Big Data Technologies

Final project

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Agenda

- Objectives
- Project introduction
- Architecture
- Big data technologies used
- Instructions
- Demo

Project Objectives

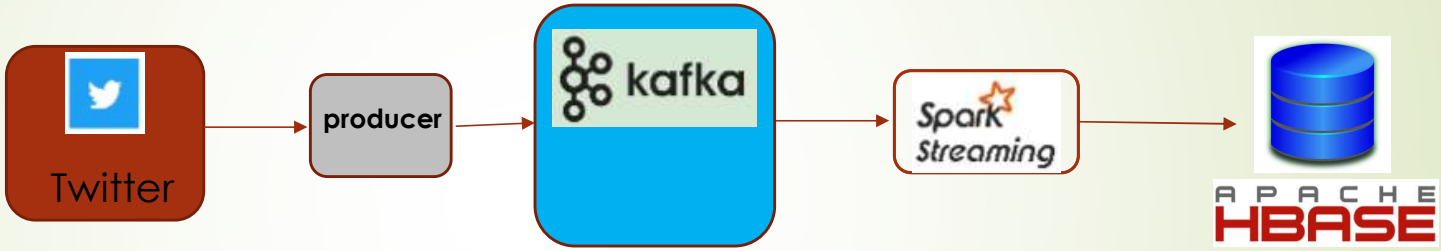
- Apply big data technologies learned in this course into real project
- Research new big data technologies
- Solve a real problem using big data technologies

Project introduction

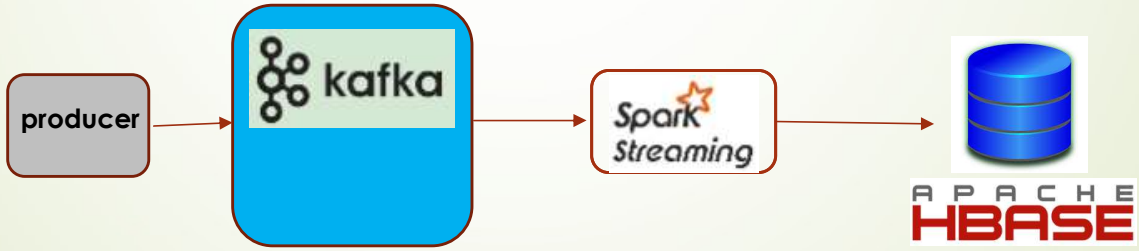
- Original/planned solved problem:
  - Extract data from twitter to see what US people are discussing/thinking about Trump and Biden
  - From the extracted data, there will be another step to analyze them and see Trump or Biden who will have more chance to win the 2020 election.
  - Unsolved issue: there is bug and cannot extract data from Twitter
- Problem is implemented
  - Generate/Read a stream of numbers and analyze/classify which one is even/odd number

Architecture

- Original/planned solved problem



- Problem is implemented/solved



Architecture (cont.)

There are 2 Java based projects

- Producer project
  - Generate/extract data from source and output to Kafka
  - Play the role as Kafka producer

- Consumer project
  - Read data from Kafka using Spark streamming
  - Analyze data
  - Output to Hbase
  - Play the role as Kafka consumer

Big Data Technologies used

- Spark Streamming
- Hbase
- Kafka
- Others: Twitter API

Instructions

- Start Kafka

  KAFKA_HOME=/home/cloudera/kafka_2.12-2.6.0; export KAFKA_HOME

  //Start Zookeeper server

  $KAFKA_HOME/bin/zookeeper-server-start.sh $KAFKA_HOME/config/zookeeper.properties

  //Start Kafka server

  $KAFKA_HOME/bin/kafka-server-start.sh $KAFKA_HOME/config/server.properties

- Create a topic

  //Create a topic

  $KAFKA_HOME/bin/kafka-topics.sh --create --zookeeper localhost:2181 --replication-factor 1 --partitions 1 --topic KafkaData

- Test Kafka with Kafka producer and consumer

  //Send some messages

  $KAFKA_HOME/bin/kafka-console-producer.sh --broker-list localhost:9092 --topic KafkaData

  //Start a consumer

  $KAFKA_HOME/bin/kafka-console-consumer.sh --bootstrap-server localhost:9092 --topic KafkaData --from-beginning

Instructions (cont.)

