Apache Spark 2.0

Matei Zaharia
@matei_zaharia

databricks™

Apache Spark 2.0

Next major release, coming out this month

- Unstable preview release at spark.apache.org

Remains highly compatible with Apache Spark 1.X

Over 2000 patches from 280 contributors!

Apache Spark Philosophy

1. Unified engine
   Support end-to-end applications

2. High-level APIs
   Easy to use, rich optimizations

3. Integrate broadly
   Storage systems, libraries, etc

New in 2.0

Structured API improvements
(DataFrame, Dataset, SparkSession)

Structured Streaming

MLlib model export

MLlib R bindings

SQL 2003 support

Scala 2.12 support

Broader Community

Deep learning libraries
(Baidu, Yahoo!, Berkeley, Databricks)

GraphFrames

PyData integration

Reactive streams

C# bindings: Mobius

JS bindings: EclairJS

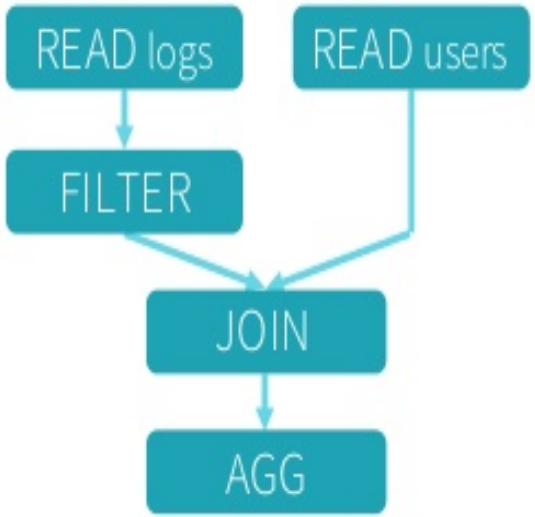
Build on common interface of RDDs & DataFrames

Deep Dive: Structured APIs

```
events =
 sc.read.json("/logs")

stats =
 events.join(users)
  .groupBy("loc","status")
  .avg("duration")

errors = stats.where(
 stats.status == "ERR")
```




```
while(logs.hasNext) {
  e = logs.next
  if(e.status == "ERR") {
    u = users.get(e.uid)
    key = (u.loc, e.status)
    sum(key) += e.duration
    count(key) += 1
  }
}
...
```

