llama Big Data Integration and Analysis

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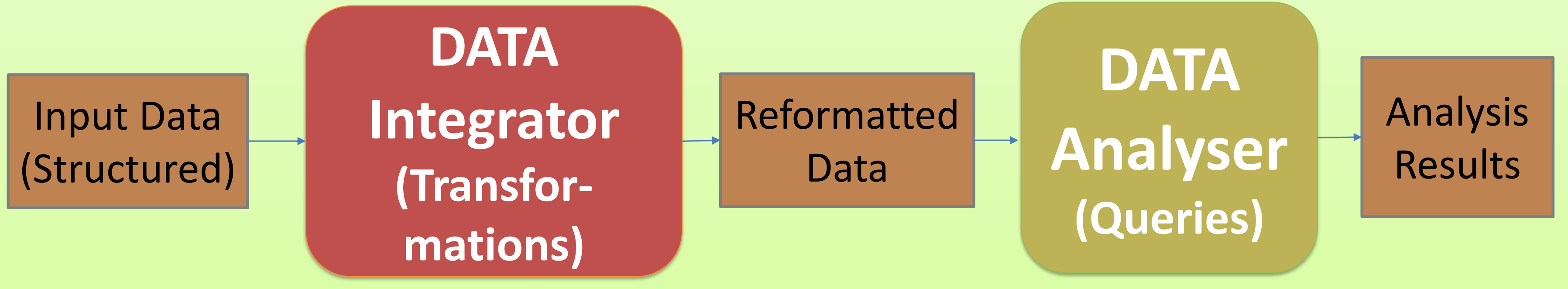
Project Overview

Llama is Data Integration and Analysis Platform made of two components:

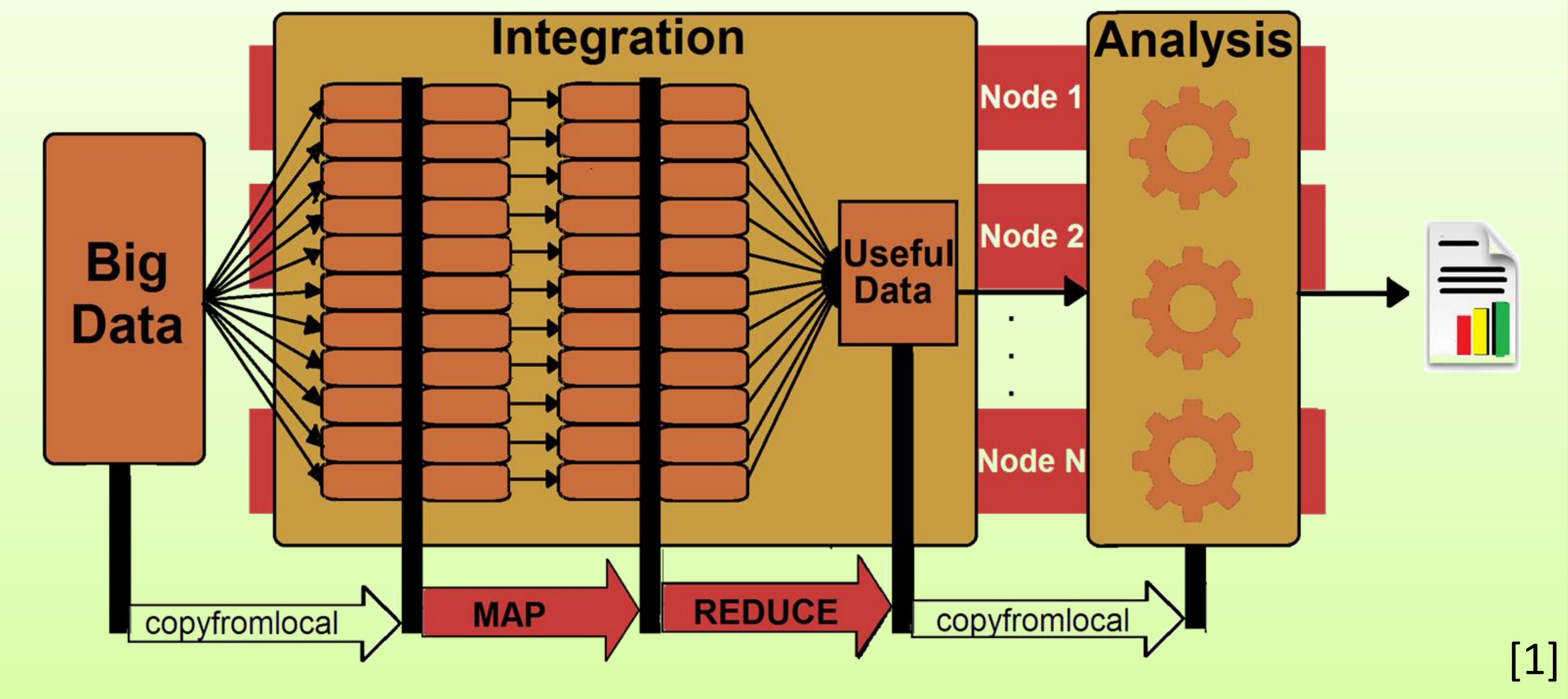
1. Data Integrator: Llama first loads structured plain files. Then data loaded is cleaned, reformatted and filtered using a series of user-selected transformations. Integration jobs can be specified in two ways: either via (1) a graphical User Interface, or (2) a script written in **IJSL**, for **I**ntegration **J**ob **S**pecification **L**anguage. If the first method is used, at the end, the job can be exported as an IJSL script that can be used in a later run.