- Start consumer application

  spark-submit --class "bangle.cs523.SparkStreamProj.App" --master yarn /home/cloudera/FinalProject/SparkStreamProj/target/SparkStreamProj-0.0.1-SNAPSHOT.jar

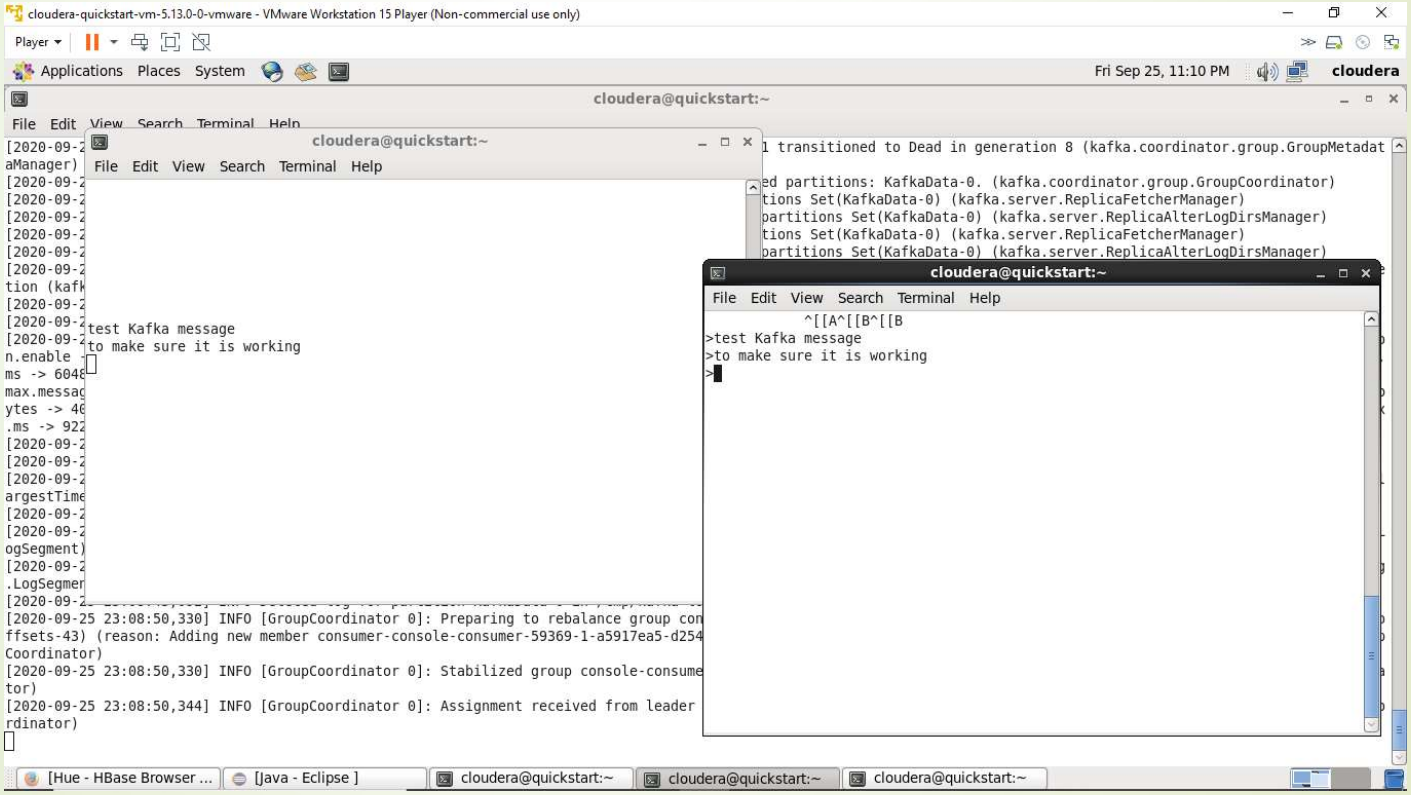
- Start producer application

  spark-submit --class "bangle.cs523.KafkaProducer.App" --master yarn /home/cloudera/FinalProject/KafkaProducer/target/KafkaProducer-0.0.1-SNAPSHOT.jar

- Check Hbase for result

Demo

- Start Kafka server and test Kafka with Kafka producer and consumer



Demo (cont.)