DataFrame API

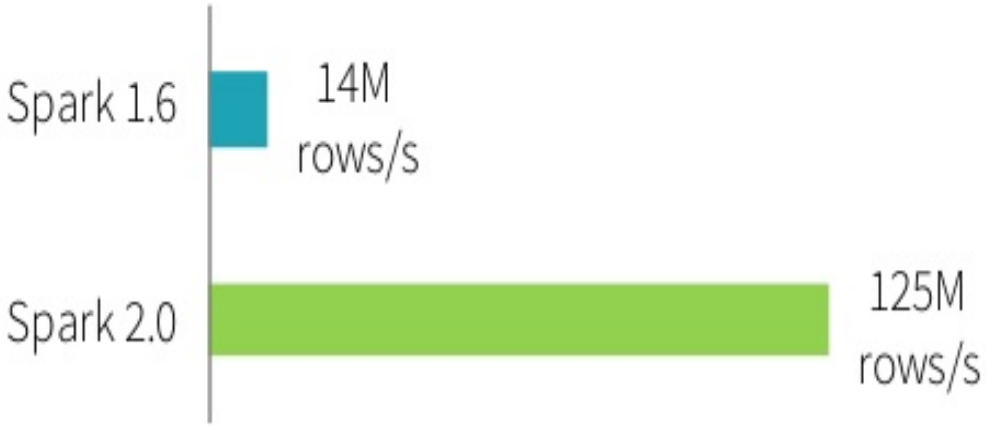
Optimized Plan

Specialized Code

New in 2.0

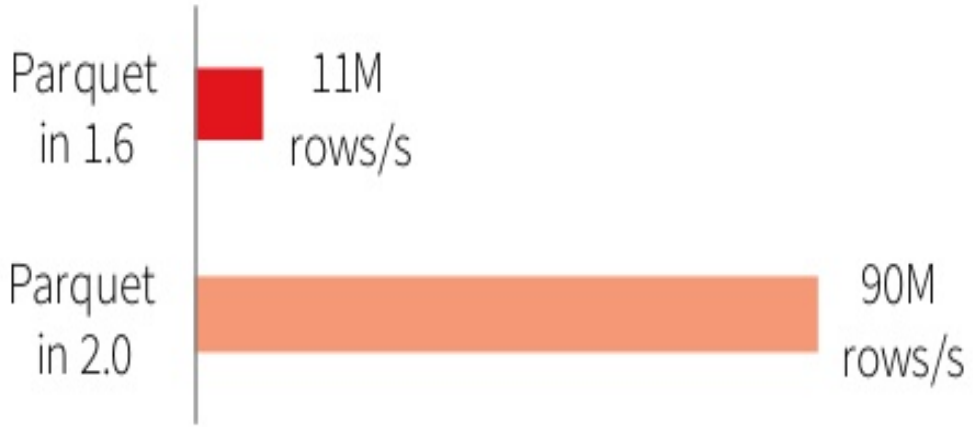
Whole-stage code generation

- Fuse across multiple operators



Optimized input / output

- Apache Parquet + built-in cache



Structured Streaming

High-level streaming API built on DataFrames

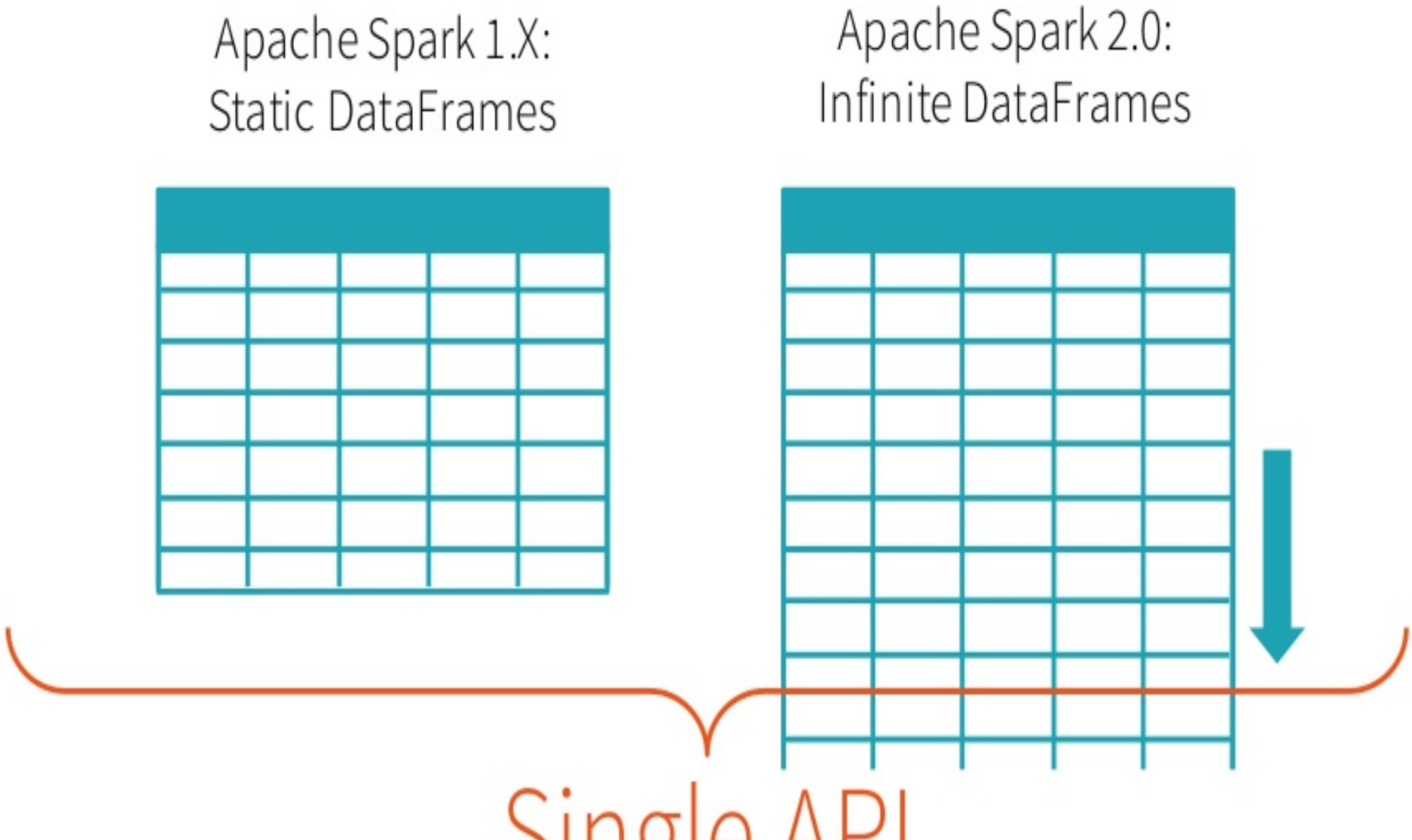
- Event time, windowing, sessions, sources & sinks

Also supports interactive & batch queries

- Aggregate data in a stream, then serve using JDBC
- Change queries at runtime
- Build and apply ML models

Not just streaming, but "continuous applications"

Structured Streaming API



Example: Batch App

```
logs = ctx.read.format("json").open("s3://logs")

logs.groupBy("userid", "hour").avg("latency")
    .write.format("jdbc")
    .save("jdbc:mysql//...")
```

