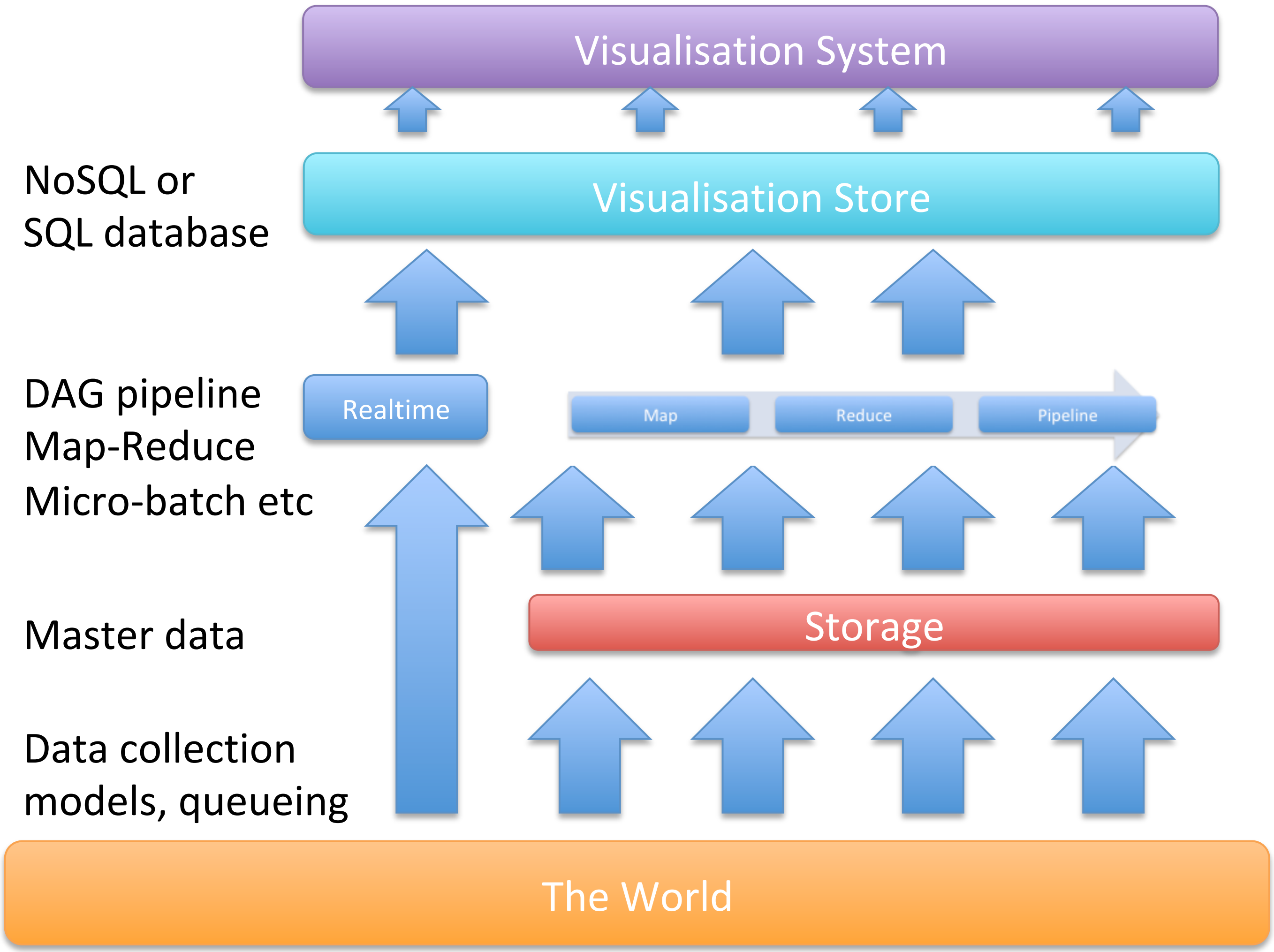
Big Data Engineering

Conclusions and Recap

Contents

- Understanding the bigger picture
- What are the different components
- Message queueing and collection systems
- Map-Reduce and DAG systems
- Realtime Systems
- Fast databases for speed
- Visualisation and Dashboards

The big picture



NoSQL or
SQL database

DAG pipeline
Map-Reduce
Micro-batch etc

Master data

Data collection
models, queueing

The big picture

- You have *immutable* master data
- You create a set of processes to:
  - Collect that data
  - Store master data
  - Process data
  - Visualise and present
- Some of those processes act on batch and others on real-time data

How to choose the components?