- Start Consumer application

cloudera-quickstart-vm-5.13.0-0-vmware - VMware Workstation 15 Player (Non-commercial use only)

Player | Applications Places System | Fri Sep 25, 11:14 PM | cloudera

cloudera@quickstart:~

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20/09/25 23:14:26 INFO storage.BlockManager: Removing RDD 14
20/09/25 23:14:26 INFO scheduler.ReceivedBlockTracker: Deleting batches ArrayBuffer()
20/09/25 23:14:26 INFO scheduler.InputInfoTracker: remove old batch metadata: 1601100862000 ms
20/09/25 23:14:28 INFO scheduler.JobScheduler: Starting job streaming job 1601100868000 ms.0 from job set of time 1601100868000 ms
20/09/25 23:14:28 INFO scheduler.JobScheduler: Added jobs for time 1601100868000 ms
20/09/25 23:14:28 INFO spark.SparkContext: Starting job: collect at App.java:78
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Got job 9 (collect at App.java:78) with 1 output partitions
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Final stage: ResultStage 9 (collect at App.java:78)
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Parents of final stage: List()
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Missing parents: List()
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Submitting ResultStage 9 (MapPartitionsRDD[19] at map at App.java:52), which has no missing parents
20/09/25 23:14:28 INFO storage.MemoryStore: Block broadcast_9 stored as values in memory (estimated size 3.8 KB, free 534.5 MB)
