Developing Batch Processing Solutions with Azure HDInsight

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Overview

Understand Hadoop

Implement HDInsight to perform batch processing

- Hive
- Spark

Understand Hadoop

What is Apache Hadoop?

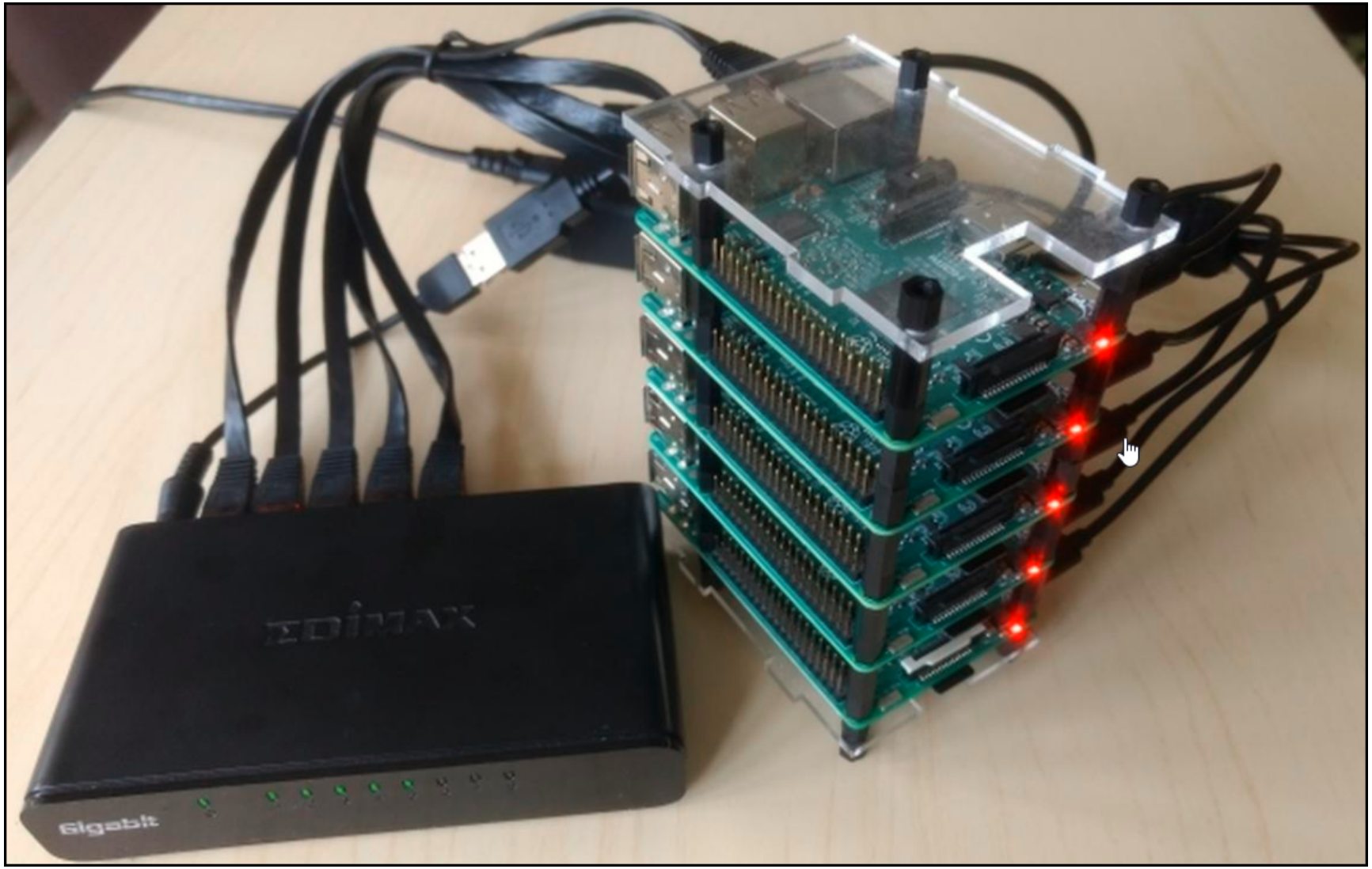
Original open-source framework for distributed big data processing and analysis

