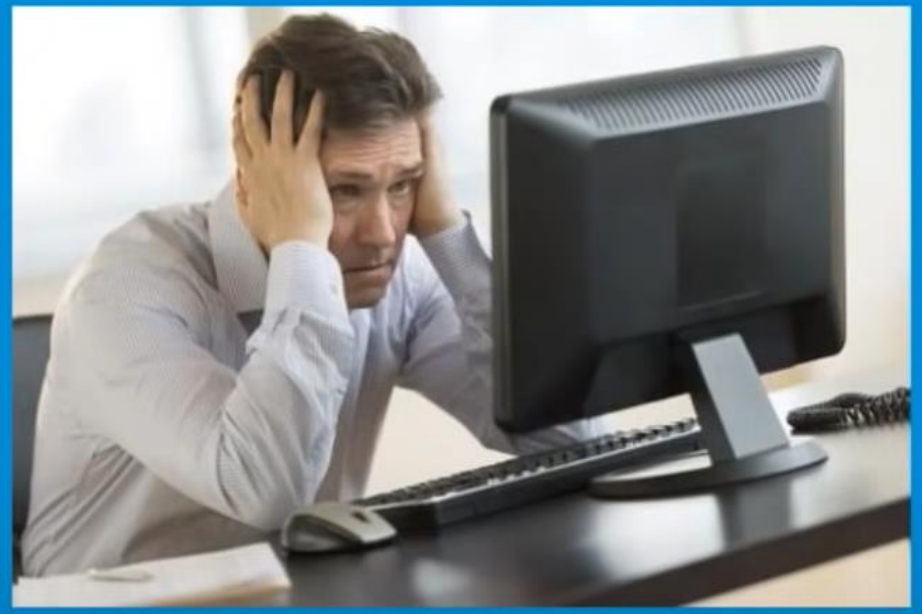

Pig Tutorial

# Agenda for today's Session

- Entry of Apache Pig
- Pig vs MapReduce
- Twitter Case Study on Apache Pig
- Apache Pig Architecture
- Pig Components
- Pig Data Model & Operators
- Running Pig Commands and Pig Scripts (Log Analysis)

# MapReduce Way

In MapReduce, you need to write a program in Java/Python to process the data.



What if you are from Non-programming background!!

Are your Hadoop days over before they even started? ☹

No need to worry at all!

There are multiple tools in Hadoop Ecosystem where you do not need programming background.

And in today's session, I will tell you abou one such tool!

# Apache PIG

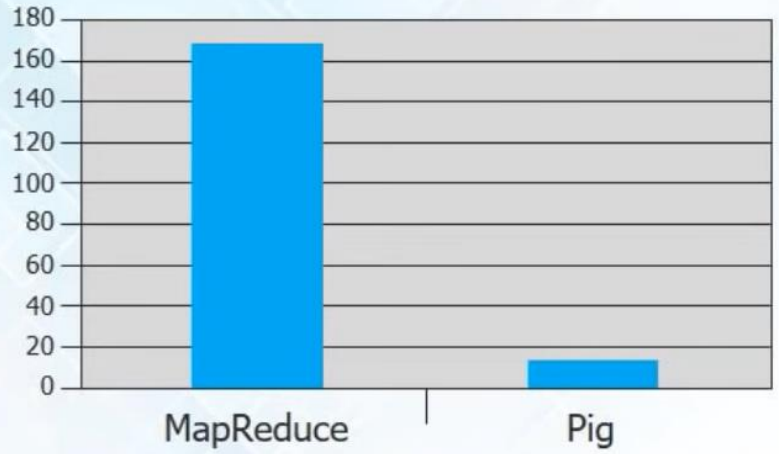
- An open-source high-level dataflow system
- Introduced by Yahoo
- Provides abstraction over MapReduce
- Two main components – the *Pig Latin* language and the *Pig Execution*