20/09/25 23:14:28 INFO storage.MemoryStore: Block broadcast_9_piece0 stored as bytes in memory (estimated size 2.2 KB, free 534.5 MB)
20/09/25 23:14:28 INFO storage.BlockManagerInfo: Added broadcast_9_piece0 in memory on localhost:48735 (size: 2.2 KB, free: 534.5 MB)
20/09/25 23:14:28 INFO spark.SparkContext: Created broadcast 9 from broadcast at DAGScheduler.scala:1004
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Submitting 1 missing tasks from ResultStage 9 (MapPartitionsRDD[19] at map at App.java:52) (first 15 tasks are for partit
ions Vector(0))
20/09/25 23:14:28 INFO scheduler.TaskSchedulerImpl: Adding task set 9.0 with 1 tasks
20/09/25 23:14:28 INFO scheduler.TaskSetManager: Starting task 0.0 in stage 9.0 (TID 9, localhost, executor driver, partition 0, ANY, 2101 bytes)
20/09/25 23:14:28 INFO executor.Executor: Running task 0.0 in stage 9.0 (TID 9)
20/09/25 23:14:28 INFO kafka.KafkaRDD: Beginning offset 203 is the same as ending offset skipping KafkaData 0
20/09/25 23:14:28 INFO executor.Executor: Finished task 0.0 in stage 9.0 (TID 9). 915 bytes result sent to driver
20/09/25 23:14:28 INFO scheduler.TaskSetManager: Finished task 0.0 in stage 9.0 (TID 9) in 4 ms on localhost (executor driver) (1/1)
20/09/25 23:14:28 INFO scheduler.TaskSchedulerImpl: Removed TaskSet 9.0, whose tasks have all completed, from pool
20/09/25 23:14:28 INFO scheduler.DAGScheduler: ResultStage 9 (collect at App.java:78) finished in 0.000 s
