One planner fits all

(How Apache Calcite makes it easier to write a DBMS)

Lightning talk at XLDB 2015
Stanford, California
Julian Hyde (Hortonworks)

“One size fits all” is an idea whose time has come and gone

–Mike Stonebraker (2005)

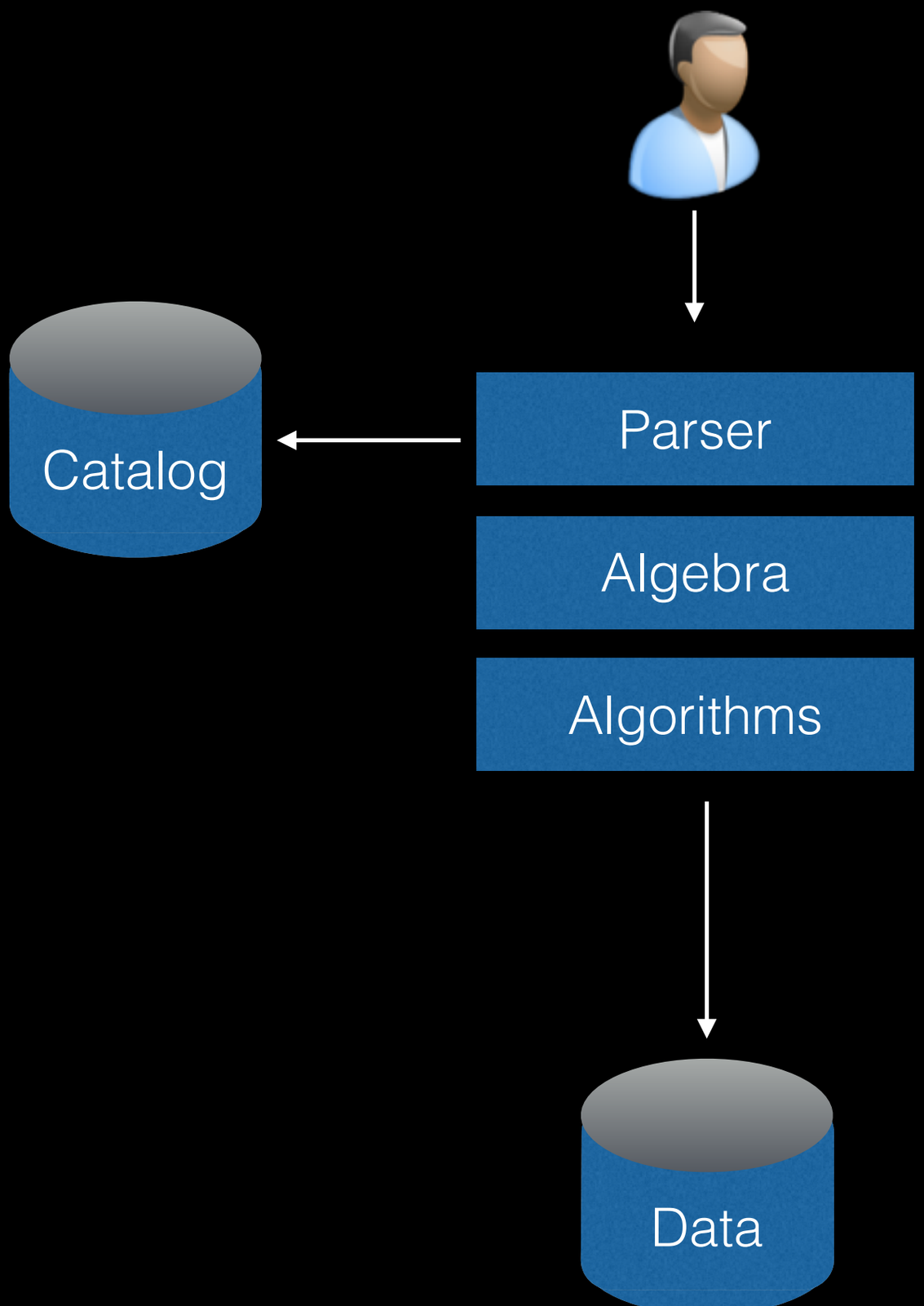
- Hadoop and other open source technologies have deconstructed the DBMS