- Two main approaches:
  - – Best of breed
    - Choose the best available component in each space
  - – Stack
    - Choose a curated stack that a team or organization is providing/selling/supporting

Approach

- Minimise the pain
  - Choose what you need when you need it
  - Don’t over engineer

How do I ingest data?

- File transfer
- Live stream
  - Sockets
  - Syslog
  - Messaging system
- From existing databases

How do I store data?

- HDFS
- NoSQL database only
  - Mongo / HBase / Cassandra
- zFS / GlusterFS / NFS etc
- Apache Parquet, CSV, or speci

How do I process data?

- Simple Map Reduce
- Hive / Pig
- DAG
- Pipeline
- etc

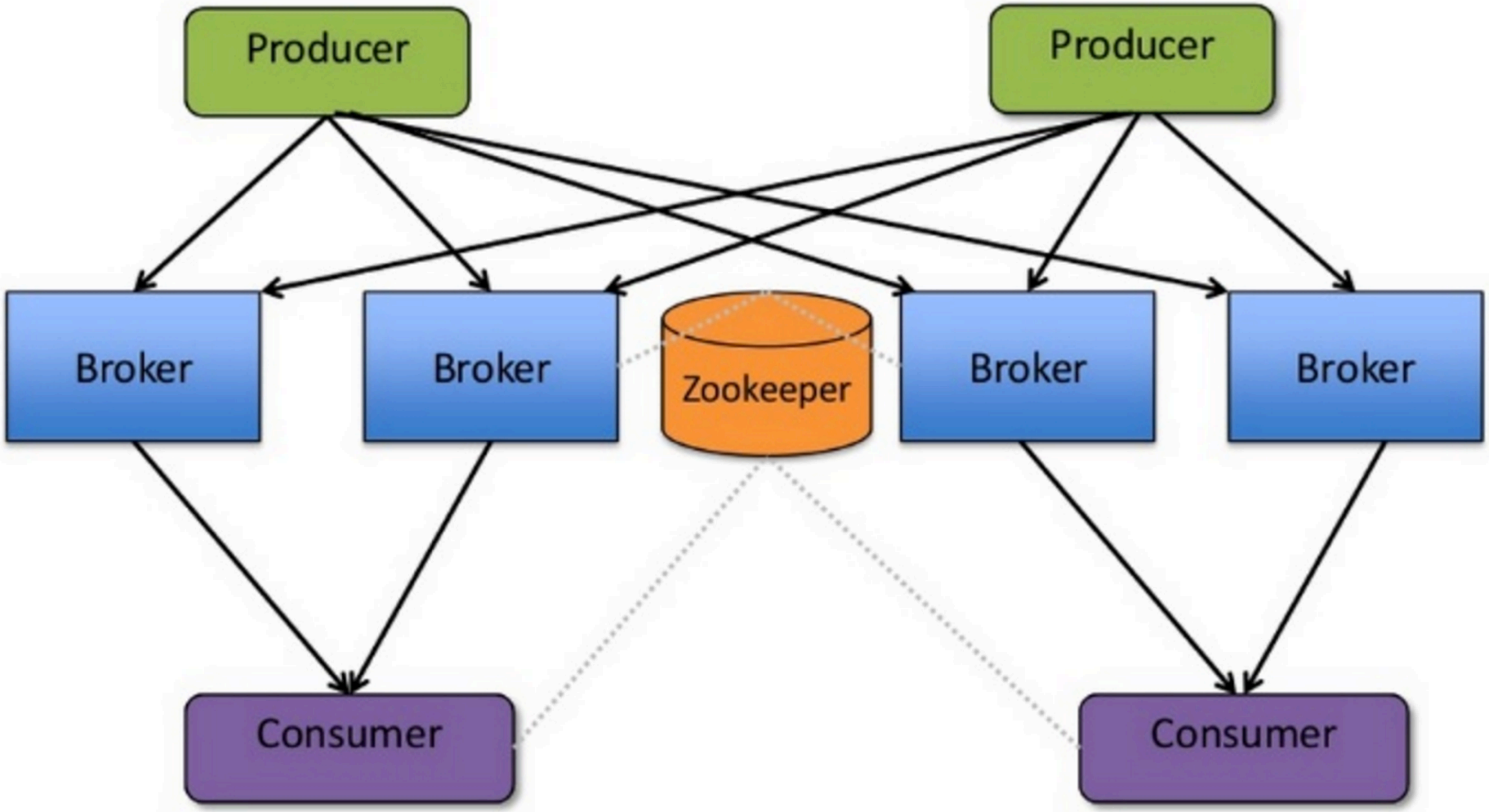
How do I visualise data

- From a SQL database?
- From a NoSQL database?
- Generate charts in Python Spark?
- Etc?

Collection / Queuing systems

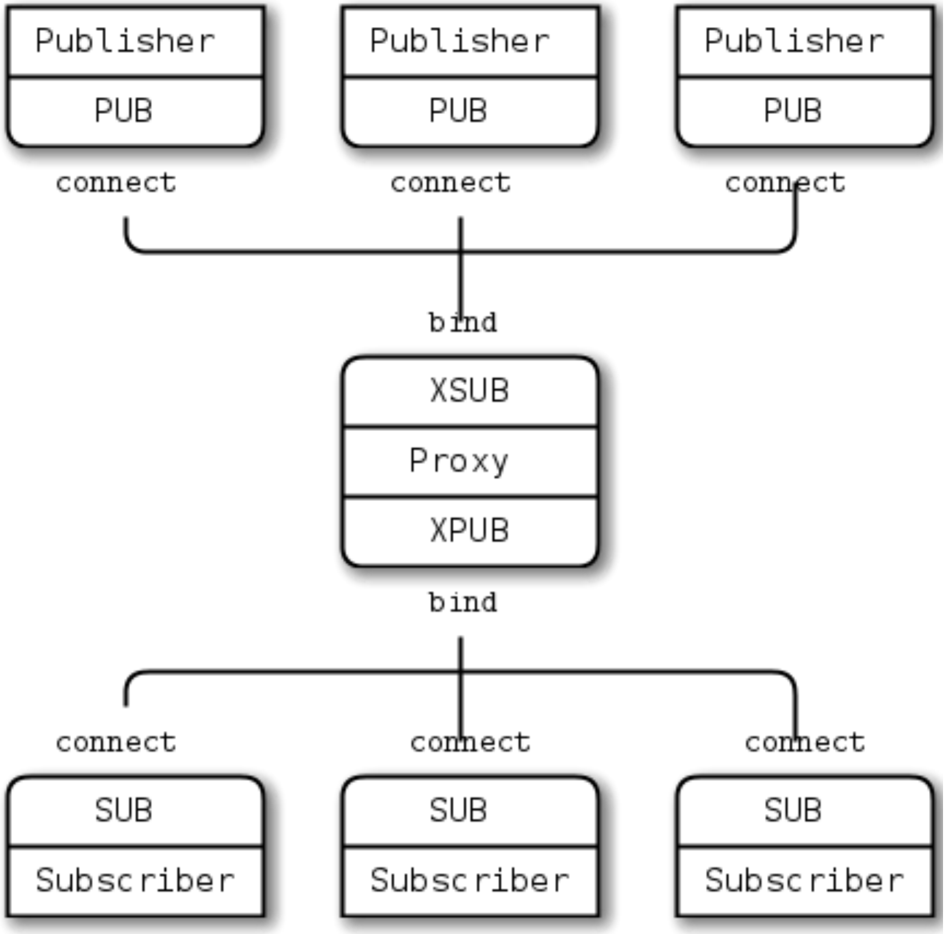
- Two ways of making the choice
  - The protocol
  - The middleware
- Protocols
  - ZeroMQ, MQTT, AMQP, STOMP, Kafka Protocol, Rendevouz, etc
- Middleware
  - Kafka, Apollo, Mosquitto, QPid, WSO2, etc