2. Data Analyzer: Once ready, the new data is analyzed by means of SQL queries. The results can be stored for possibly further analysis.



Input Data (Structured) → DATA Integrator (Transfor-mations) → Reformatted Data → DATA Analyser (Queries) → Analysis Results

System Architecture



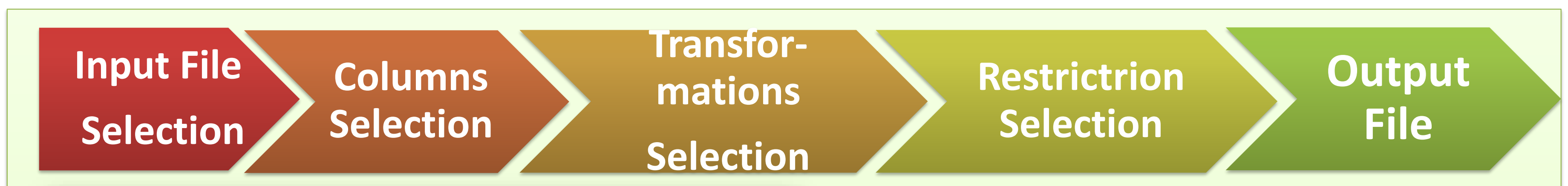
[1]

Implementation

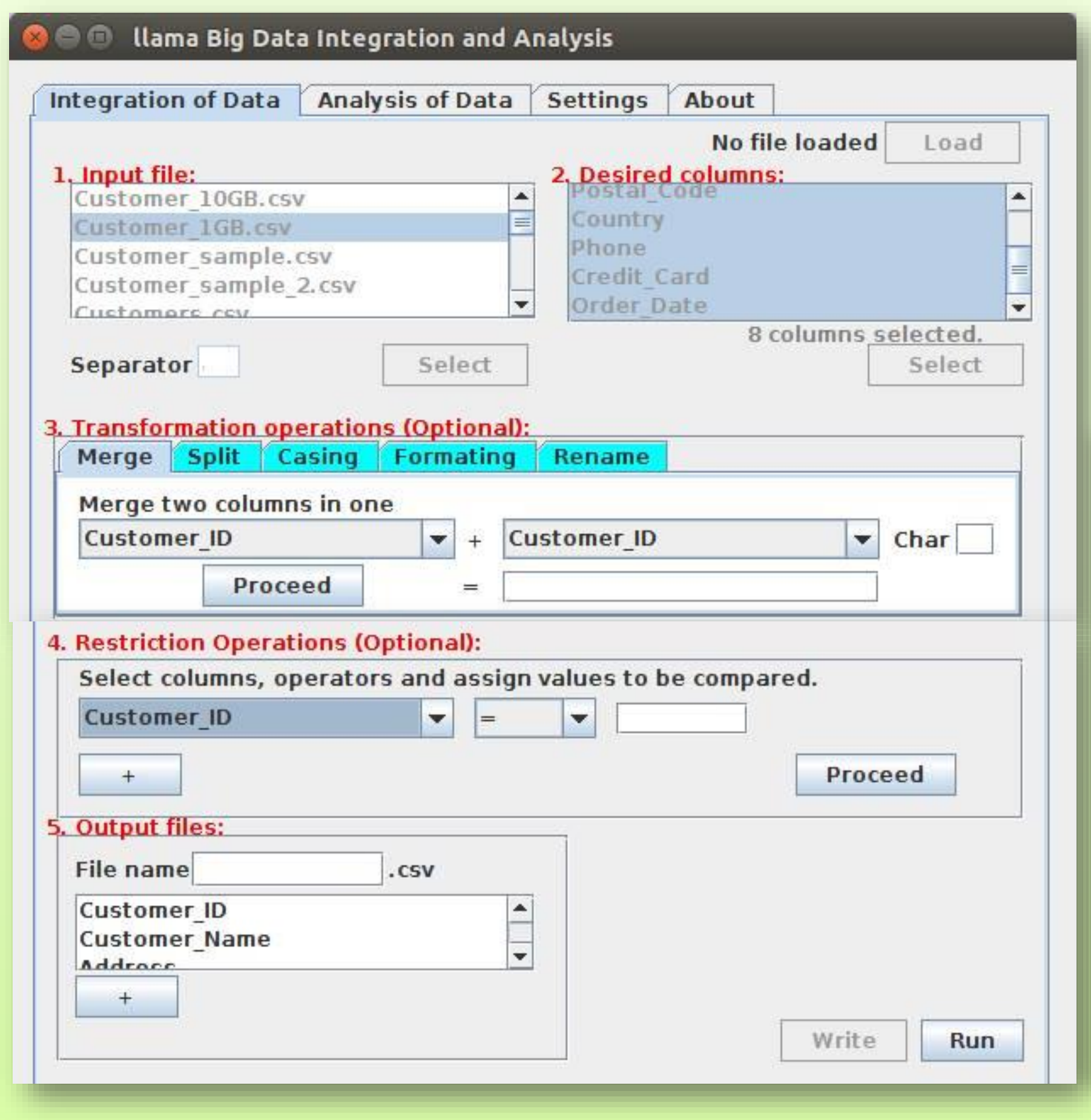
Apache Hadoop is an open-source framework for distributed storage and processing of very large data sets on a of commodity hardware. [2]

Apache Spark is an open-source cluster computing framework. It employs the concept of RDDs which are distributed units of data that resides primarily in memory, hence its high speed. [3]

Data Integrator



Input File Selection → Columns Selection → Transfor-mations Selection → Restrictrion Selection → Output File



llama Big Data Integration and Analysis

Integration of Data | Analysis of Data | Settings | About

No file loaded [Load]

1. Input file: Customer_10GB.csv, Customer_1GB.csv, Customer_sample.csv, Customer_sample_2.csv, Customers.csv

2. Desired columns: Postal_Code, Country, Phone, Credit_Card, Order_Date

8 columns selected.

Separator [Select] [Select]

3. Transformation operations (Optional): Merge | Split | Casing | Formating | Rename

Merge two columns in one: Customer_ID + Customer_ID Char [Proceed] =

4. Restriction Operations (Optional):

Select columns, operators and assign values to be compared.

Customer_ID = [+] [Proceed]