- Query parser/API + catalog + authorization + algorithms + scheduler + engine + data format + storage


image credit: http://oliviaobryon.com


Interesting
Boring
image credit: http://oliviaobryon.com

Conventional DB



Apache Calcite
DB framework

Schema SPI

Parser

Algebra

Operators,
Rules,
Statistics,
Cost model

Engine

Engine

Engine

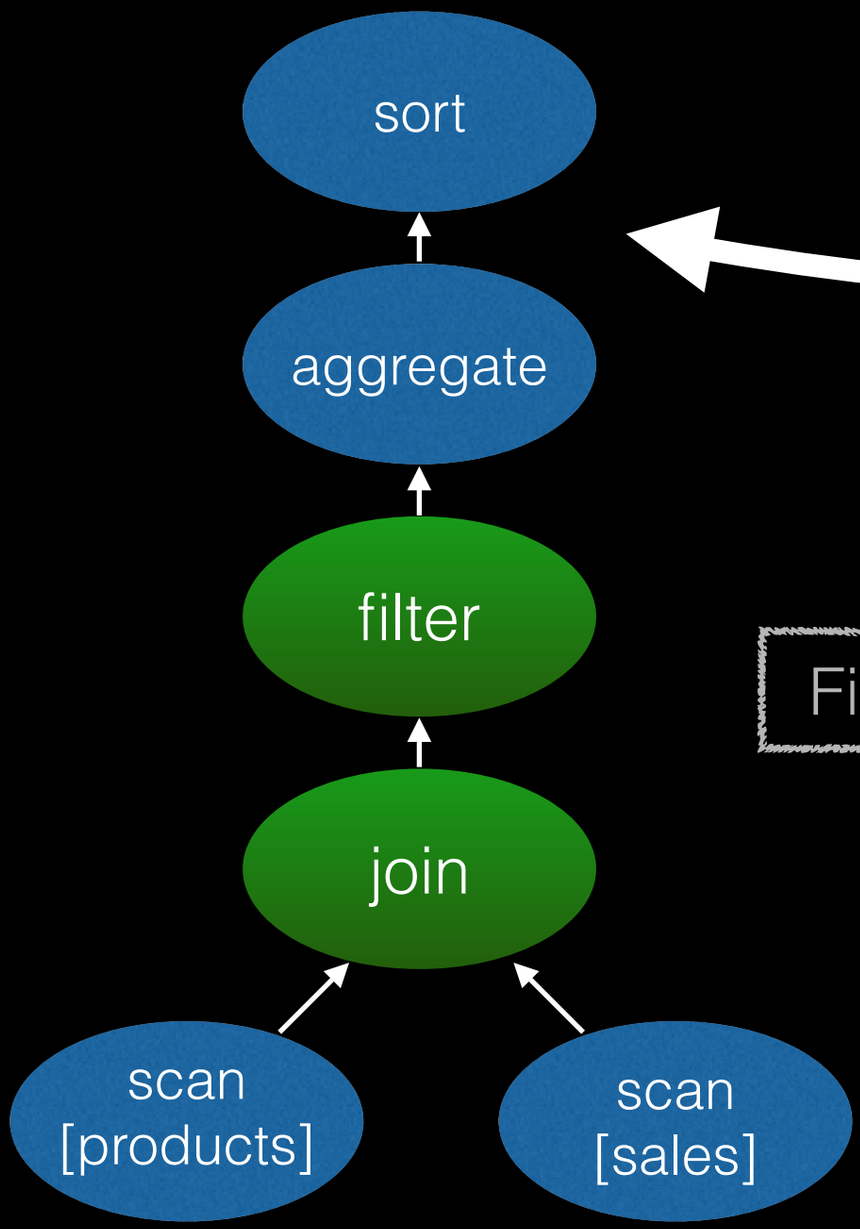
Data

Data

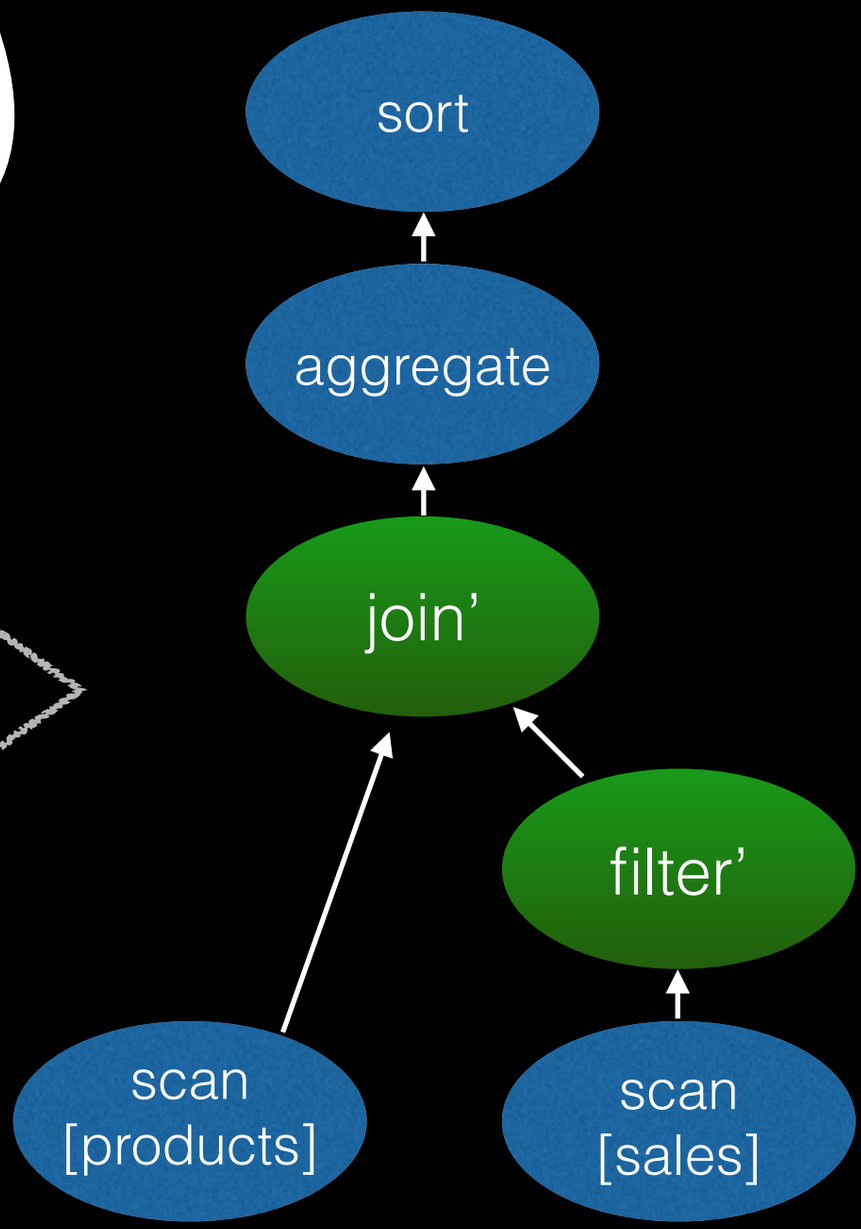
Data

```
SELECT products.name, COUNT(*)
FROM sales
JOIN products USING (productId)
WHERE sales.discount IS NOT NULL
GROUP BY products.name
ORDER BY COUNT(*) DESC
```