Apache Kafka



Source: http://www.slideshare.net/charmalloc/

ZeroMQ


Publisher
PUB
connect
Publisher
PUB
connect
Publisher
PUB
connect
bind
XSUB
Proxy
XPUB
bind
connect
connect
connect
SUB
Subscriber
SUB
Subscriber
SUB
Subscriber

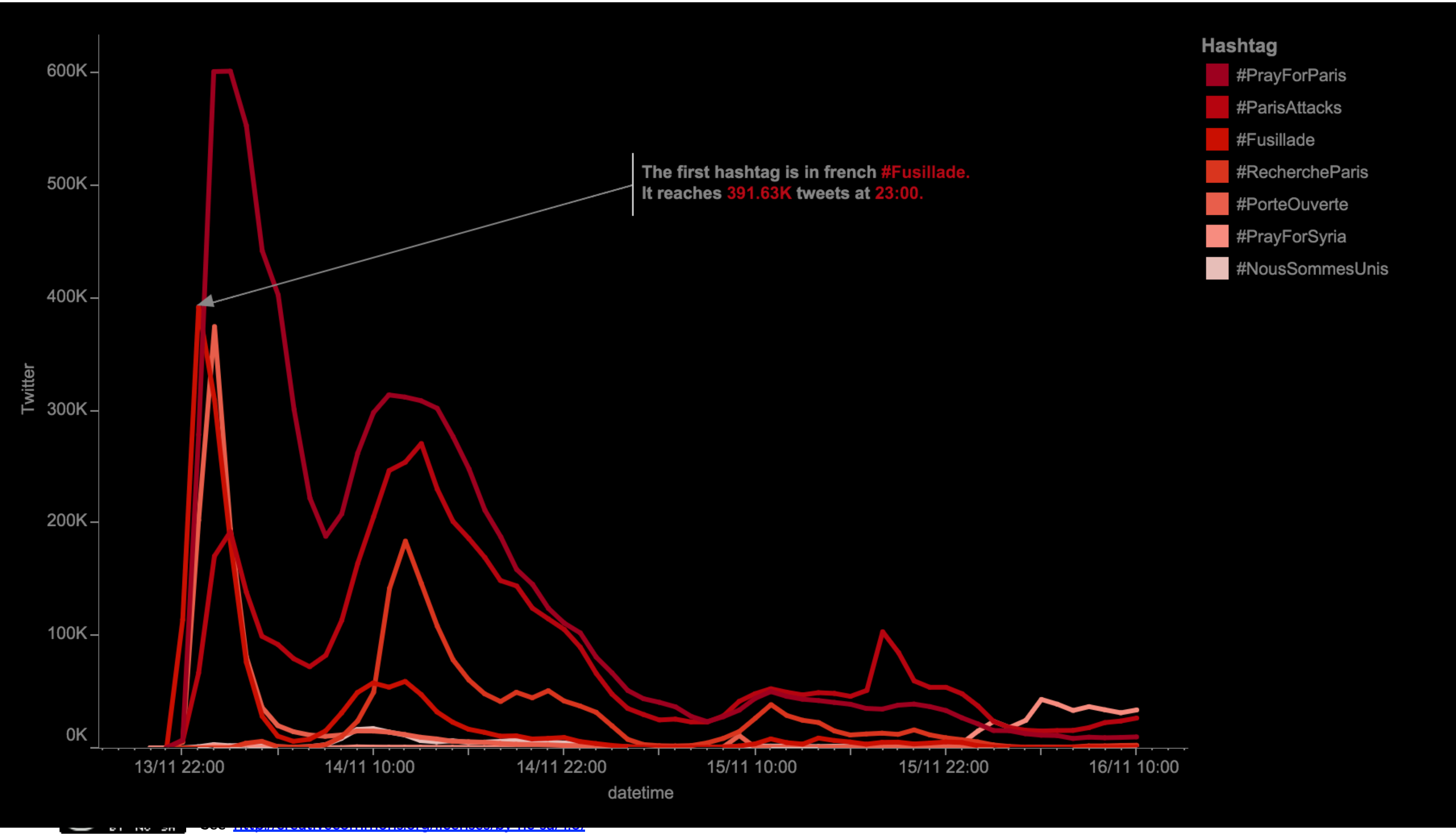
Processing approaches

- Covered in detail already
- Hadoop
- Spark
- Tez
- etc

Cluster Management

- Spark
- YARN
- Mesos
- Kubernetes
- etc

Visualisation



The first hashtag is in french #Fusillade.
It reaches 391.63K tweets at 23:00.

Visualisation approaches

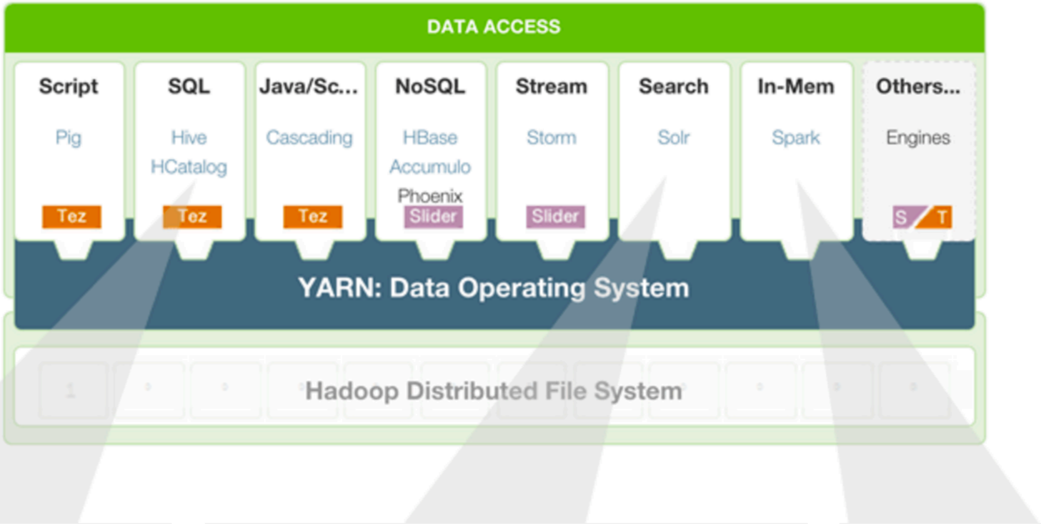
- Full products
  - Tableau, Qlik, SAS, GoodData
- Web-based systems
  - Tableau Public, Datawrapper, Raw, Plotly
- Developer oriented
  - D3.js, dygraphs, Python charting, Leaflet, Fusion Charts, Google Charts, etc

Fortune top 10 big data companies

fortune.com/2014/06/13/these-big-data-companies-are-ones-to-watch/

- MapR – Apache Hadoop
- MemSQL
- Databricks – Apache Spark
- Platfora – Apache Hadoop
- Splunk
- Teradata – Apache Hadoop
- Palantir – Hadoop, Cassandra, Lucene
- Premise
- Datameer – Apache Hadoop
- Cloudera – Apache Hadoop
- Hortonworks – Apache Hadoop
- MongoDB – MongoDB
- Trifacta – Apache Hadoop

Hortonworks



Enhanced SQL Semantics in Apache Hive

Hive adds time intervals and UNION semantics, 2.5x performance improvements and improved query scheduling, along with a more streamlined user interface for Hive within Ambari.