5. Output files:

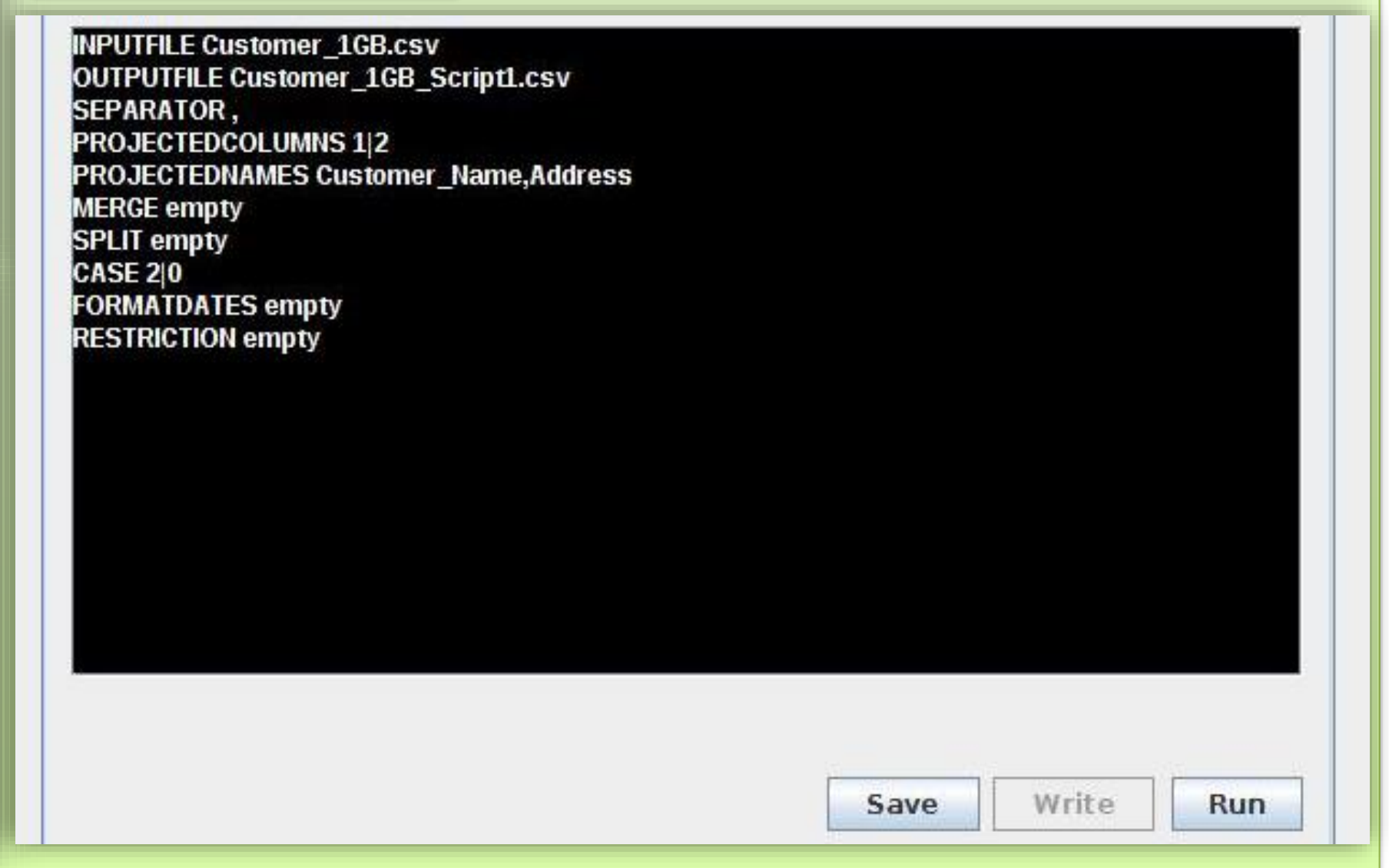
File name .csv

Customer_ID, Customer_Name, Address [+]

[Write] [Run]