Based on Google File System

Core components:

- Hadoop File System (HDFS)
- YARN resource manager
- MapReduce processing algorithm
  - Java

Commodity Hardware



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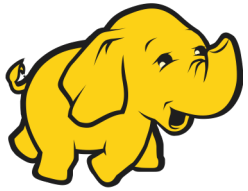
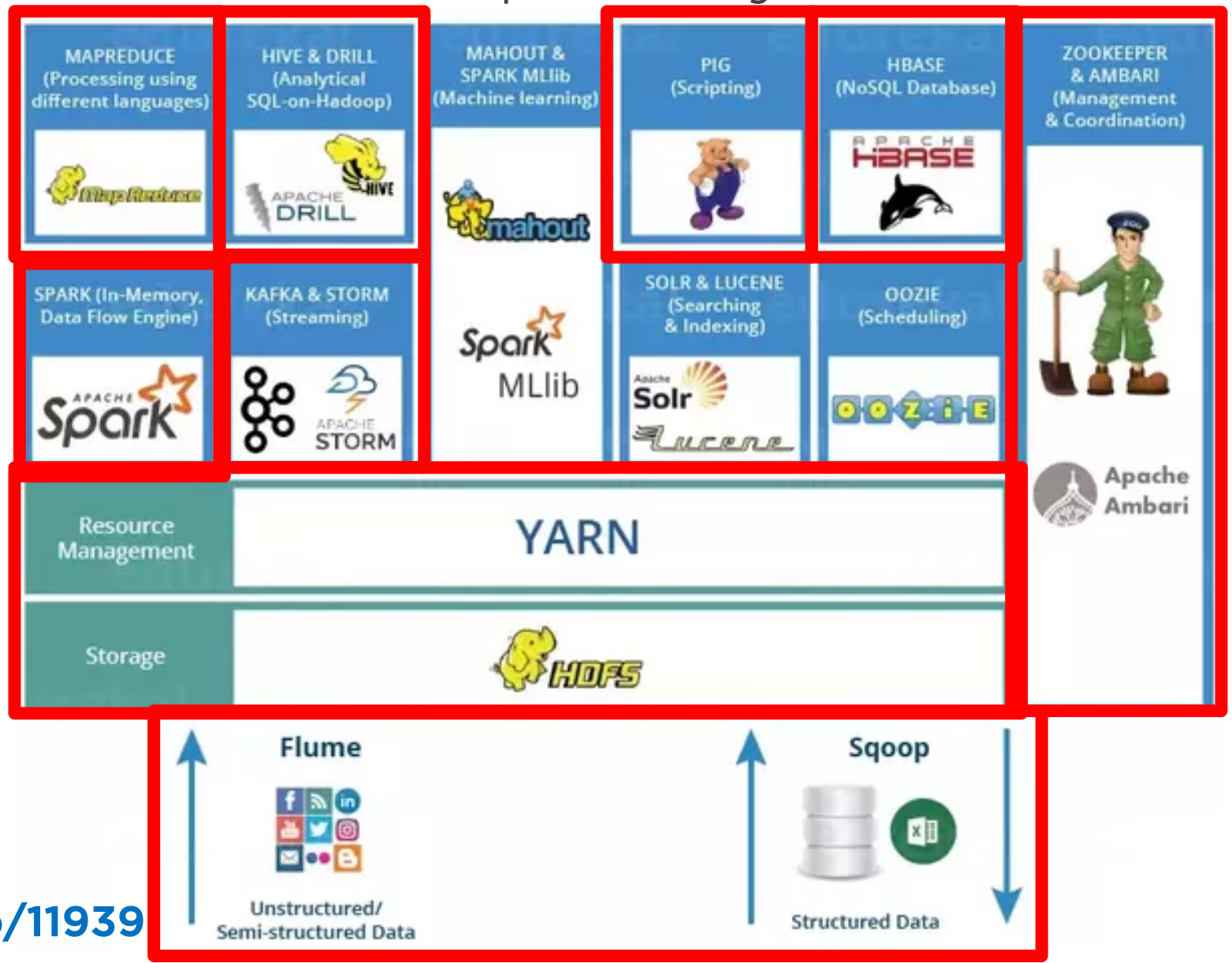