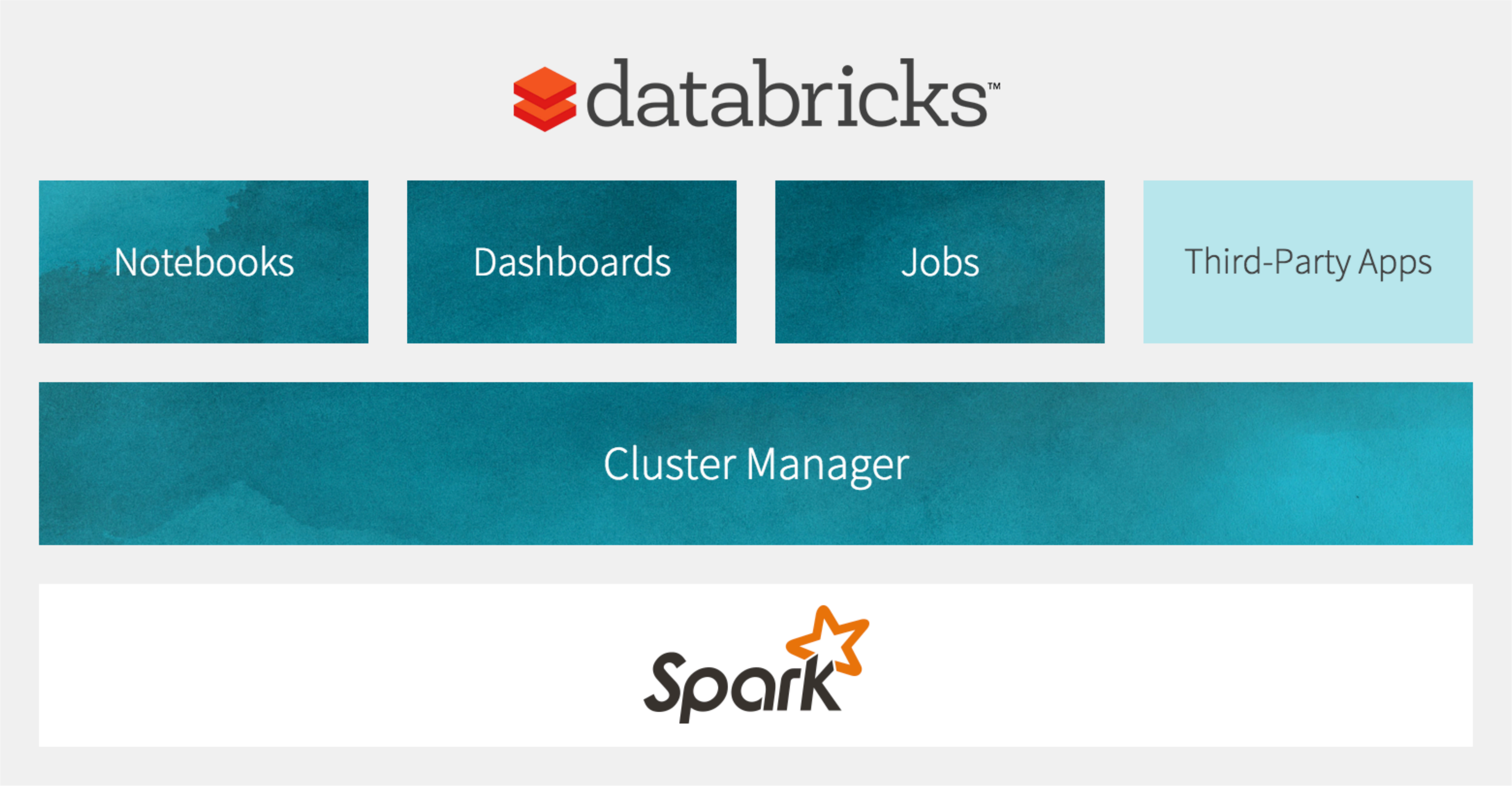
Solr on YARN

The Solr search engine is being built to run on YARN and is now in technical preview. This critical advancement allows customers to reduce their total cost of ownership by deploying Solr within the same cluster as other workloads – eliminating the need for a "side cluster" dedicated to indexing data and delivering search results.