(*) alternative flow

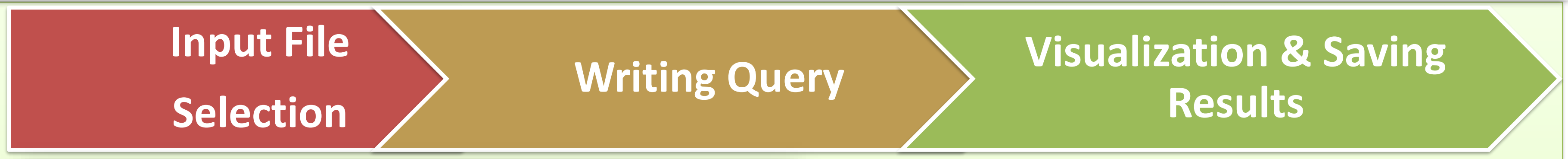
Write or Load IJSL Script



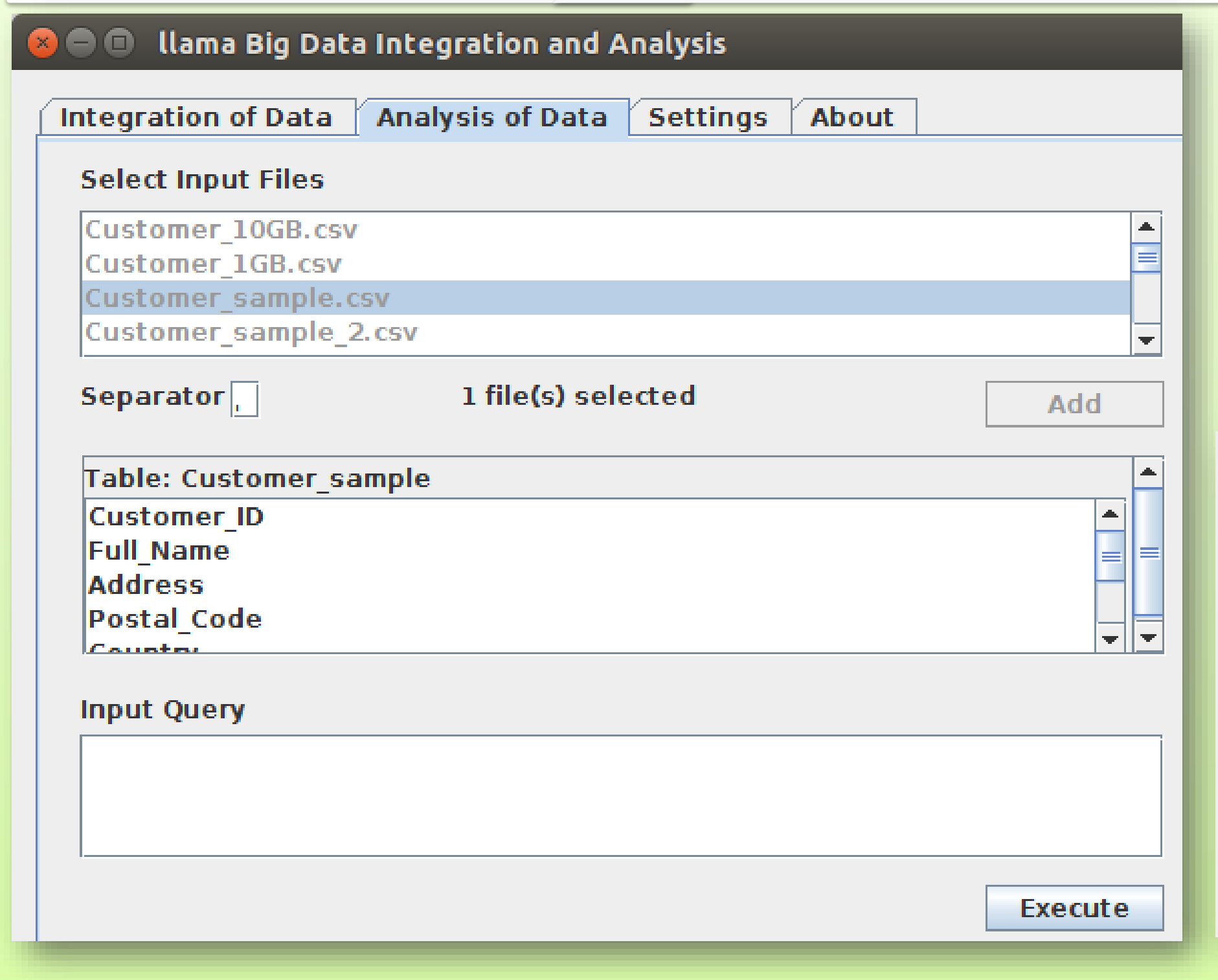
```
INPUTFILE Customer_1GB.csv
OUTPUTFILE Customer_1GB_Script1.csv
SEPARATOR ,
PROJECTEDCOLUMNS 1|2
PROJECTEDNAMES Customer_Name,Address
MERGE empty
SPLIT empty
CASE 2|0
FORMATDATES empty
RESTRICTION empty
```

[Save] [Write] [Run]

Data Analyser



Input File Selection → Writing Query → Visualization & Saving Results



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Integration of Data | Analysis of Data | Settings | About