***Fun Fact:***

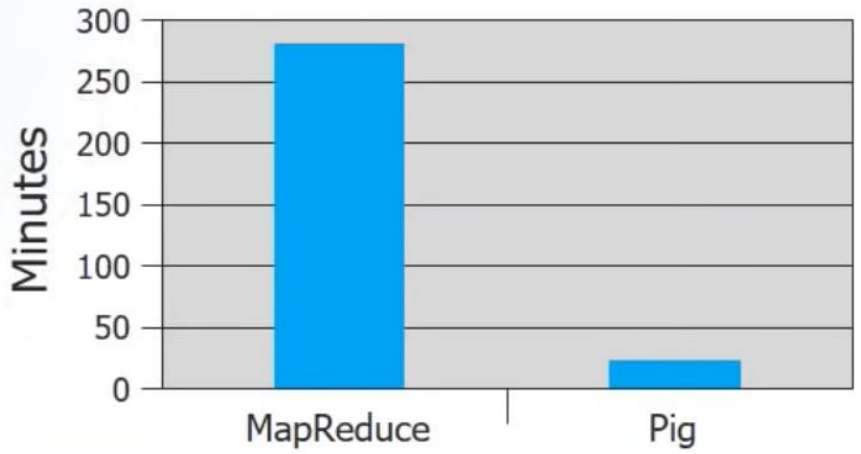
✓ ***10 lines of pig latin= approx. 200 lines of Map-Reduce Java Program***

# Why go for PIG when MR is there?

1/20 the lines of Code




1/16 the development Time



# Apache Pig vs MapReduce

# Apache Pig vs MapReduce

- High-level data flow tool
- No need to write complex programs
- Built-in support for data operations like joins, filters, ordering, sorting etc.
- Provides nested data types like tuples, bags, and maps


- Low-level data processing paradigm
- You need write programs in Java/Python etc.
- Performing data operations in MapReduce is a humongous task
- Nested data types are not there in MapReduce

# Some more reasons to choose Apache Pig

# Why Apache Pig?

→ Can take any data
- Structured data
- Semi-Structured data
- Unstructured data

→ Easy to learn, Easy to write and Easy to read
- Data Flow Language
- Reads like a series of steps

→ Extensible by UDF (User Defined Functions)
- Java
- Python
- JavaScript
- Ruby

→ Provides common data operations filters, joins, ordering, etc. and nested data types tuples, bags, and maps missing from MapReduce.

→ An ad-hoc way of creating and executing map-reduce jobs on very large data sets

→ Open source and actively supported by a community of developers.