Hadoop Ecosystem



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Hadoop vs. Traditional RDBMS

RDBMS

Structured data

ACID

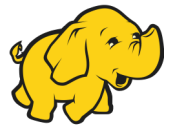
Lower data throughput, but faster granular query performance

Vertically scaled

OLTP

SQL Server/Azure SQL Database are licensed and closed source

Hadoop



Unstructured (although you can project structure) – "schema on read"

CAP

Higher data throughput, but slower granular query performance

Horizontally scaled

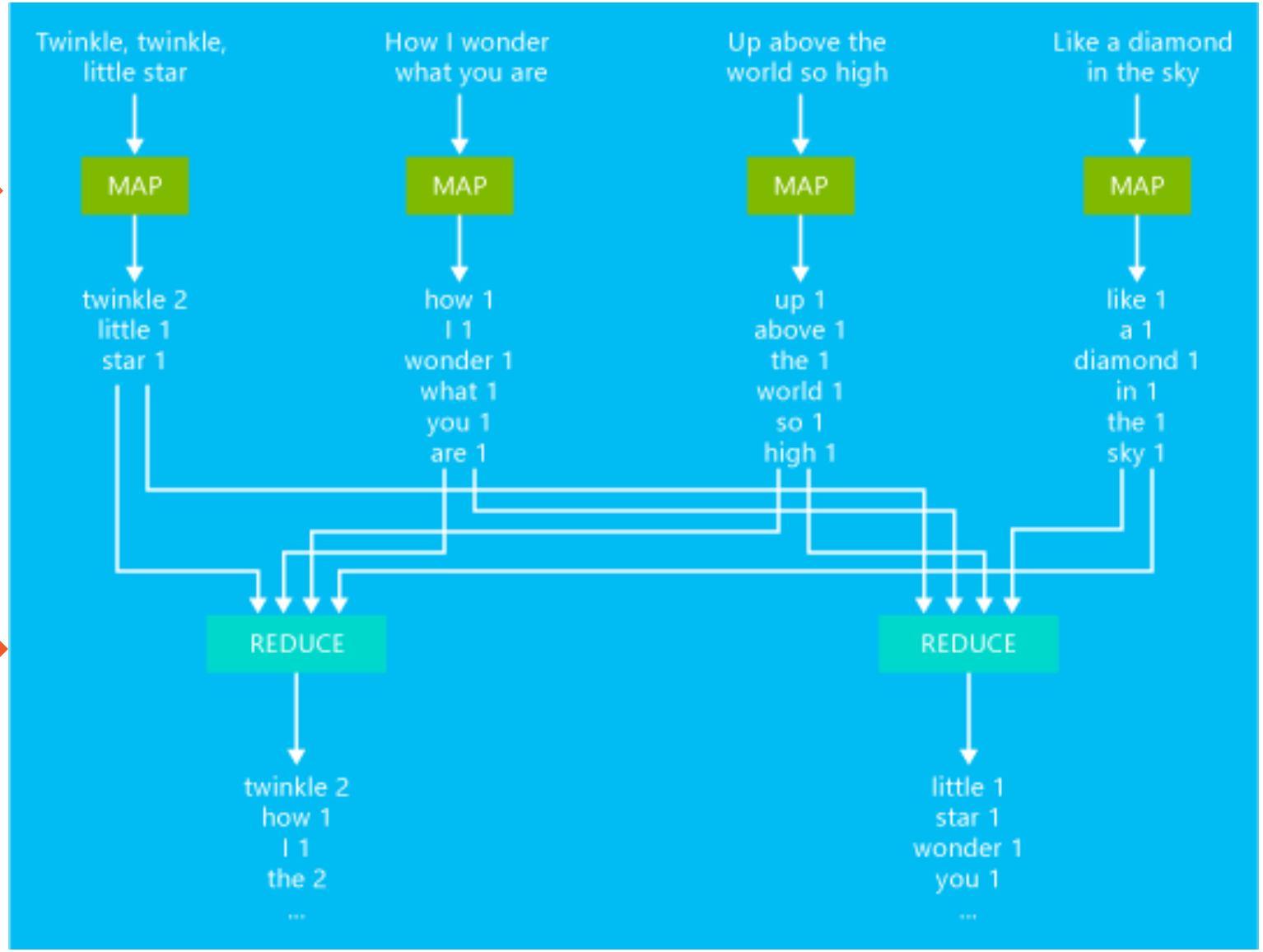
OLAP

(Mostly) free and open source

MapReduce Operation

Data is chunked redundantly across nodes

Massive parallelism



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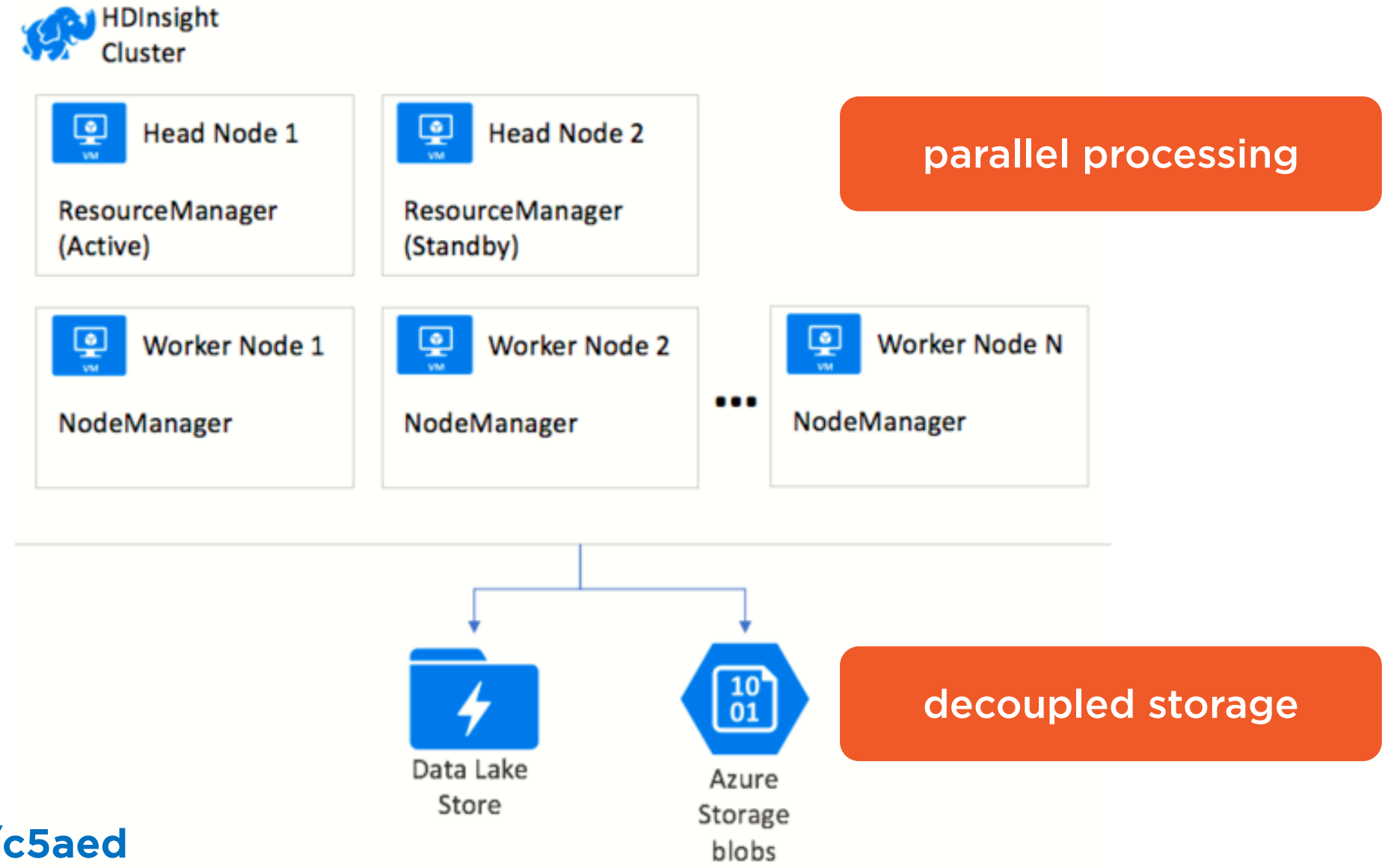
Implement HDInsight