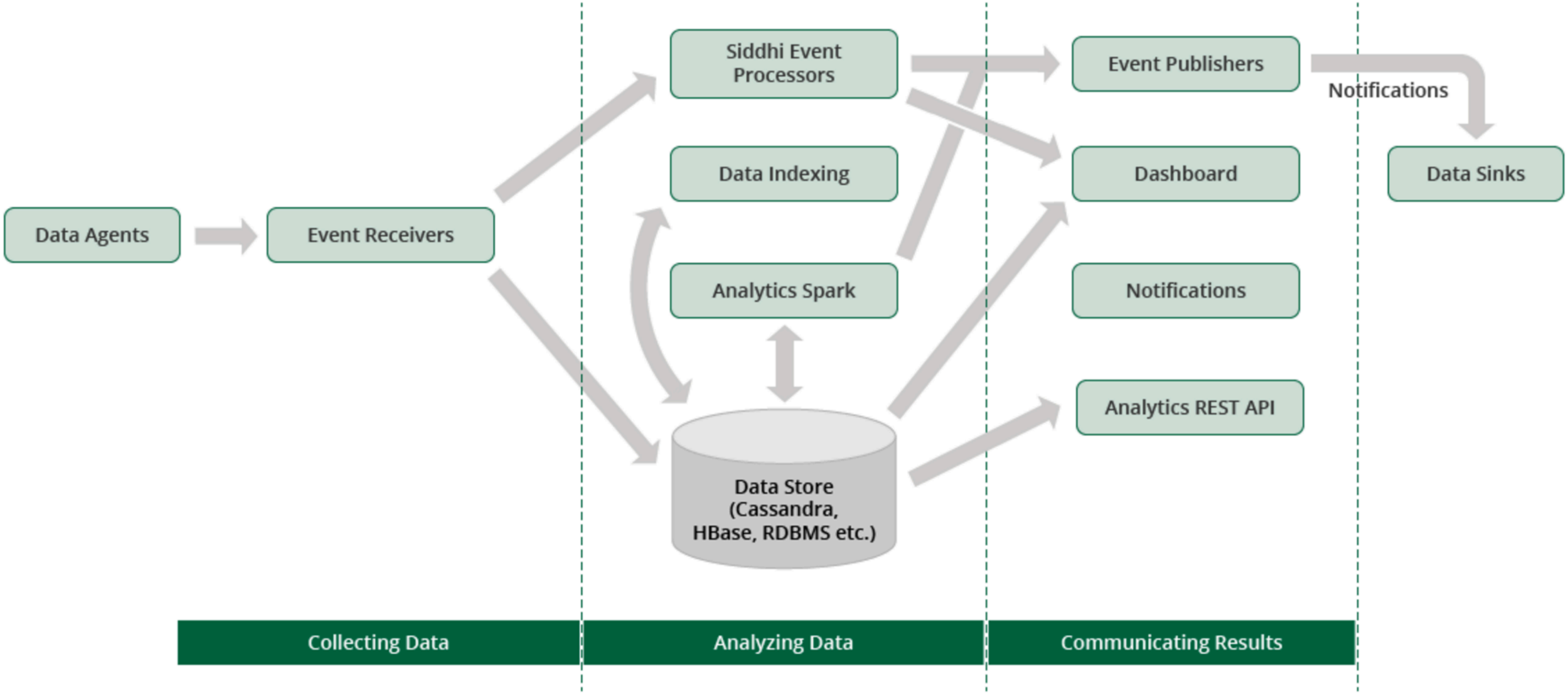
New capabilities for feature-rich Spark applications

Apache Spark on YARN is enhanced with the new DataFrame API, machine learning algorithms such as clustering, frequent pattern-mining algorithms and a technology preview of SparkSQL.