# Twitter Case Study

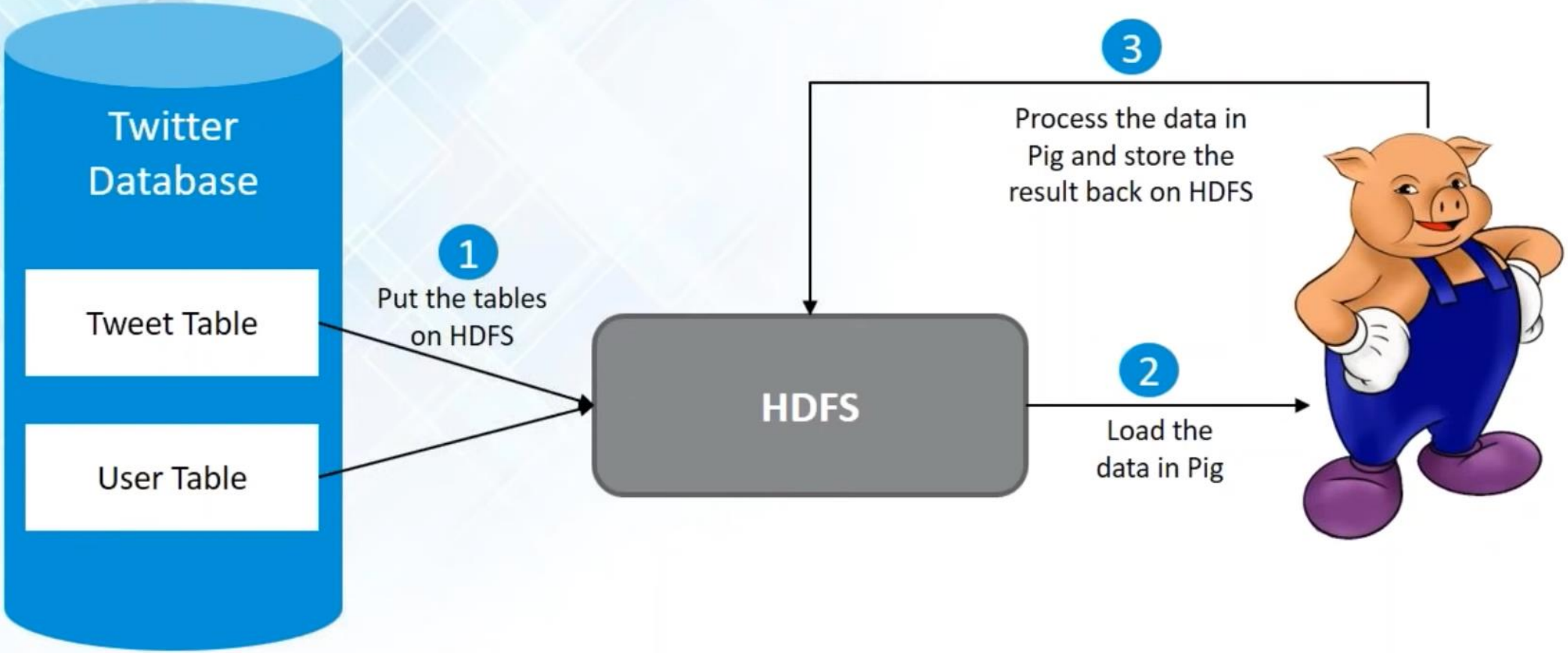
# Twitter Case Study

- Twitter's data was growing at an accelerating rate (i.e. 10 TB/day).
- Thus, Twitter decided to move the archived data to HDFS and adopt Hadoop for extracting the business values out of it.
- Their major aim was to analyse data stored in Hadoop to come up with the multiple insights on a daily, weekly or monthly basis.

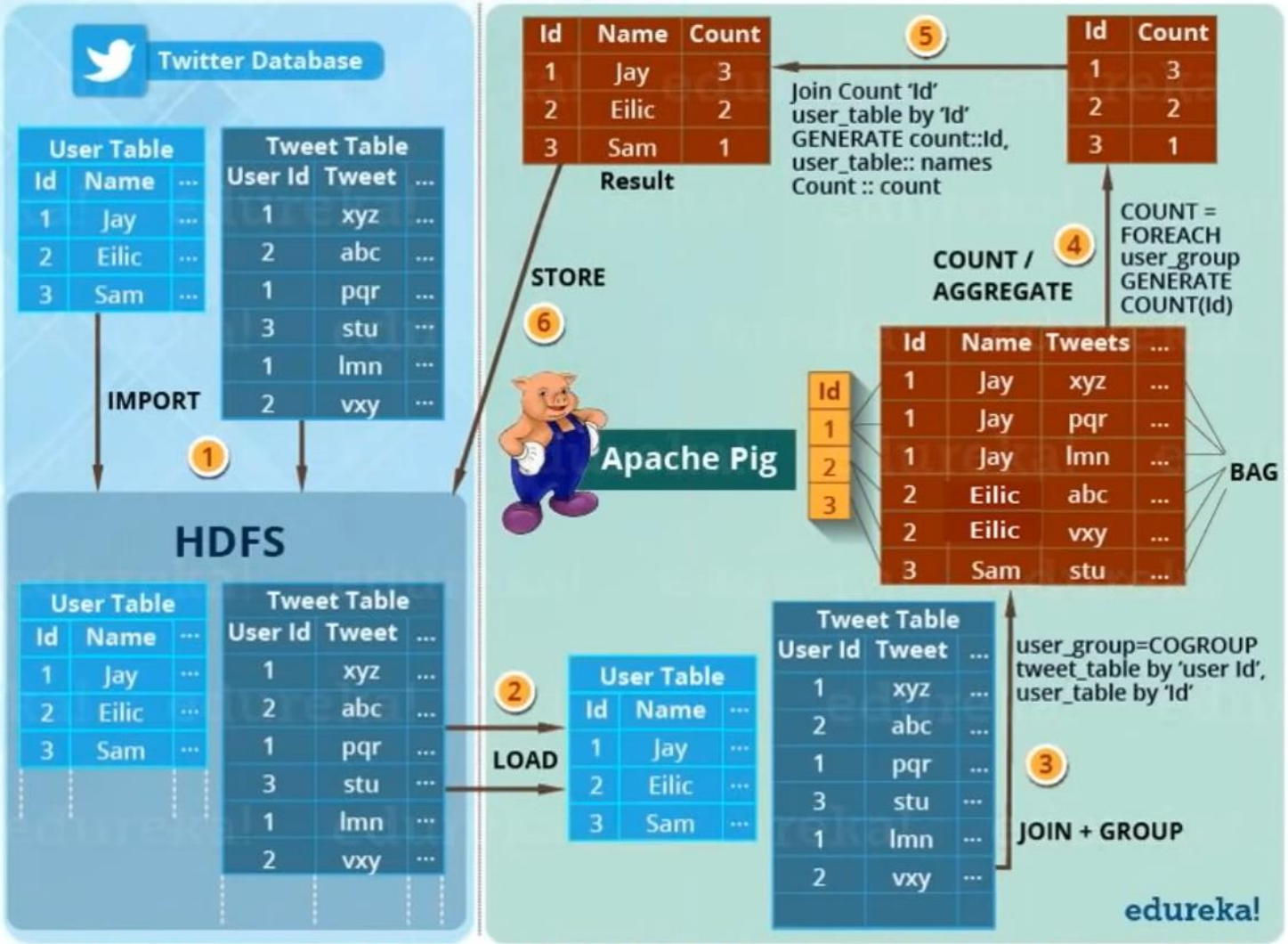
Let me talk about one of the insight they wanted to know.