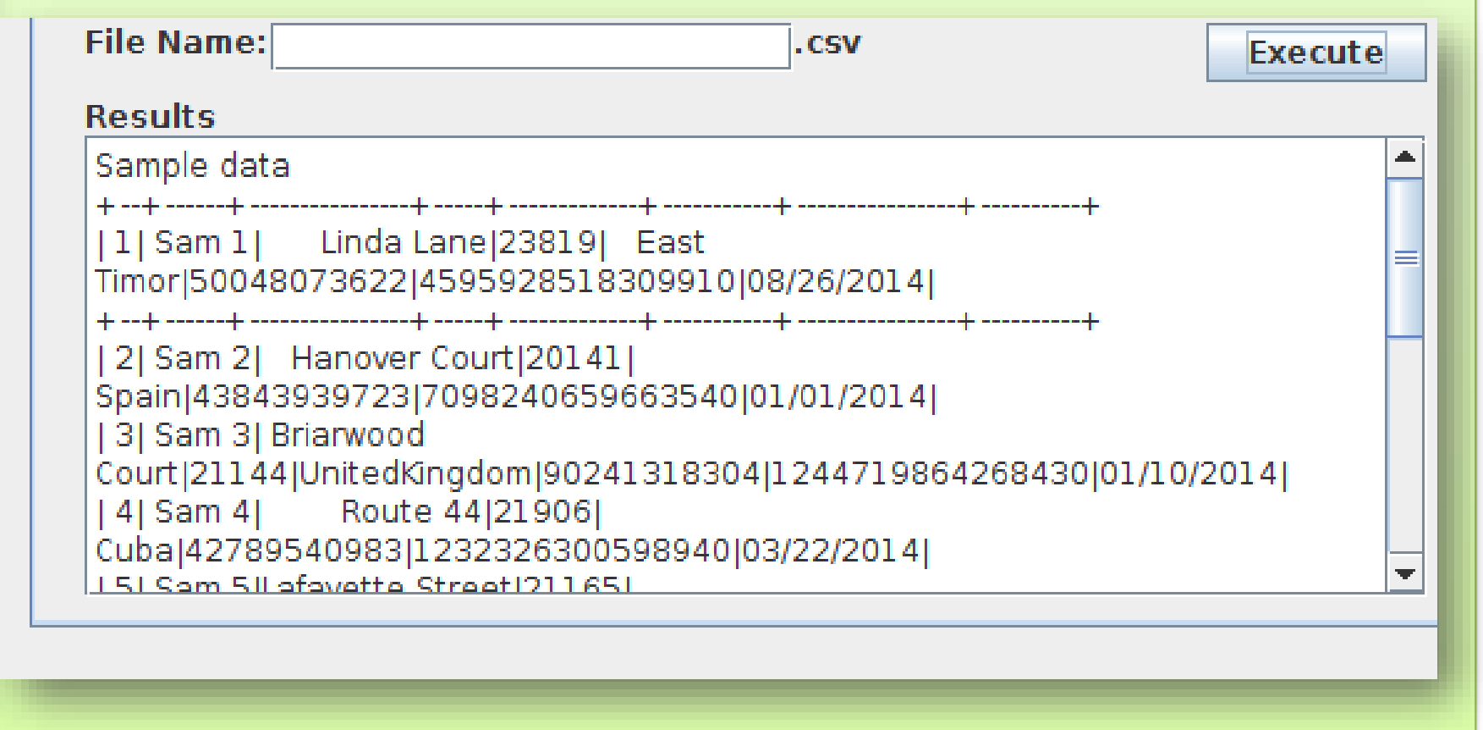
Select Input Files: Customer_10GB.csv, Customer_1GB.csv, Customer_sample.csv, Customer_sample_2.csv

Separator , — 1 file(s) selected [Add]

Table: Customer_sample — Customer_ID, Full_Name, Address, Postal_Code, Country

Input Query

[Execute]