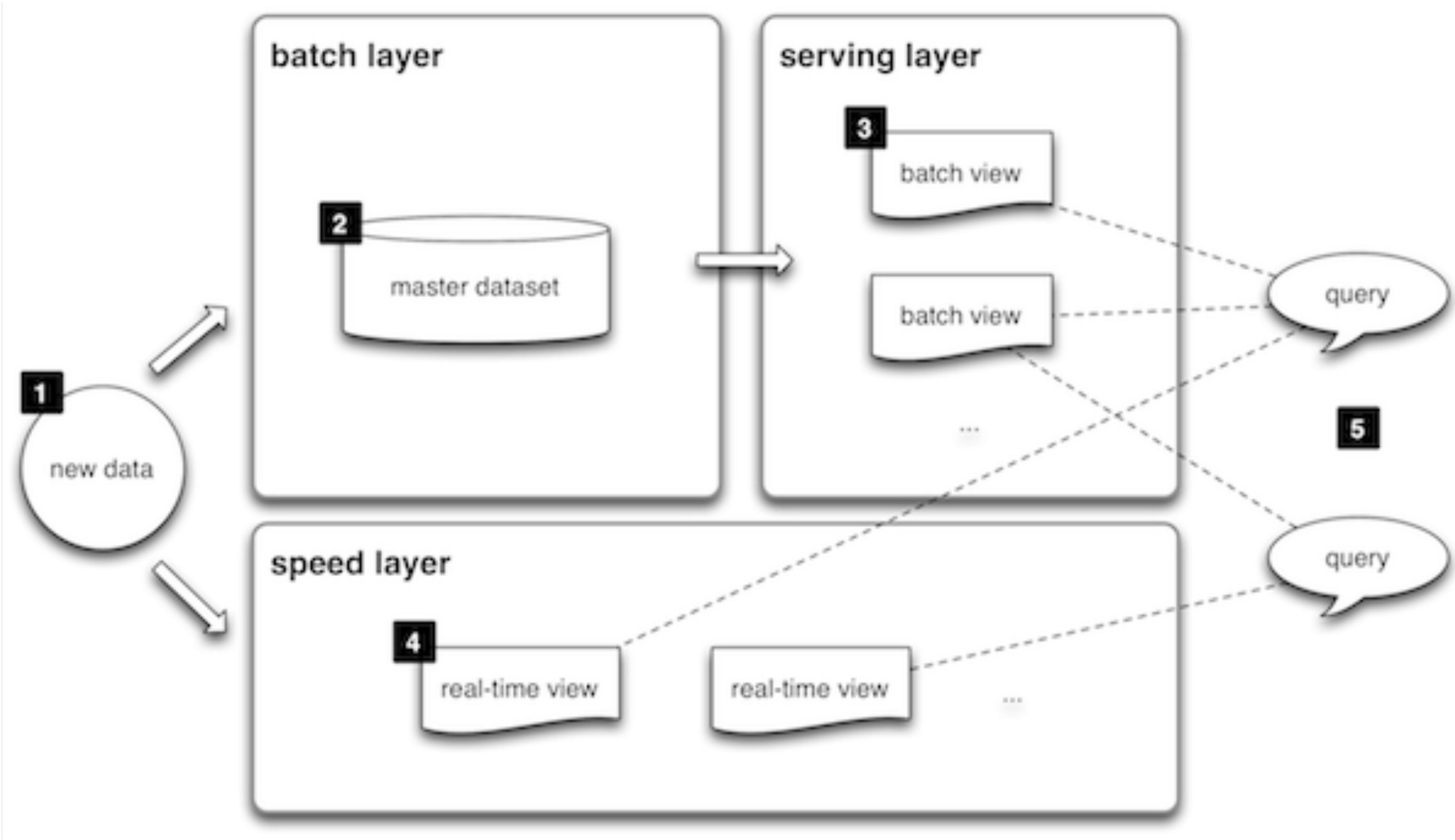
Databricks


databricks
Notebooks
Dashboards
Jobs
Third-Party Apps
Cluster Manager
Spark

WSO2 DAS


Siddhi Event Processors
Event Publishers
Notifications
Data Sinks
Data Indexing
Dashboard
Data Agents
Event Receivers
Analytics Spark
Notifications
Analytics REST API
Data Store (Cassandra, HBase, RDBMS etc.)
Collecting Data
Analyzing Data
Communicating Results

Lambda


batch layer
serving layer
3
batch view
2
master dataset
batch view
...
1
new data
query
5
query
speed layer
4
real-time view
real-time view
...

The real answer

- You are on the bleeding edge
  - Expect to have some pain

Questions?