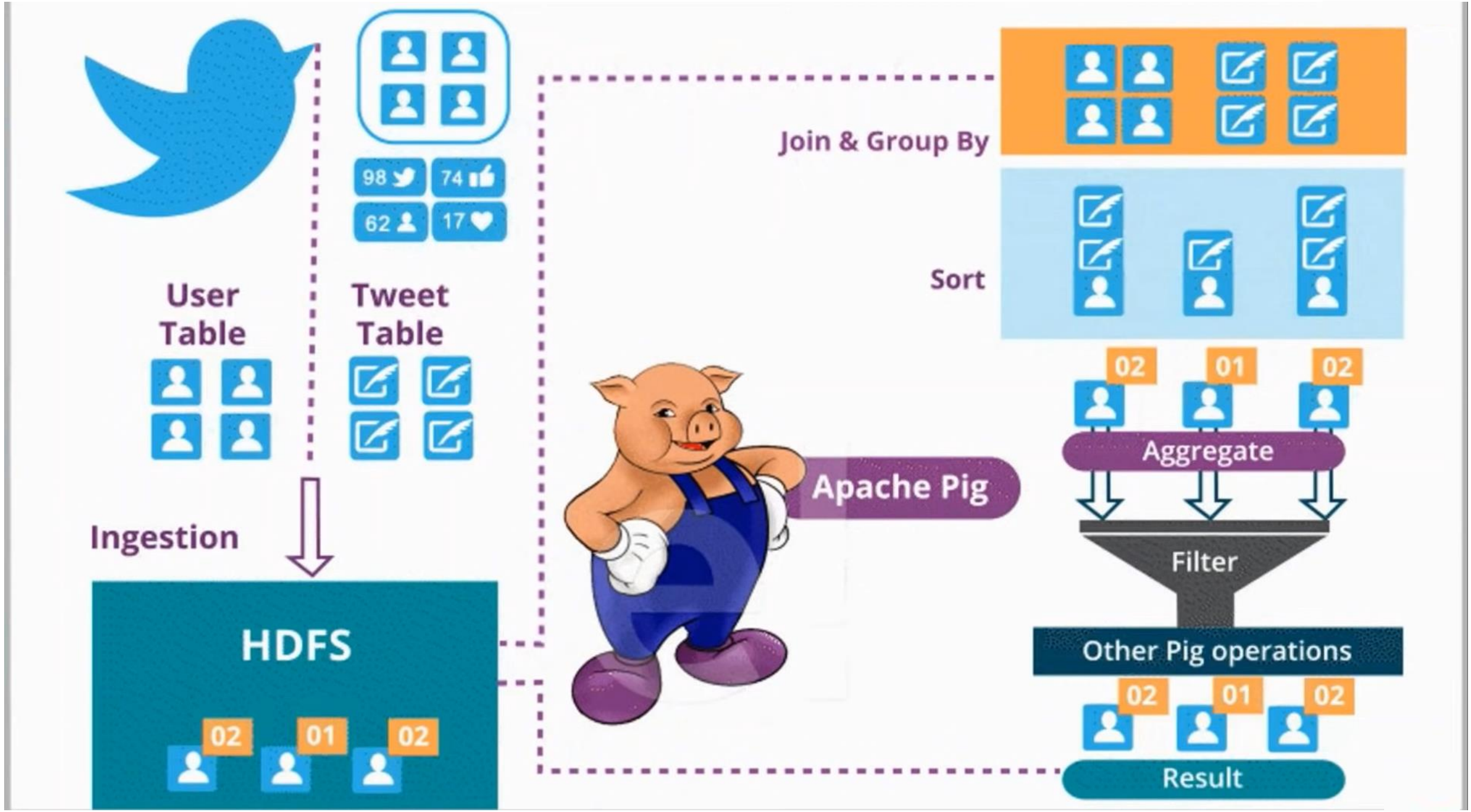
*Analyzing how many tweets are stored per user, in the given tweet tables?*