20/09/25 23:14:28 INFO scheduler.DAGScheduler: Job 9 finished: collect at App.java:78, took 0.013521 s
20/09/25 23:14:28 INFO scheduler.JobScheduler: Finished job streaming job 1601100868000 ms.0 from job set of time 1601100868000 ms
20/09/25 23:14:28 INFO scheduler.JobScheduler: Total delay: 0.061 s for time 1601100868000 ms (execution: 0.020 s)
20/09/25 23:14:28 INFO rdd.MapPartitionsRDD: Removing RDD 17 from persistence list
20/09/25 23:14:28 INFO storage.BlockManager: Removing RDD 17
20/09/25 23:14:28 INFO kafka.KafkaRDD: Removing RDD 16 from persistence list
20/09/25 23:14:28 INFO storage.BlockManager: Removing RDD 16
20/09/25 23:14:28 INFO scheduler.ReceivedBlockTracker: Deleting batches ArrayBuffer()
20/09/25 23:14:28 INFO scheduler.InputInfoTracker: remove old batch metadata: 1601100864000 ms
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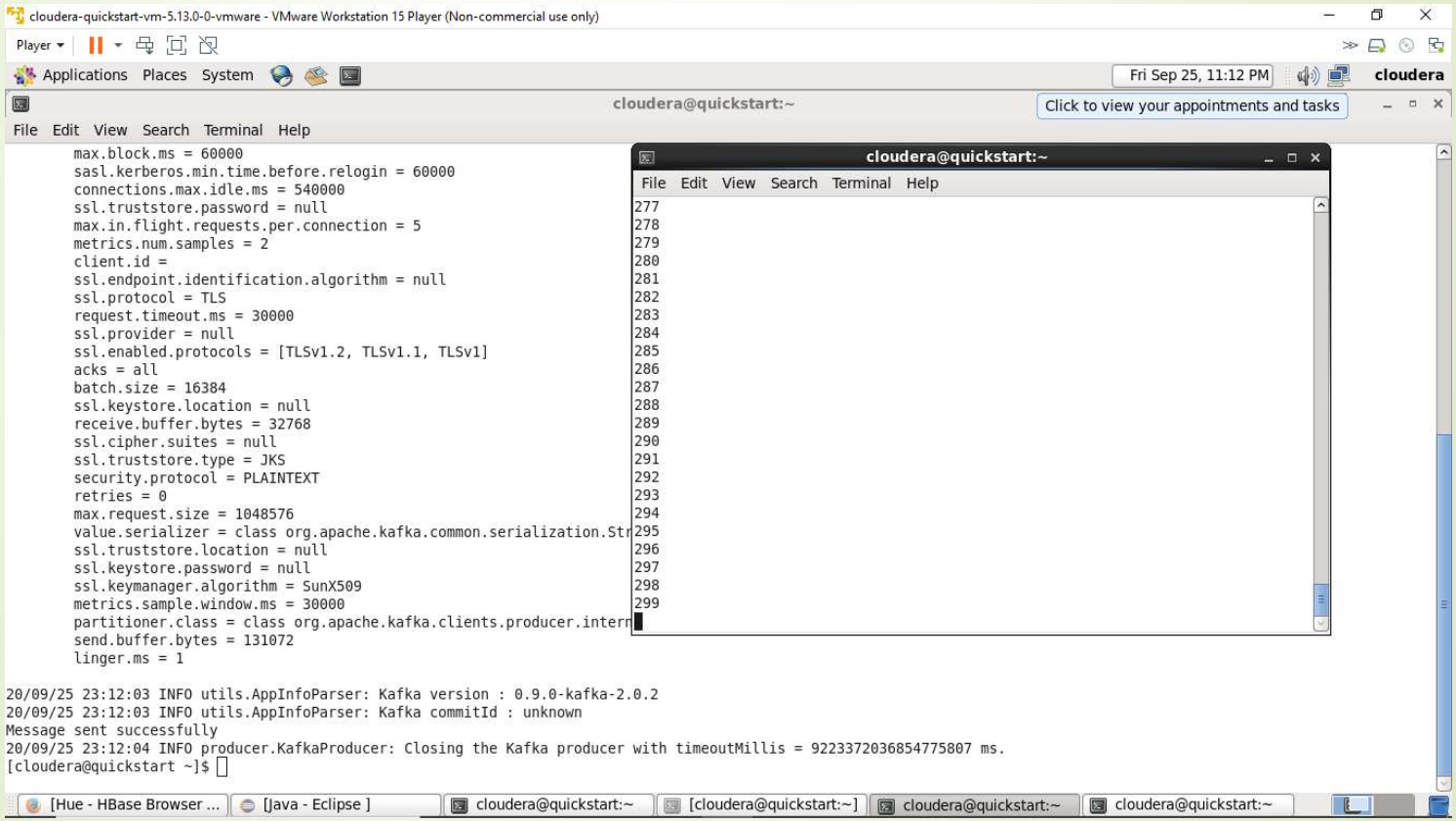
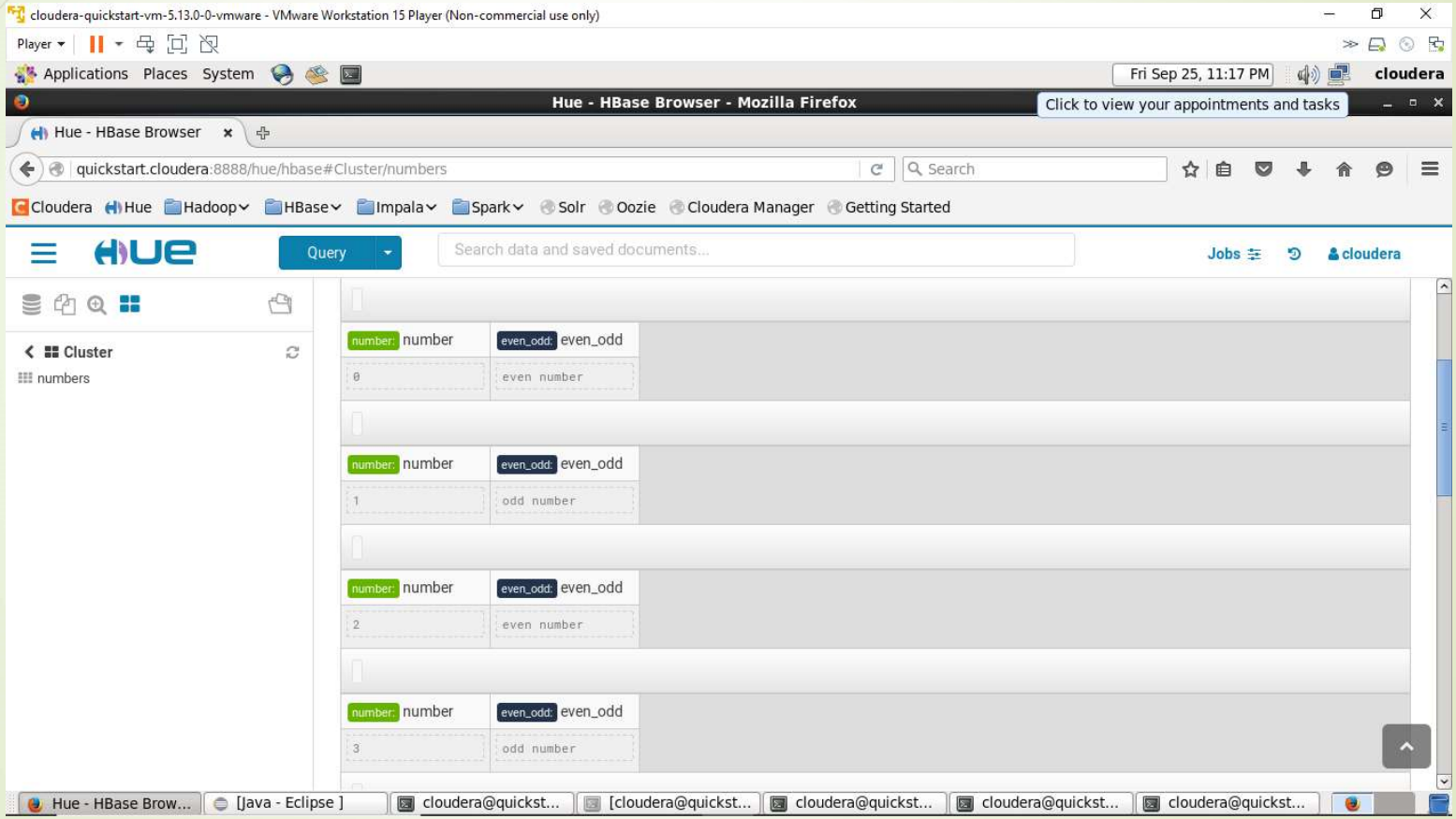
Demo (cont.)

- Start Producer application and check Kafka consumer for generated numbers



Demo (cont.)

- Check result in HBase



Coveraged Requirements

Project Parts	Short Description	Notes
1	Spark Streaming Project	SparkStreamProj project
2	Spark and HBase Integration	SparkStreamProj project
3	Additional small research project	Integrated with Kafka in both projects
4	Video recording of project demo	Link to video will be provided

Thank You