HDInsight High-Level Architecture



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HDInsight Cluster Types

Hadoop

- Batch query and analysis of HDFS stored data

HBase

- Processing for large schemaless NoSQL data

Interactive Query

- In-memory caching for fast Hive queries

Kafka

- Distributed streaming data platform

ML Services

- Predictive modeling and machine learning

Spark

- In-memory processing and interactive queries

Storm

- Real-time event processing

Demo

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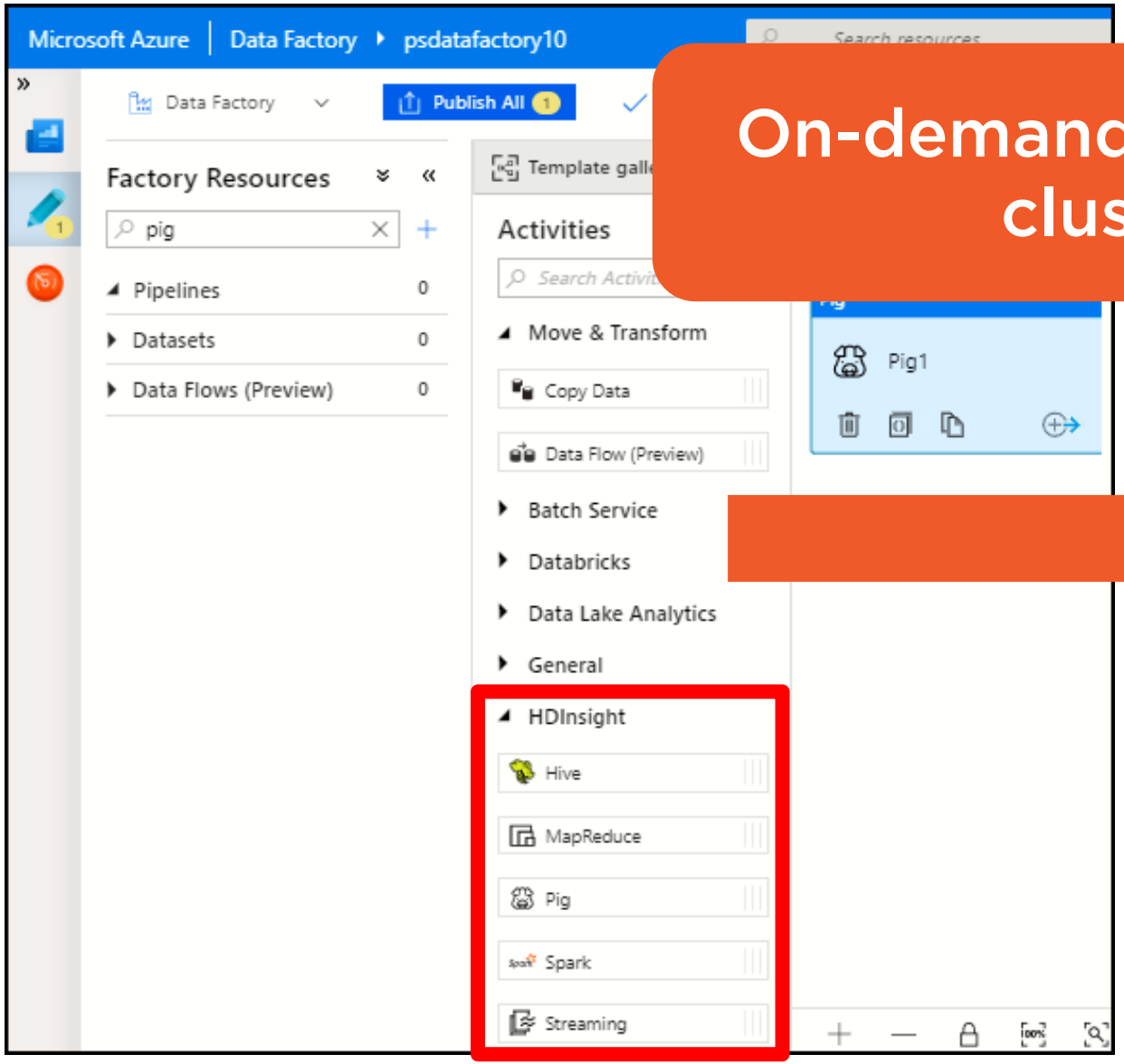
Provision an HDInsight cluster