# High Level Implementation



# Detailed Implementation Flow




98
74
62
17
User Table
Tweet Table
Ingestion
HDFS
02
01
02
Join & Group By
Sort
Apache Pig
02
01
02
Aggregate
Filter
Other Pig operations
02
01
02
Result

# Apache Pig Architecture

# Apache Pig Architecture

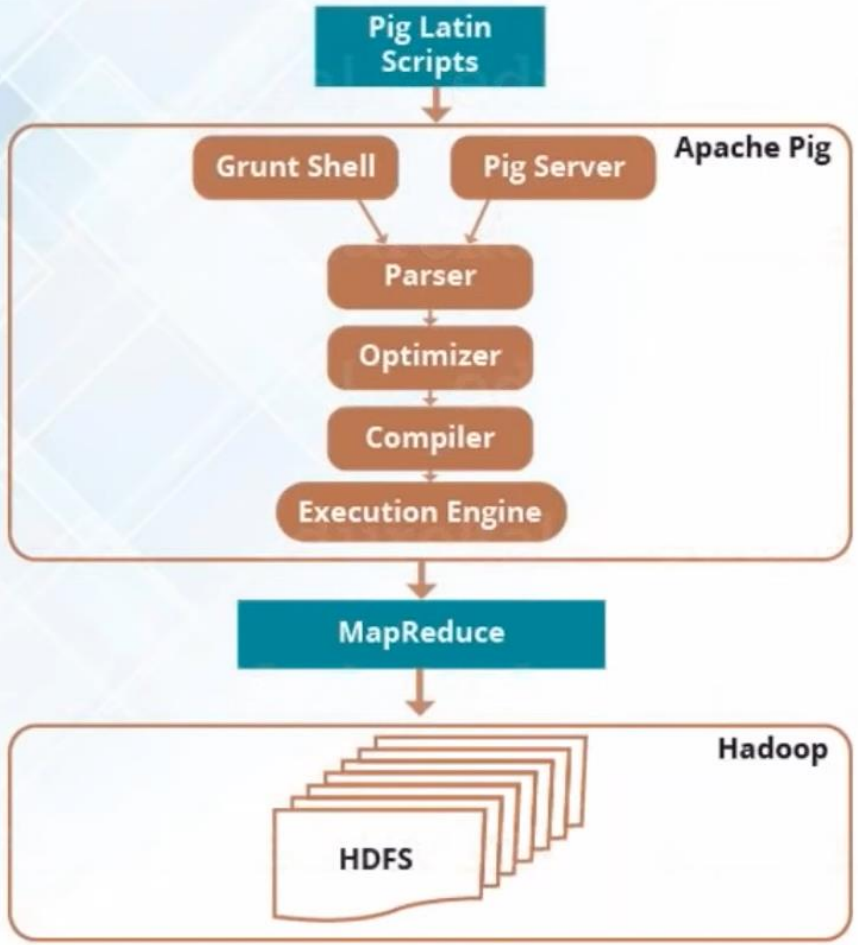
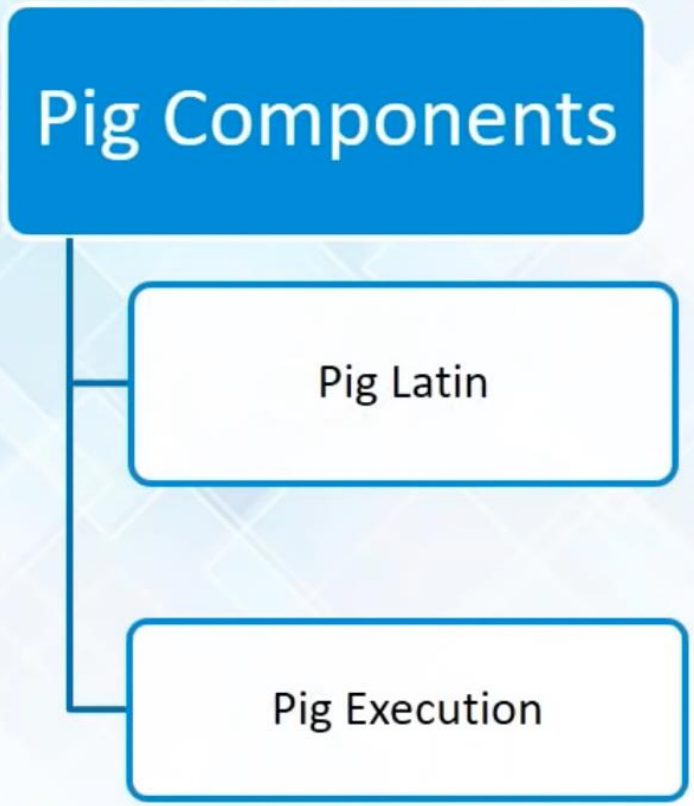
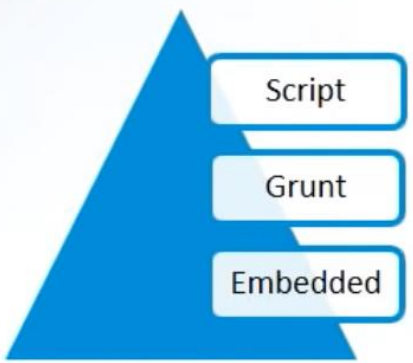



