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Telecom Data Analysis

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Sarva, Sai Roopak; Masetty, Anudeep; and Kondam, Vinay Reddy, "Telecom Data Analysis" (2015). *All Capstone Projects*. 149. http://opus.govst.edu/capstones/149

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1 Project Description

1.1 Project Abstract

The telecommunications industry regularly uses data analytics in fields such as customer analysis and network optimization. For financial analysis such as identifying risks, which could negatively impact an entity's financial performance, communications service providers have traditionally used statistical sampling techniques that cover only short time periods and a limited subset of data.

Given the massive number of transactions processed by telecommunications companies; and the costs and complexity involved in their operations, data analytics offers a valuable opportunity for enhancing the frameworks and procedures they adopt to drive profitability and minimize unnecessary downside risk.

1.2 Competitive Information

All other Service providers are having terabytes of data and scattered across the organization. In order to exploit the full potential of this stored data, service providers must have solutions that can help them correlate, process and decipher the actionable information. This is not possible without big data and advanced analytics.

1.3 Relationship to Other Applications/Projects

This project is relevant to the existing techniques of analyzing data using different databases like MYSQL but not same in the platform and architecture used in this project. MySQL is playing a key role in many big data platforms. Based on estimates from a leading Hadoop vendor, MySQL is a core component of the big data pipeline in over 80% of deployments

1.4 Assumptions and Dependencies

Assumptions are made based on rapid data growth in the future of a telecom Industry. The telecom sector's use of data analytics tools is expected to grow at a compound annual growth rate of 28.28 percent over the next four years.

1.5 Future Enhancements

The one possible evolution which made is moving this platform to cloud based engines might help burden of managing cluster environment. The mobile market is poised for a huge explosion of new business. More than half of the world's population of 7 billion is using mobile connections at present, and estimates suggest another billion will join in over the next two to three years. With many subscribers using more than one device, the total number of mobile connections, also around 7 billion at present, is increasing sharply.

1.6 Definitions and Acronyms

HDFS – Hadoop Distributed File System MR – MapReduce

2 Technical Description

This application scope is to use Hadoop infrastructure to analyze the data which is coming to Hadoop cluster and stored in HDFS as files and to find out the solution for business problems

Telecom Data Analysis will help telecom companies to do market analysis and predictive analysis based on existing users and their orders information. The current systems cannot handle the large volume in a reasonable time. The new system will use Hadoop framework to handle processing of semi-structured and large volumes of data by parallelism techniques

These are the components used in this project:-Initial Data Storage : MySQL Data Ingestion : Sqoop (SQL+Hadoop),MapReduce Data Storage from Hadoop : HDFS and HIVE tables Data Analysis : HIVE and MapReduce

2.1 Project/Application Architecture

Architecture : Starts by importing data from RDBMS systems to Hadoop – Creating tables on top of imported data – Apply analytical queries to get business insights



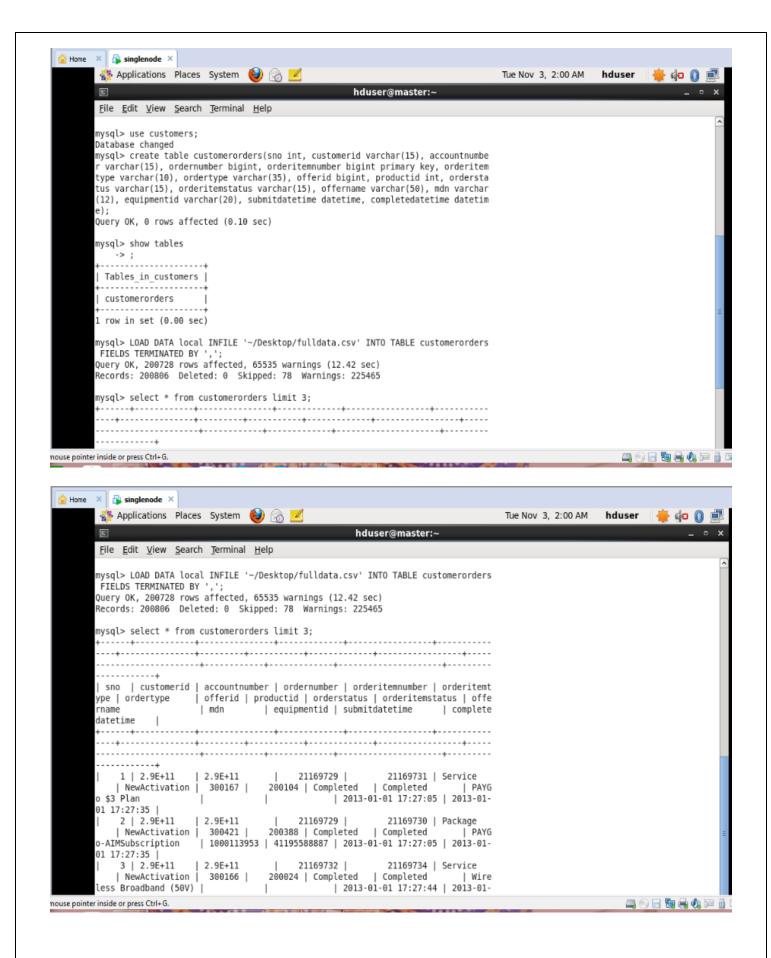
2.2 Project/Application Information flows