Azure Data Factory Integration



On-demand HDInsight cluster

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            "type": "LinkedServiceReference"
        },
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}
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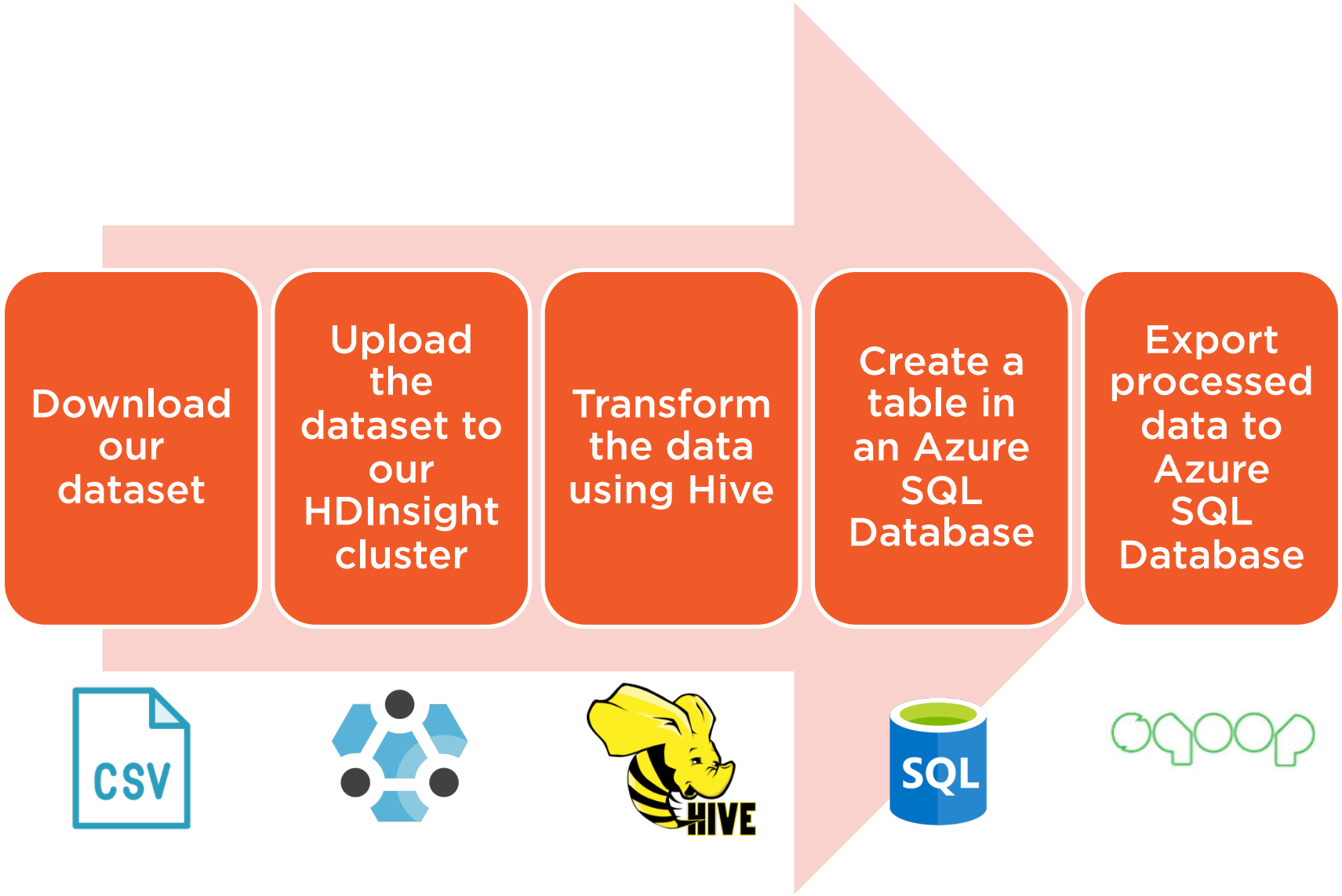
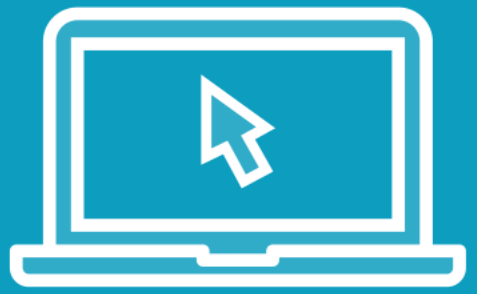
Our HDInsight/Hive Batch Processing Job



Demo



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Run the tutorial:
https://docs.microsoft.com/en-us/azure/hdinsight/interactive-query/interactive-query-tutorial-analyze-flight-data