Figure: Apache Pig Architecture

# Apache Pig Components




It is made up of a series of operations or transformations that are applied to the input data to produce output.




Contains Pig commands in a file (.pig)

Interactive shell for running Pig commands

Provisioning pig script in Java

# Apache Pig Running Modes

# Pig Running Modes

You can run Apache Pig in 2 modes:

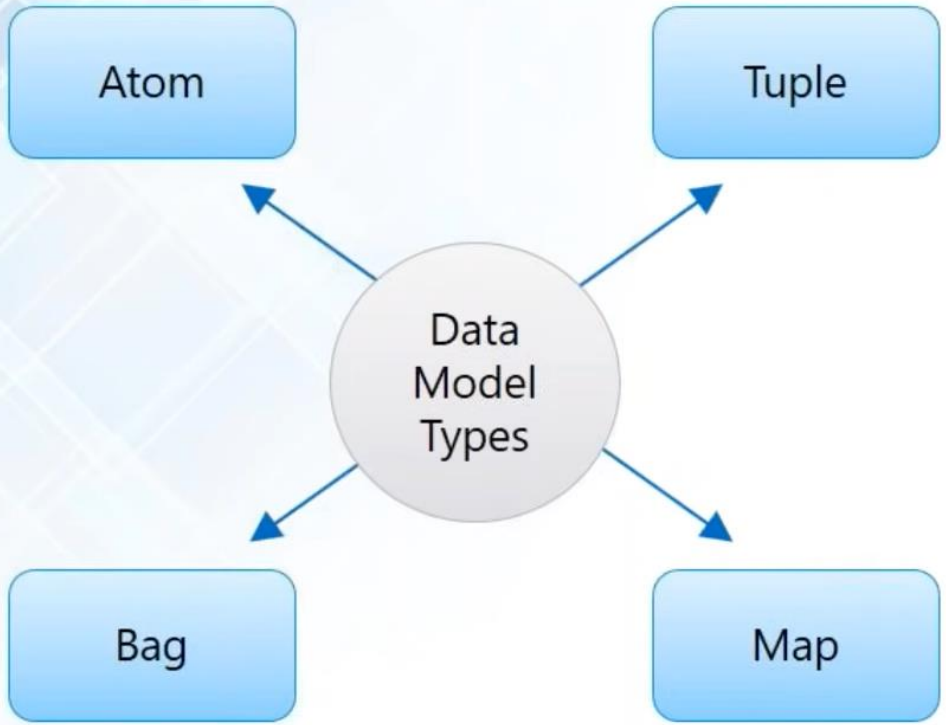
**MapReduce Mode** – This is the default mode, which requires access to a Hadoop cluster and HDFS installation. The input and output in this mode are present on HDFS.