translate SQL to relational algebra

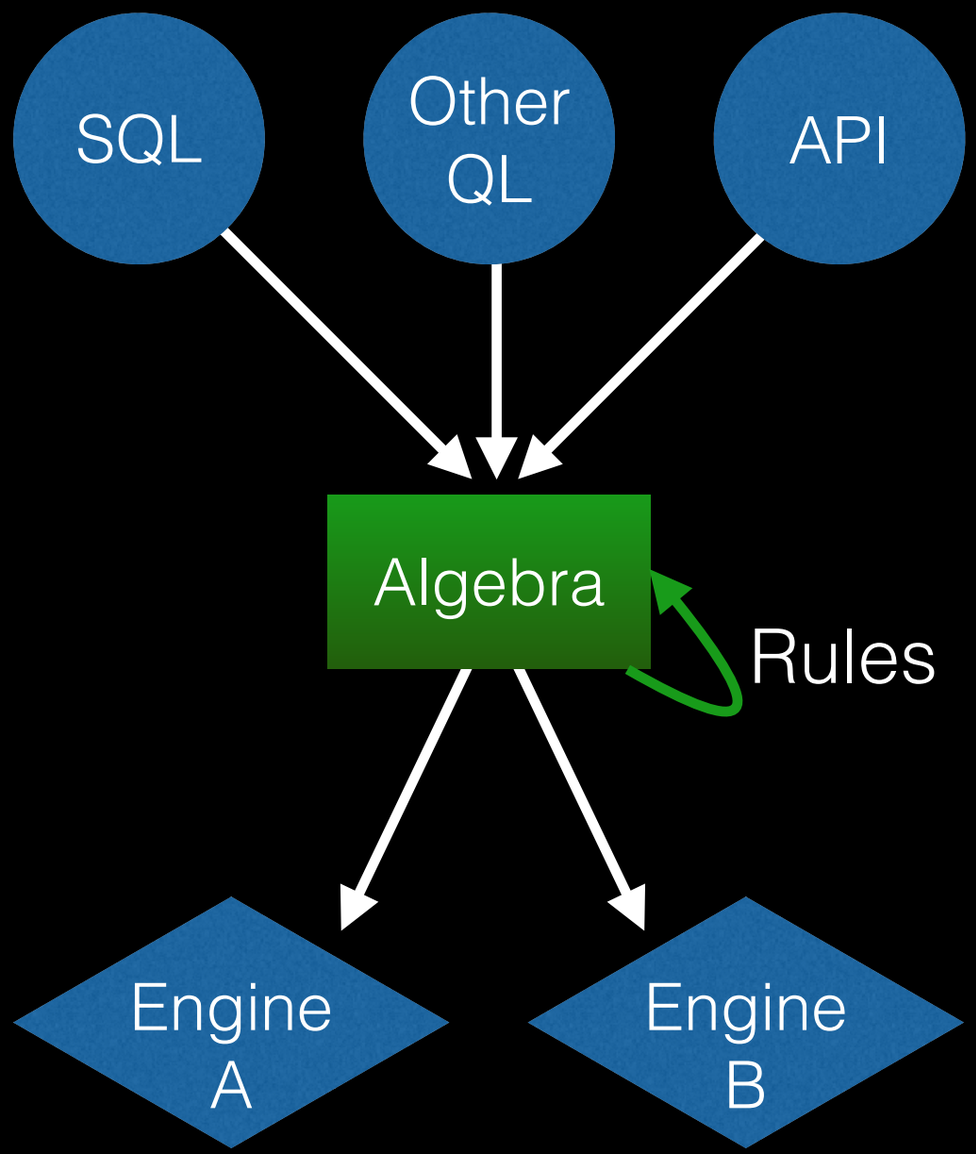


FilterIntoJoinRule



Relational algebra

- Robust
- Allows re-use
- Complex cost-based optimization
- Multiple front-ends & back-ends
- Not just for “flat” relations



Thank you!

Download: http://calcite.incubator.apache.org

Use Calcite to build your next database!

Calcite powers Apache Hive, Drill, Phoenix, Kylin

An Apache Incubator project since May 2014

@julianhyde

What's in the box?

- SQL parser & AST
- JDBC/ODBC framework
- Built-in operators (project, filter, …)
- In-memory engine
- 100+ rules
- Planning engines
- Adapters (CSV, JDBC, Mongo, …)
- Streaming SQL
- Materialized views

Hortonworks