi/part-00000-707c36c6-064d-4b14-ba70-2c5097151913-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:04 time-wise-kpi/part-00000-76e4dbcc-5dc6-4592-8795-2215d69b017c-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:10 time-wise-kpi/part-00000-7e61af6e-a000-4e79-4a6a-352965e1f747-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:09 time-wise-kpi/part-00000-84c81f63-4f94-4980-84fd-87eae935862e-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:17 time-wise-kpi/part-00000-9af1306e-cfd8-4fae-a807-3a4cbb818185-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:12 time-wise-kpi/part-00000-a5e7fe15-1c93-402f-961f-87adf97041da-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:13 time-wise-kpi/part-00000-bc7b91d7-20af-499e-aabf-2eb8cb39d570-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:18 time-wise-kpi/part-00000-d3334c4d-4c11-4bef-a0ed-b000fac8d6a3-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:16 time-wise-kpi/part-00000-daf43a5-acea-4340-9d0d-8698c3a40771-c000.json
-rw-r--r-- 1 hadoop hadoop 212 2022-06-15 16:12 time-wise-kpi/part-00004-0341bcd9-6bf2-4d98-840f-f277aedd81cf-c000.json
-rw-r--r-- 1 hadoop hadoop 194 2022-06-15 16:09 time-wise-kpi/part-00012-0f16fdd4-2b77-435c-a9e6-e051316d707c-c000.json
-rw-r--r-- 1 hadoop hadoop 201 2022-06-15 16:10 time-wise-kpi/part-00054-48e3dd59-f404-463c-b48d-bb9b3cf0cd1c-c000.json
-rw-r--r-- 1 hadoop hadoop 196 2022-06-15 16:17 time-wise-kpi/part-00062-7d911238-3e40-4d11-843f-3fd8f256e948-c000.json
-rw-r--r-- 1 hadoop hadoop 195 2022-06-15 16:13 time-wise-kpi/part-00087-80fe8e25-b743-408b-811e-0262051decof-c000.json
-rw-r--r-- 1 hadoop hadoop 186 2022-06-15 16:18 time-wise-kpi/part-00088-b73849a3-c467-42f3-bb72-75f0f0b92d43-c000.json
-rw-r--r-- 1 hadoop hadoop 196 2022-06-15 16:14 time-wise-kpi/part-00099-0b1a7e0d-9777-4b29-b7d5-e76266e967b1-c000.json
-rw-r--r-- 1 hadoop hadoop 184 2022-06-15 16:15 time-wise-kpi/part-00106-5b2d8b71-4acd-44da-8c6b-fa4892063e23-c000.json
-rw-r--r-- 1 hadoop hadoop 200 2022-06-15 16:11 time-wise-kpi/part-00133-6a735a5d-2429-4e1a-858c-e433640e3d76-c000.json
-rw-r--r-- 1 hadoop hadoop 200 2022-06-15 16:08 time-wise-kpi/part-00154-203a6b62-7fee-4c10-8058-8d5b1be82a84-c000.json
-rw-r--r-- 1 hadoop hadoop 184 2022-06-15 16:16 time-wise-kpi/part-00198-21224b93-lac7-4748-806b-d39e02d0b82a-c000.json
[hadoop@ip-172-31-6-228 ~]$
```

```
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -ls time-country-wise-kpi
Found 38 items
drwxr-xr-x - hadoop hadoop 0 2022-06-15 16:18 time-country-wise-kpi/_spark_metadata
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:14 time-country-wise-kpi/part-00000-0196de06-0879-4821-be0e-081ec5c256f8-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:15 time-country-wise-kpi/part-00000-25284aab-6393-40a2-bf36-a189be1bf1cd-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:17 time-country-wise-kpi/part-00000-32296765-2dd2-42bb-91ee-a13bdf1e8327-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:04 time-country-wise-kpi/part-00000-3519f0a1-5b0d-4cd2-9a10-119a5a0e23ed-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:07 time-country-wise-kpi/part-00000-45c70e01-c04e-46ed-872d-c713e0e7f61d-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:18 time-country-wise-kpi/part-00000-7c4a61c2-8500-4673-bf5f-1c906bad6135-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:05 