About Apache Spark

Processing engine that serves as a MapReduce alternative

Goal: make MapReduce's scale and fault-tolerance faster via in-memory processing

Language support: Scala, Python, Java, R, and SQL

Data science frameworks support: TensorFlow, PyTorch, scikit-learn

Azure Databricks

Ecosystem built around Apache Spark

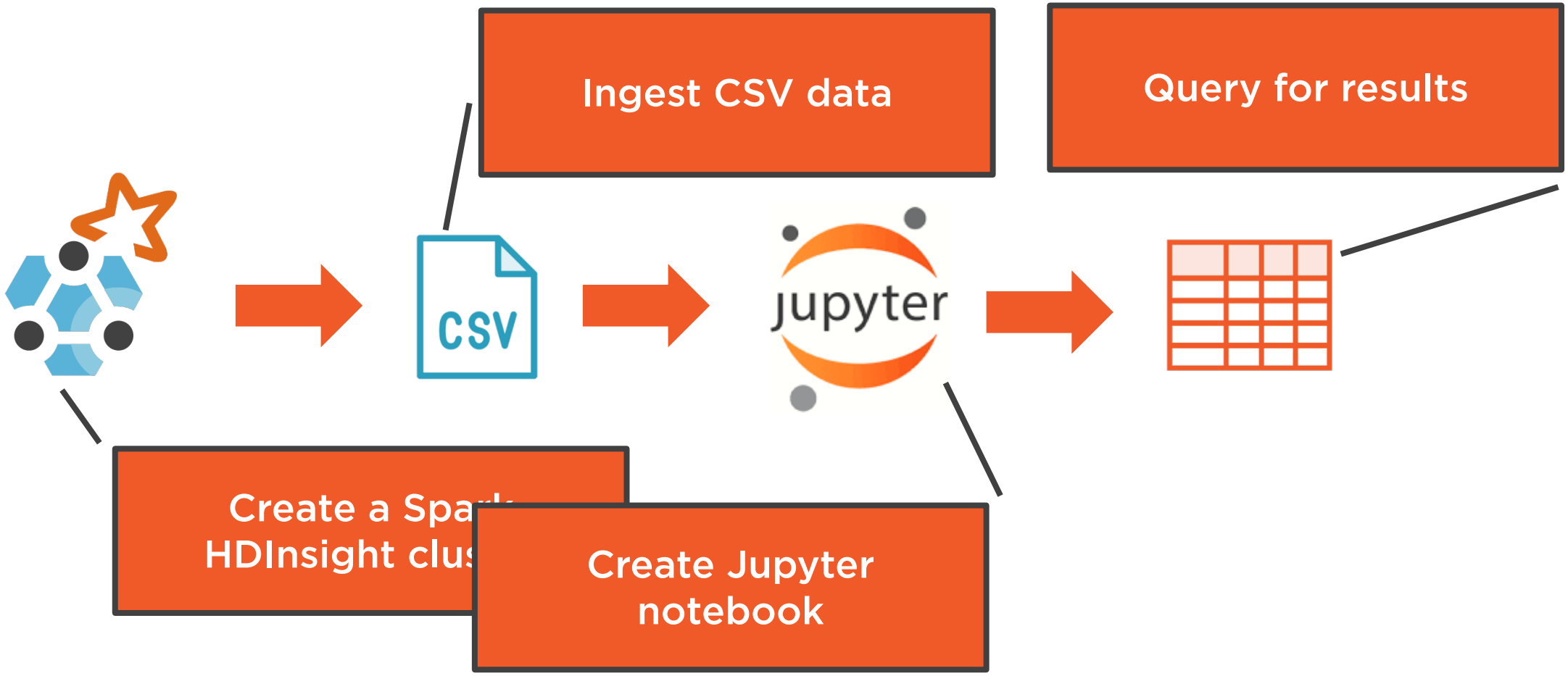
Azure Databricks is Microsoft's hosted environment

Fast, optimized, auto-scaled environment

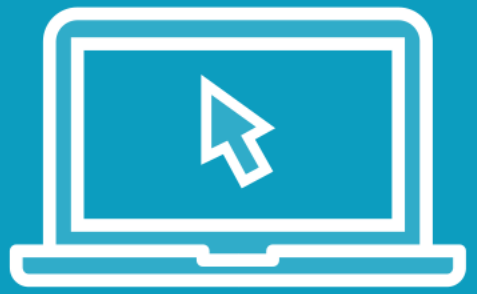
Jupyter notebooks

Integration with Azure ecosystem (Data Factory)

Our HDInsight/Spark Batch Processing Job



Demo



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Run the tutorial:

https://docs.microsoft.com/en-us/azure/hdinsight/spark/apache-spark-load-data-run-query

Next module:

https://docs.microsoft.com/en-us/azure/hdinsight/spark/apache-spark-load-data-run-query

For Further Learning

The Building Blocks of Hadoop
(Janani Ravi)
Taught by a former Google engineer

HDInsight Deep Dive: Storm, HBase, and Hive
(Elton Stoneman)
Employs a real-world scenario

Summary

Microsoft designed HDInsight in conjunction with Hortonworks

- First-class Hadoop experience

Lower compute costs mean Apache Spark is moving to the forefront of big data analysis

Next module: Developing Batch Processing Solutions with Azure Databricks