Step: I Initial Data Storage

- Generally the telecom company consists of the customers' orders data in the form of a excel file where it has 200078 records in it.
- In this step we need to store the data in MySQL database by creating a database called customers and a table called customer orders
- So that data from excel file can be loaded into MySQL through logging into MySQL

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Step : II Data Ingestion

- Data ingestion is the process of obtaining, importing, and processing data for later use or storage in a database.
- In this step the data is imported from MySQL database to hive ecosystem by using a tool called SQOOP
- Where SQOOP is a used in HADOOP to import the data from other sources

Step : III Data Storage in Hadoop

- In this step we used HDFS and hive components to make sure the data got imported into hive successfully or not.
- By using the web interface we can access the customerorders file which got imported into hive
- Once we get into hive by using several queries we checked the data got imported or not.

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Step : IV Data Analysis

- In this step we used hive and map reduce components to analyze the data and to get the required reports
- Here Hive converts SQL queries into MapReduce jobs by using its own feature called HiveQL
- By executing selected four different hive queries on Hive. We analyzed the customer data

Home × Siglenode ×
hive> set hive.cli.print.header=true;
hive> select count(B.hour)as count,B.hour from(select A.ordernumber ,hour(A.submitdatetime)as hour from (select distinct ord
ernumber , submitdatetime from customerorders)A)B group by B.hour order by count desc;
Total MapReduce jobs = 3
Launching Job 1 out of 3
Number of reduce tasks not specified. Estimated from input data size: 1
In order to change the average load for a reducer (in bytes):
<pre>set hive.exec.reducers.bytes.per.reducer=<number></number></pre>
In order to limit the maximum number of reducers:
<pre>set hive.exec.reducers.max=<number></number></pre>
In order to set a constant number of reducers:
set mapred.reduce.tasks= <number></number>
Starting Job = job_201511211648_0002, Tracking URL = http://master:50030/jobdetails.jsp?jobid=job_201511211648_0002
Kill Command = /usr/local/hadoop-1.0.4/libexec//bin/hadoop job -Dmapred.job.tracker=master:54311 -kill job_201511211648_00
02
Hadoop job information for Stage-1: number of mappers: 1; number of reducers: 1
2015-11-21 16:55:57,814 Stage-1 map = 0%, reduce = 0%
2015-11-21 16:56:22,150 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 12:09 sec
2015-11-21 16:56:23,190 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 12.09 sec
2015-11-21 16:56:24,224 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 12.09 sec
2015-11-21 16:56:25,249 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 12.09 sec 2015-11-21 16:56:26,277 Stage-1 map = 100%, reduce = 0%, Cumulative CPU 12.09 sec
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Job 1: Map: 1 Reduce: 1 Cumulative CPU: 10.15 sec HDFS Read: 1495 HDFS Write: 1042 SUCCESS Job 2: Map: 1 Reduce: 1 Cumulative CPU: 10.03 sec HDFS Read: 1495 HDFS Write: 148 SUCCESS	
Total MapReduce CPU Time Spent: 44 seconds 670 msec	
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MapReduce Total cumulative CPU time: 10 seconds 900 msec Ended Job = job_201511211648_0018	
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Job 1: Map: 1 Reduce: 1 Cumulative CPU: 21.37 sec HDFS Read: 1015 HDFS Write: 562 SUCCESS	
Job 2: Map: 1 Reduce: 1 Cumulative CPU: 10.9 sec HDFS Read: 1015 HDFS Write: 19 SUCCESS Total MapReduce CPU Time Spent: 50 seconds 340 msec	
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hive>	
> select orderyear, TotalOrders, DiscOrders, ((DiscOrders/TotalOrders)*100) as DiscPercentage from (select orderyear, nt(ordernumber) as TotalOrders, count(case OrderType when 'Disconnect' THEN 'asdf' ELSE null END) as DiscOrders from(select	cou ct d
istinct ordernumber, ordertype, year(submitdatetime)as orderyear from customerorders where ordertype<>'')A group by ordery	/ear
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MapReduce Jobs Launched:	
Job 0: Map: 1 Reduce: 1 Cumulative CPU: 32.75 sec HDFS Read: 32753309 HDFS Write: 198 SUCCESS	
Job 1: Map: 1 Reduce: 1 Cumulative CPU: 9.03 sec HDFS Read: 651 HDFS Write: 133 SUCCESS	
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2.3 Interactions with other Projects (if Any)