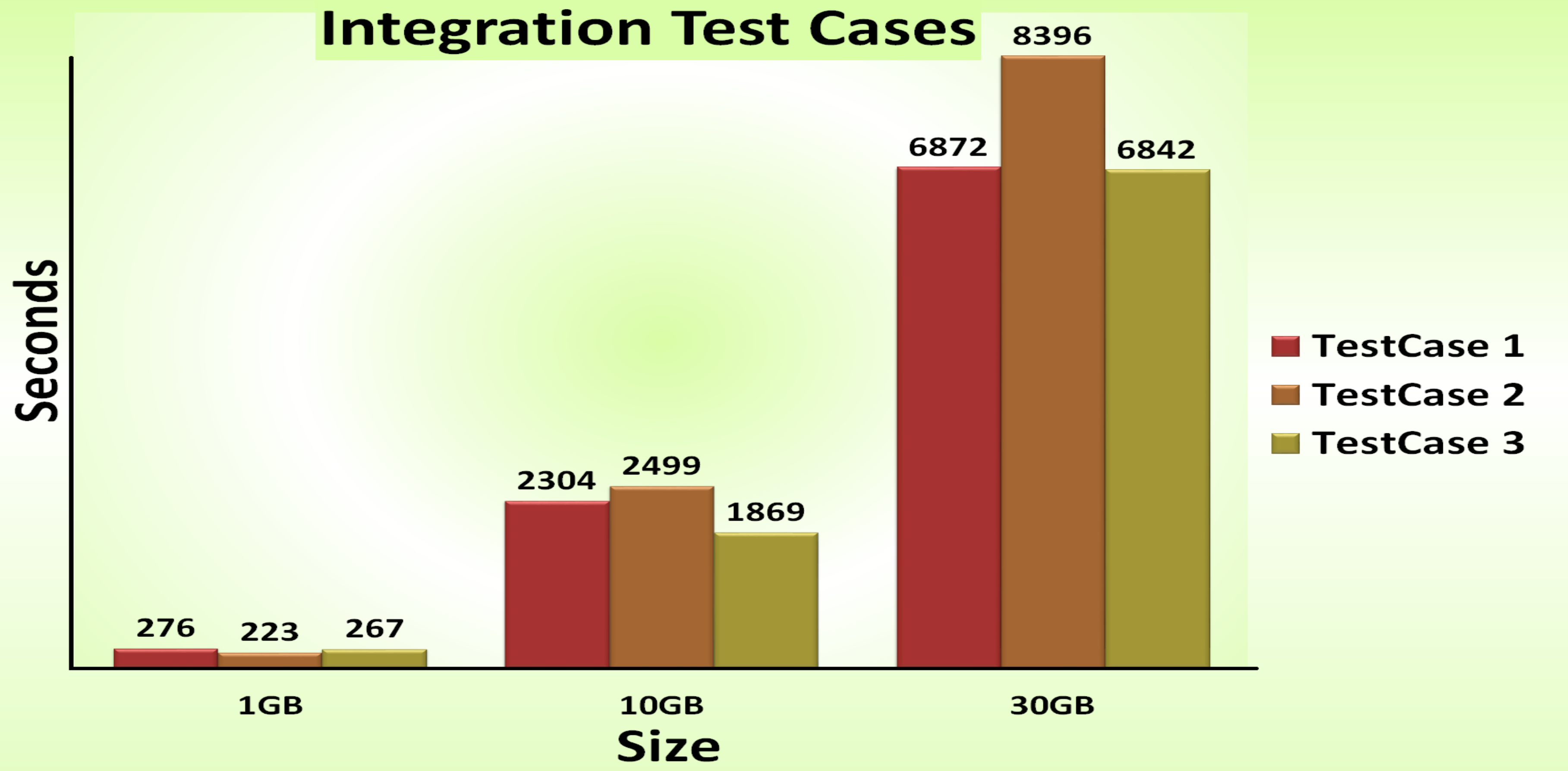


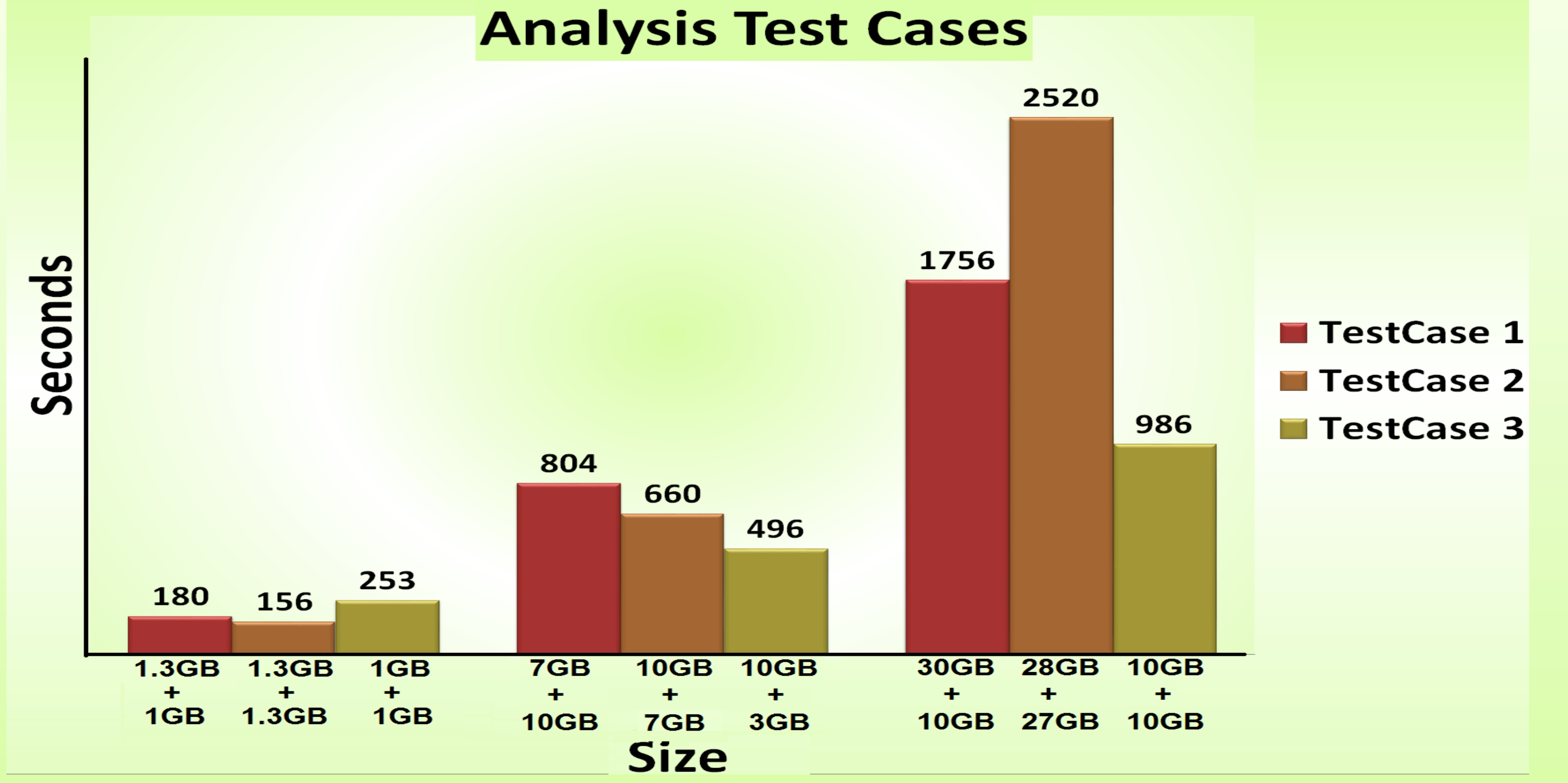
File Name: .csv [Execute]

Results

```
Sample data
+--+------+---------------+-----+------------+----------+---------------+---------+
|1| Sam 1|     Linda Lane|23819|  East
Timor|50048073622|4595928518309910|08/26/2014|
+--+------+---------------+-----+------------+----------+---------------+---------+
|2| Sam 2|  Hanover Court|20141|
Spain|43843939723|7098240659663540|01/01/2014|
|3| Sam 3| Briarwood
Court|21144|UnitedKingdom|90241318304|1244719864268430|01/10/2014|
|4| Sam 4|       Route 44|21906|
Cuba|42789540983|1232326300598940|03/22/2014|
|5| Sam 5|Lafayette Street|21165|
```

Evaluations





Live Demo

A virtual machine hosted on EIS03

Software installed:

- Ubuntu 14.04 LTS 64bit
- 1GB RAM
- JDK 1.8
- Apache Hadoop 2.6
- Apache Spark 1.4

Local Access:
User: eis-user
Password: E1sbda2015

Remote Access:
Partner ID: 392368182
Password: E1sbda2015

References :

[1] http://www.glennklockwood.com/data-intensive/hadoop/mapreduce-workflow.png

[2] https://en.wikipedia.org/wiki/Apache_Hadoop

[3] https://en.wikipedia.org/wiki/Apache_Spark