time-country-wise-kpi/part-00000-831b5819-7a4e-4212-ba35-2e784cd0d0421-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:13 time-country-wise-kpi/part-00000-83ca12d0-59d2-4348-8885-0319428874bc-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:10 time-country-wise-kpi/part-00000-8b88acea-afbe-4441-8b2e-0ef5fcff16af-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:16 time-country-wise-kpi/part-00000-a237f2cb-7521-4a8c-bca3-615a64b3cb3a-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:08 time-country-wise-kpi/part-00000-a724ac59-bc11-4b95-90f5-33f17d86bf62-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:06 time-country-wise-kpi/part-00000-de17eb37-5f53-4098-9379-b39f45c39127-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:11 time-country-wise-kpi/part-00000-df236787-21b6-4aa8-9647-022f669e29ed-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:09 time-country-wise-kpi/part-00000-e6353d2d-5c90-483d-ab9e-8c01319f12d7-c000.json
-rw-r--r-- 1 hadoop hadoop 0 2022-06-15 16:12 time-country-wise-kpi/part-00000-f57ea320-21d3-47e9-adbb-e76562979eea-c000.json
-rw-r--r-- 1 hadoop hadoop 156 2022-06-15 16:17 time-country-wise-kpi/part-00002-3f65b776-731d-4f39-b3bd-5fd1c2841a61-c000.json
-rw-r--r-- 1 hadoop hadoop 176 2022-06-15 16:09 time-country-wise-kpi/part-00012-c344fba-31b1-414a-9b7b-99173af7b5d1-c000.json
-rw-r--r-- 1 hadoop hadoop 155 2022-06-15 16:12 time-country-wise-kpi/part-00019-befc29a8-8460-4b5c-87b9-c7db233ada10-c000.json
-rw-r--r-- 1 hadoop hadoop 169 2022-06-15 16:12 time-country-wise-kpi/part-00022-4c57b3e6-144b-42ff-aeb6-68485b6835f0-c000.json
-rw-r--r-- 1 hadoop hadoop 155 2022-06-15 16:11 time-country-wise-kpi/part-00034-a75939a0-8103-4b5b-a305-9d7497485d32-c000.json
-rw-r--r-- 1 hadoop hadoop 156 2022-06-15 16:11 time-country-wise-kpi/part-00045-52a168c7-5564-4842-81f1-d9c16a76d765-c000.json
-rw-r--r-- 1 hadoop hadoop 174 2022-06-15 16:10 time-country-wise-kpi/part-00049-964051e4-a8a7-47a0-9233-8645a42c8088-c000.json
-rw-r--r-- 1 hadoop hadoop 177 2022-06-15 16:14 time-country-wise-kpi/part-00065-6191ce46-d0e2-4b1e-ba50-aab4579a73fb-c000.json
-rw-r--r-- 1 hadoop hadoop 167 2022-06-15 16:17 time-country-wise-kpi/part-00073-2631e7e5-c252-42db-8912-6ff468206705-c000.json
-rw-r--r-- 1 hadoop hadoop 182 2022-06-15 16:11 time-country-wise-kpi/part-00081-41c88ae7-58a1-4d76-b583-b9f378ad239a-c000.json
-rw-r--r-- 1 hadoop hadoop 182 2022-06-15 16:10 time-country-wise-kpi/part-00081-5d66a435-714e-4bf9-bc42-c8e3e5ccdd19f-c000.json
-rw-r--r-- 1 hadoop hadoop 182 2022-06-15 16:08 time-country-wise-kpi/part-00082-59a9a162-f76f-419b-9755-664bb9003638-c000.json
-rw-r--r-- 1 hadoop hadoop 170 2022-06-15 16:16 time-country-wise-kpi/part-00086-deb0d215-50b8-4b76-9477-2c8f26f00021-c000.json
-rw-r--r-- 1 hadoop hadoop 165 2022-06-15 16:15 time-country-wise-kpi/part-00095-ded0b8be-ab41-4a41-9e60-9542f94578fb-c000.json
-rw-r--r-- 1 hadoop hadoop 157 2022-06-15 16:08 time-country-wise-kpi/part-00108-83c35027-a744-41ba-9f88-e46da4787b58-c000.json
-rw-r--r-- 1 hadoop hadoop 168 2022-06-15 16:11 time-country-wise-kpi/part-00132-c347d6b5-1232-4a36-b5ad-148d2251e3ab-c000.json
-rw-r--r-- 1 hadoop hadoop 156 2022-06-15 16:11 time-country-wise-kpi/part-00146-ed982e74-64a2-439a-b69c-ac0371366934-c000.json