It can interacted with other reporting tools to visualize the results.

2.4 Interactions with other Applications

Interaction with other RDMS system like MySQL is needed here to ingest the data.

2.5 Capabilities

MySQL should provide capabilities to support retrieving the data from its database from Hadoop. HIVE should be able to handle very big data in less response time.

2.6 Risk Assessment and Management

Risk associated with this project is when data ingestion is happening, Developer may loss some data if any services of Hadoop are not running or any nodes are failed. To make sure to not to happen this keep poll cluster to ensure all services are up and running.

3 Project Requirements

3.1 Identification of Requirements

Need at least single node running Hadoop cluster with MySQL installed and Hadoop 1.0.4 installed.

And HIVE any version have installed and successfully running on cluster .

3.2 Operations, Administration, Maintenance and Provisioning (OAM&P)

There is no special skill requirement needed for maintenance and administration until unless user is familiar with basic HDFS commands.

3.3 Security and Fraud Prevention

There no special requirement to take for security here , Bu default Hadoop provides key based communication between nodes.

3.4 Release and Transition Plan

Project will be deployed to the client by ingesting HIVE results to other reporting tools to create user interface for all results in the form of tables.

4 Project Design Description

Given the massive number of transactions processed by telecommunications companies; and the costs and complexity involved in their operations, data analytics offers a valuable opportunity for enhancing the frameworks and procedures they adopt to drive profitability and minimize unnecessary downside risk.

For simpler and faster processing of only relevant data, service providers need an advanced analytics driven big data solution that will help them to achieve timely and accurate insights using data mining and predictive analytics, text mining, forecasting and optimization capability to continuously drive innovation and help service providers make the best possible decisions.

5 Project Internal/external Interface Impacts and Specification

As we discuss about the project external interface impact, it deals with the MySQL which plays a major impact in importing the data into Hive. In case if the importing got failed or import was not successful then the analyzing of data cannot be done and we need to stop the project at same time, which generate a heavy loss to company and client. Coming to project Internal Interface , it impacts very less when compared to the external interface

6 Project Design Units Impacts

There will be no impact on MySQL database. Once the ingestion done there will be impact on HIVE database and table will be updated.

6.1 Functional Area/Design Unit

6.1.1 Functional Overview

This project starts with importing the data from MySQL to HIVE, after that several queries are applied to analyze the data in a functional way.

6.1.2 Impacts

This project completely deals in between MySQL an HIVE, SO no other elements will get effected.

6.1.3 Requirements

• Hadoop distribution.(Hadoop 1.0.4)

- MapReduce, Sqoop, Hive.
- VM ware workstation 9.0/VM ware Player 5 or greater.
- SSH Server as well as Client.
- JDK 1.7

7 References

http://birtanalytics.actuate.com/telecom-analytics

http://spotfire.tibco.com/blog/?p=18318