*Command: pig*

**Local Mode** – With access to a single machine, all files are installed and run using a local host and file system. Here the local mode is specified using '-x flag' (pig -x local). The input and output in this mode are present on local file system.

*Command: pig –x local*

# Pig Data Model



# Pig Data Model – Tuple and Bag


Figure: Apache Pig Data Model

edureka!

- Tuple is an ordered set of fields which may contain different data types for each field.

  *Example of tuple – (1, Linkin Park, 7, California)*

- A Bag is a collection of a set of tuples and these tuples are subset of rows or entire rows of a table.

  Example of a bag – {(Linkin Park, 7, California), (Metallica, 8), (Mega Death, Los Angeles)}

# Pig Data Model – Map and Atom

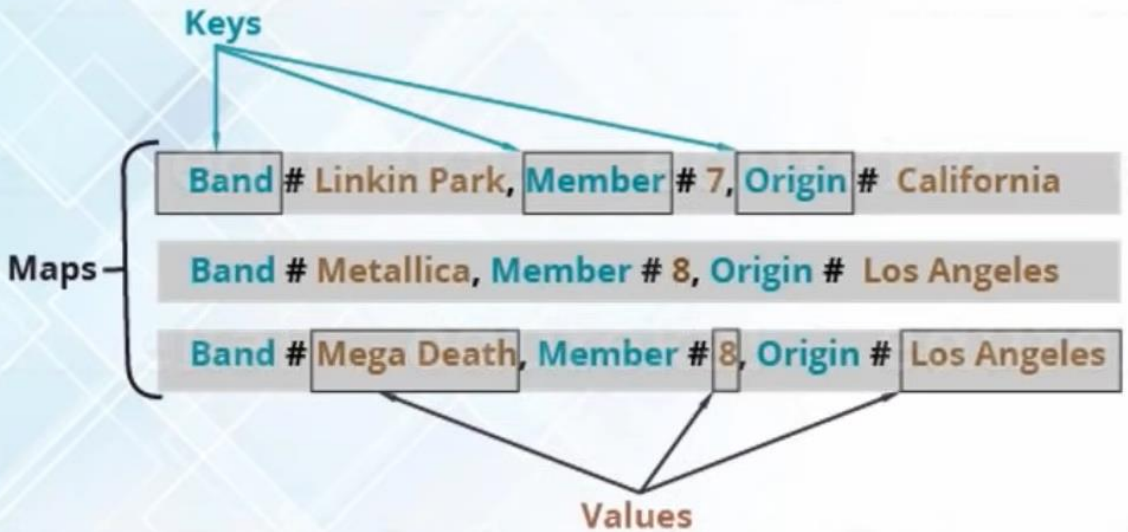



**Figure: Map Example**

- A Map is key-value pairs used to represent data elements.

  Example of maps– [band#Linkin Park, members#7 ], [band#Metallica, members#8 ]

- Atoms are basic data types which are used in all the languages like string, int, float, long, double, char[], byte[]

# Pig Operators

edureka!

| Operator | Description |
|---|---|
| LOAD | Load data from the local file system or HDFS storage into Pig |
| FOREACH | Generates data transformations based on columns of data |
| FILTER | Selects tuples from a relation based on a condition |
| JOIN | Join the relations based on the column |
| ORDER BY | Sort a relation based on one or more fields |
| STORE | Save results to the local file system or HDFS |
| DISTINCT | Removes duplicate tuples in a relation |
| GROUP | Groups together the tuples with the same group key (key field) |
| COGROUP | It is same as GROUP. But COGROUP is used when multiple relations re involved |