-rw-r--r-- 1 hadoop hadoop 180 2022-06-15 16:18 time-country-wise-kpi/part-00153-14d8dcd9-b8ca-433d-ab49-be93600d9fc6-c000.json
-rw-r--r-- 1 hadoop hadoop 177 2022-06-15 16:13 time-country-wise-kpi/part-00171-619e513b-bd5a-47c0-b39e-4734228160ee-c000.json
-rw-r--r-- 1 hadoop hadoop 154 2022-06-15 16:11 time-country-wise-kpi/part-00175-44606e86-3c64-4fcb-80f1-6eb766f281db-c000.json
-rw-r--r-- 1 hadoop hadoop 164 2022-06-15 16:16 time-country-wise-kpi/part-00180-328b9507-76e6-4f05-b506-3c16e01d4285-c000.json
-rw-r--r-- 1 hadoop hadoop 165 2022-06-15 16:12 time-country-wise-kpi/part-00185-ffa2a99d-0618-41c2-abab-cb73865996b7-c000.json
[hadoop@ip-172-31-6-228 ~]$
```

```
[hadoop@ip-172-31-6-228 ~]$ time-wise-kpi/part-00198-21224b93-lac7-4748-806b-d39e02d0b82a-c000.json
-bash: time-wise-kpi/part-00198-21224b93-lac7-4748-806b-d39e02d0b82a-c000.json: No such file or directory
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -cat time-wise-kpi/part-00133-6a735a5d-2429-4e1a-858c-e433640e3d76-c000.json/
{"window":{"start":"2022-06-15T16:04:00.000Z","end":"2022-06-15T16:05:00.000Z"},"OPM":17,"total_sales_volume":789.1,"average_transaction_size":46.41764705882353,"rate_of_return":0.058823529411764705}
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -cat time-country-wise-kpi/part-00185-ffa2a99d-0618-41c2-abab-cb73865996b7-c000.json/
{"window":{"start":"2022-06-15T16:05:00.000Z","end":"2022-06-15T16:06:00.000Z"},"country":"United Kingdom","OPM":10,"total_sales_volume":214.0,"rate_of_return":0.1}
[hadoop@ip-172-31-6-228 ~]$
```

```

[hadoop@ip-172-31-6-228 ~]$ time-wise-kpi/part-00198-21224b93-lac7-4748-806b-d39e02d0b82a-c000.json
-bash: time-wise-kpi/part-00198-21224b93-lac7-4748-806b-d39e02d0b82a-c000.json: No such file or directory
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -cat time-wise-kpi/part-00198-21224b93-lac7-4748-806b-d39e02d0b82a-c000.json/
{"window":{"start":"2022-06-15T16:04:00.000Z","end":"2022-06-15T16:05:00.000Z"},"OPM":17,"total_sales_volume":789.1,"average_transaction_size":46.41764705882353,"rate_of_return":0.058823529411764705}
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -cat time-country-wise-kpi/part-00185-f4a2a99d-0618-41c2-abab-cb7386599eb7-c000.json/
{"window":{"start":"2022-06-15T16:05:00.000Z","end":"2022-06-15T16:06:00.000Z"},"country":"United Kingdom","OPM":10,"total_sales_volume":214.0,"rate_of_return":0.1}
[hadoop@ip-172-31-6-228 ~]$ hadoop fs -get /user/hadoop/time-wise-kpi ./time-wise-kpi
[hadoop@ip-172-31-6-228 ~]$

```

The screenshot shows a WinSCP session with the local path 'C:\Users\meta\Desktop\Data Engineering Course 4 Project-Retail Data Analyst\Prashant\Final The Final File(Actual Final)' and the remote path '/home/hadoop/'. The local directory contains various files including '1.JPG' through '11.JPG', 'Codelogic.docx', 'Console-output.txt', 'New Text Document.txt', 'spark-streaming.py', and 'spark-streaming.py.bak'. The remote directory contains 'time-country-wise-kpi', 'time-wise-kpi', and 'spark-streaming.py'. A download progress dialog is open, showing the file 'part-00180-328b9507-76ed-4f05-6506-3c16d164' is being downloaded from 'C:\Users\Prashant\Final The Final File(Actual Final)' to the remote location. The progress is at 99%, with 18.6 KB transferred and 154 KB remaining. The time left is 0:00:01, and the time elapsed is 0:00:36. The speed is 154 KB/s.