Example: Continuous App

```
logs = ctx.read.format("json").stream("s3://logs")

logs.groupBy("userid", "hour").avg("latency")
    .write.format("jdbc")
    .startStream("jdbc:mysql//...")
```

More Details in Conference

Engine: Structuring Spark, Structured Streaming, deep dives

ML: SparkR, MLlib 2.0, new algorithms

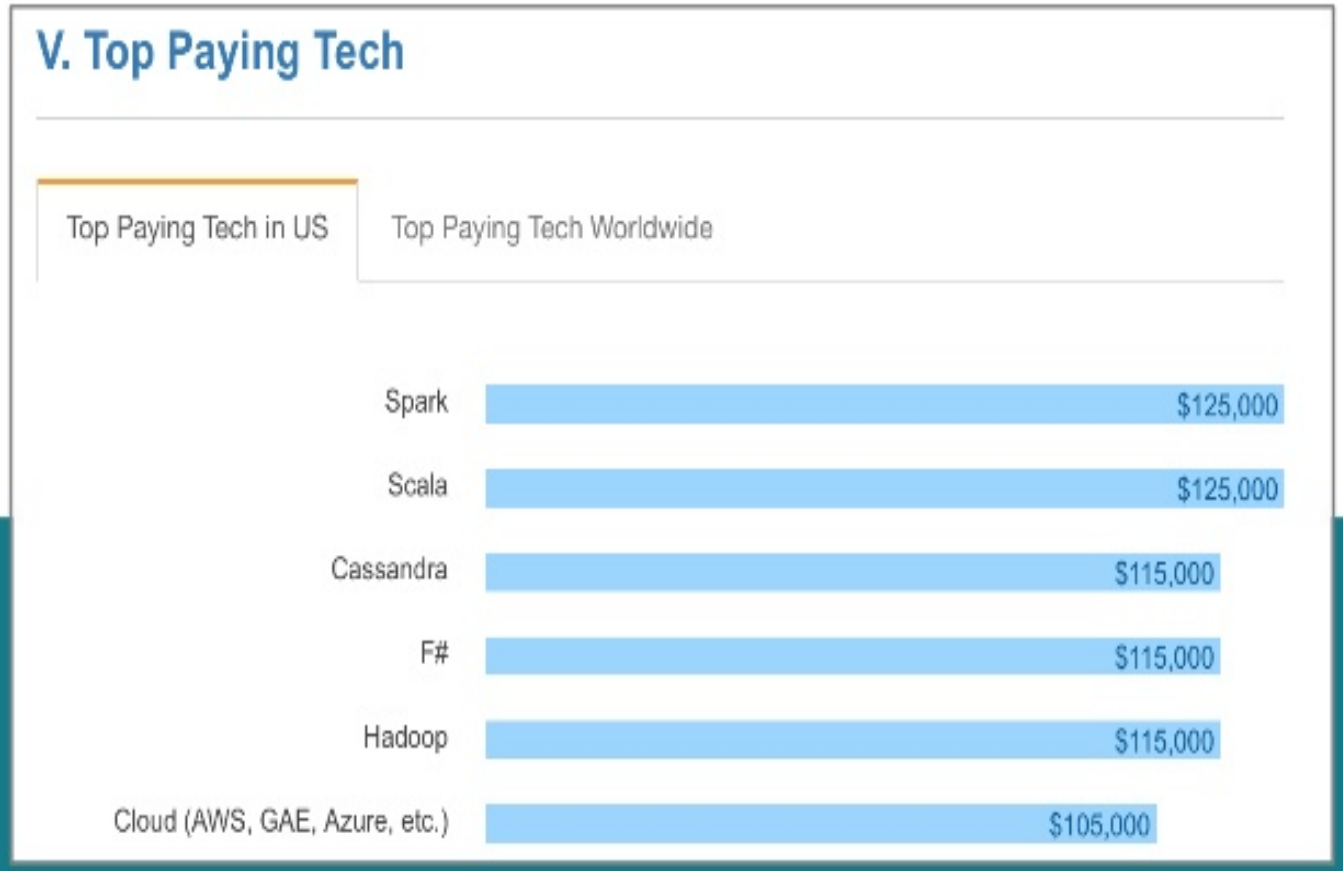
Other: deep learning, GraphFrames, Solr, Cassandra, …

Try 2.0-preview at spark.apache.org

Growing the Community

New initiatives from Databricks

The largest challenge in applying big data is the skills gap.



StackOverflow Developer Survey 2016

Databricks Community Edition

Free version of Databricks with:

- Interactive tutorials
- Apache Spark and popular data science libraries
- Visualization & debug tools

GA Today!

databricks.com/ce

Massive Open Online Courses

Free 5-course series on big data with Apache Spark

dbricks.co/mooc16

Demo

Michael Armbrust

databricks