The screenshot shows a WinSCP session with the local path 'C:\Users\meta\Desktop\Data Engineering Course 4 Project-Retail Data Analyst\Prashant\Final The Final File(Actual Final)' and the remote path '/home/hadoop/'. The local directory contains various files including 'time-country-wise-kpi', '1.JPG' through '12.JPG', 'Codelogic.docx', 'Console-output.txt', 'New Text Document.txt', 'spark-streaming.py', and 'spark-streaming.py.bak'. The remote directory contains 'time-country-wise-kpi', 'time-wise-kpi', and 'spark-streaming.py'. A download progress dialog is open, showing the file '14' is being downloaded from 'C:\Users\Prashant\Final The Final File(Actual Final)' to the remote location. The progress is at 20%, with 2.46 KB transferred and 9.62 KB remaining. The time left is 0:00:17, and the time elapsed is 0:00:06. The speed is 962 KB/s.

time-country-wise-kpi - ec2-3-83-21-2.compute-1.amazonaws.com - WinSCP

Local Mark Files Commands Session Options Remote Help

ec2-3-83-21-2.compute-1.amazonaws.com X New Session

Desktop

Upload Edit Properties New

time-country-wise-kpi

C:\Users\meta\ Desktop \Data Engineering\Course 4 Project-Retail Data Analysis\Prashant\Final The Final File\Actual Final\

Name	Size	Type	Changed
time-country-wise-kpi		Parent directory	15-06-2022 21:57:55
time-wise-kpi		File folder	15-06-2022 21:56:51
1.JPG	252 KB	JPG File	15-06-2022 21:49:37
2.JPG	267 KB	JPG File	15-06-2022 21:49:56
3.JPG	248 KB	JPG File	15-06-2022 21:50:13
4.JPG	253 KB	JPG File	15-06-2022 21:50:31
5.JPG	308 KB	JPG File	15-06-2022 21:50:47
6.JPG	40 KB	JPG File	15-06-2022 21:51:19
7.JPG	33 KB	JPG File	15-06-2022 21:51:44
8.JPG	206 KB	JPG File	15-06-2022 21:52:19
9.JPG	200 KB	JPG File	15-06-2022 21:53:46
10.JPG	63 KB	JPG File	15-06-2022 21:54:46
11.JPG	74 KB	JPG File	15-06-2022 21:55:43
12.JPG	177 KB	JPG File	15-06-2022 21:57:33
13.JPG	179 KB	JPG File	15-06-2022 21:57:55
CodeLogic.docx	69 KB	Microsoft Office ...	15-06-2022 17:44:00
Console-output.txt	20 KB	Text Document	25-10-2021 17:28:24
New Text Document.txt	1 KB	Text Document	15-06-2022 21:23:27
spark-streaming.py	5 KB	Python File	15-06-2022 21:18:02
spark-streaming.py.bak	5 KB	BAK File	15-06-2022 21:18:38

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/home/hadoop/time-country-wise-kpi/time-country-wise-kpi/

Name	Size	Changed	Rights	Owner
spark_metadata		15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-1a4e1c2-8500-4d77-4f91-1c00b6d9135-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-8b8f6ace-afbe-4441-8b2c-9d9cf816af-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-45c70e1c-c04e-46ed-872d-c7136e761d-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-83ca1240-594d-4348-8885-031942b8874b-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-0196a6d6-8b79-4d21-8a4b-081ec-c25988-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-831b5819-7d4e-4212-ba15-2e78a5d0a21-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-351980a1-38d4-4c02-8a10-118a3a0e23ed-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-2534a4ab-6393-40a2-8f16-e189be18f1cd-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-329b7693-2a6d-43bb-91ee-a13d8f1e1327-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-a37762cb-7521-4a0c-bca3-615d463c3a3a-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-a724ec59-bc11-4865-9095-33f148668f2-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-de17eb37-3933-4098-9379-b39f4539127-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-8c330707-2168-4a4b-9547-022669e29ed-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-a3735d5a-5c90-403d-ab0e-b0137912af-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00000-f57a120-2143-47cd-adbb-e78562979ea-c000.json	0 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00002-38f58776-731d-4939-b3ed-5d81c1a61-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00012-c34afba-31b1-414a-9b7c-99173af70d1-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00019-befc236b-9480-4b5c-07bf-c0b23ada10-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00022-4c17b4ed-14db-429f-ae6b-68d83d6379-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00034-e79398a0-8103-485e-a105-9d7407485d32-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00045-52a168c7-5564-4842-8111-d1c1fa76d765-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00049-9d4071e4-e074-47d0-9233-80d3ac4c088-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00055-0191e4b6-df4d-4b10-ae02-aea579a71b-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00073-261a7e5-c252-42ab-8012-6846d209705-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00081-5d66a435-714d-48f9-bc42-c8a35cdd19f-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00081-41c8a67-35a1-4d76-8381-b9b71ad231a-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00082-59b91a2-079f-479d-975d-68d4b603030-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00086-6da0215-59ab-4b76-9d77-5d807020021-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00095-ded88b0e-ab11-4a41-9e60-9542945787b-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00108-43c35027-a744-41ba-9f8b-e46da4787b58-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00132-c34769b5-123d-4a30-83ed-148d251e1ab4-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00146-e09d1c74-644d-439e-b05c-ec0371368934-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00153-14d8dc09-bfca-433d-ab49-bcd930009fd-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00171-6195131b-bd5a-47c0-b396-473d28160ee-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00175-4406a089-3c4d-481b-8091-64b7602814b-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00183-32b9f057-76ad-495d-b36c-3c16d14d251-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop
part-00185-fa2a99d-9d18-41c2-ab4b-cb73863996b7-c000.json	1 KB	15-06-2022 16:25:25	rw-rw-r--	hadoop

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time-wise-kpi - ec2-3-83-21-2.compute-1.amazonaws.com - WinSCP

Local Mark Files Commands Session Options Remote Help

ec2-3-83-21-2.compute-1.amazonaws.com X New Session

Desktop

Upload Edit Properties New

time-wise-kpi

C:\Users\meta\ Desktop \Data Engineering\Course 4 Project-Retail Data Analysis\Prashant\Final The Final File\Actual Final\

Name	Size	Type	Changed
time-wise-kpi		Parent directory	15-06-2022 21:57:55
time-country-wise-kpi		File folder	15-06-2022 21:56:51
time-wise-kpi		File folder	15-06-2022 21:57:43
1.JPG	252 KB	JPG File	15-06-2022 21:49:37
2.JPG	267 KB	JPG File	15-06-2022 21:49:56
3.JPG	248 KB	JPG File	15-06-2022 21:50:13
4.JPG	253 KB	JPG File	15-06-2022 21:50:31
5.JPG	308 KB	JPG File	15-06-2022 21:50:47
6.JPG	40 KB	JPG File	15-06-2022 21:51:19
7.JPG	33 KB	JPG File	15-06-2022 21:51:44
8.JPG	206 KB	JPG File	15-06-2022 21:52:19
9.JPG	200 KB	JPG File	15-06-2022 21:53:46
10.JPG	63 KB	JPG File	15-06-2022 21:54:46
11.JPG	74 KB	JPG File	15-06-2022 21:55:43
12.JPG	177 KB	JPG File	15-06-2022 21:57:33
13.JPG	179 KB	JPG File	15-06-2022 21:57:55
14.JPG	354 KB	JPG File	15-06-2022 21:58:43
CodeLogic.docx	69 KB	Microsoft Office ...	15-06-2022 17:44:00
Console-output.txt	20 KB	Text Document	25-10-2021 17:28:24
New Text Document.txt	1 KB	Text Document	15-06-2022 21:23:27
spark-streaming.py	5 KB	Python File	15-06-2022 21:18:02
spark-streaming.py.bak	5 KB	BAK File	15-06-2022 21:18:38

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/home/hadoop/time-wise-kpi/time-wise-kpi/

Name	Size	Changed	Rights	Owner
spark_metadata		15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-919c35f6-1736-433e-bc2d-dc033d455d4d-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-4c37b2bd-1e14-4802-ba46-5323a5630e7-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-7d61a6fe-e000-4e7b-a646-352905a17467-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-9af1306e-cf8b-4f8e-ab07-3a6c8b181815-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-3a9a1a07-1163-42d6-975b-28b1682bcb0b-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-0214f0bd-33ce-4d58-b193-ba2555fca7b7-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-041ea273-20ce-458d-b1d1-8cdaad8d5684-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-044b7eed-e577-40a7-5cc0-04f8d17f2311-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-76ad48cc-5d6c-4592-0795-2215a89b071c-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-4c19f3c3-9594-4000-5d64-07ae49d95862-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-4d1e169e-a761-410c-aad8-7c39ba3219f9-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-7073c6c6-064d-4b14-ba70-25097151913-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-c5e76e15-1c93-4028-9e1b-07d897041da-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-c576b1e7-20af-409e-a94f-3a6a1c193773-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-03334c4d-4c11-4daf-e1ed-4d009ac3d8a3-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00000-d4f4d3a5-ac5a-4340-9d46-8698ca407711-c000.json	0 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00004-0341bc09-6842-4a98-840f-8277adab1cf-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00012-0f18a884-2b77-431c-e1e6-e051316d707c-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00034-4b4e459-4024-4d3c-b48d-b4b1b3f0c11c-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00062-7d911238-3e40-4d11-843f-3d4829d6e481-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00087-80feda25-b743-401b-811e-0262051dec0f-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00088-b73849a3-c487-4253-ba72-79f090e0443-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00099-ba7a5d4e-0777-4b2b-b7d5-07626a6e9b71-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00106-5b2ab871-4e4c-441a-850c-e4336a0c3d76-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00133-4a735a5d-2429-4e1a-850c-e4336a0c3d76-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00154-203a6b62-77ee-4c10-8058-6d361be2d484-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop
part-00189-21224693-1ac7-4748-806b-d39e1d5d682a-c000.json	1 KB	15-06-2022 16:25:10	rw-rw-r--	hadoop

0 B of 2.09 KB in 0 of 28