cloudera

Big Data Analytics with Tableau and Apache Impala

The Leader for Analytic SQL on Hadoop

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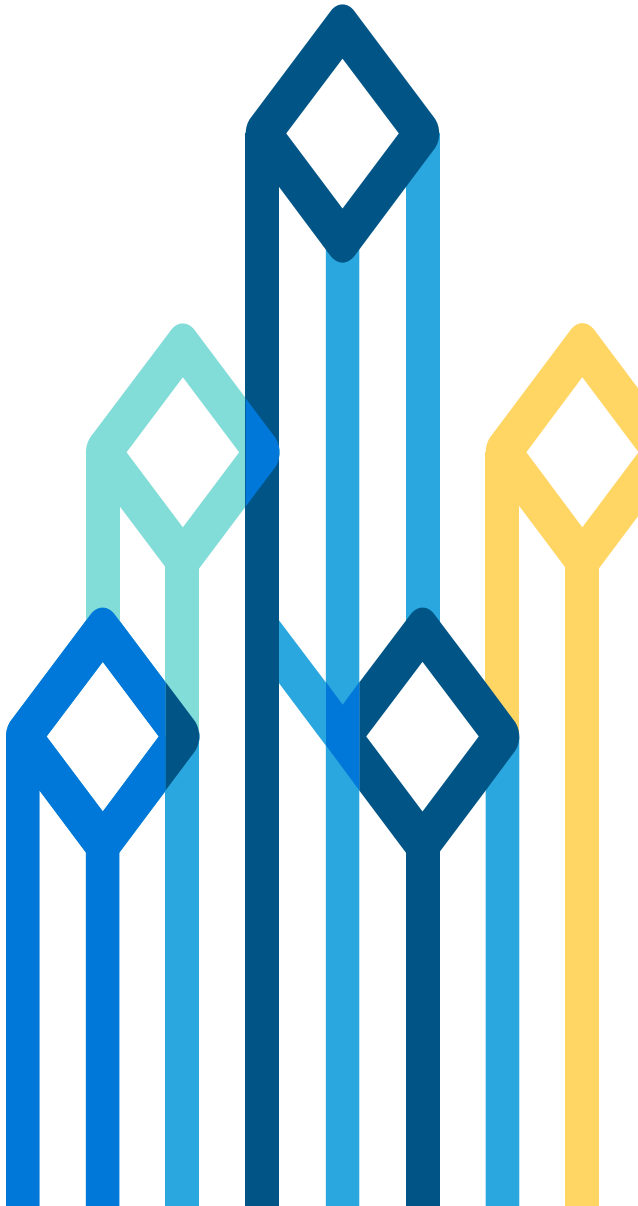

Solution: Hadoop & Ecosystem

- Hadoop is a software platform for storing, processing, and analyzing “big data”
  - Distributed
  - Scalable
  - Fault-tolerant
  - Open source

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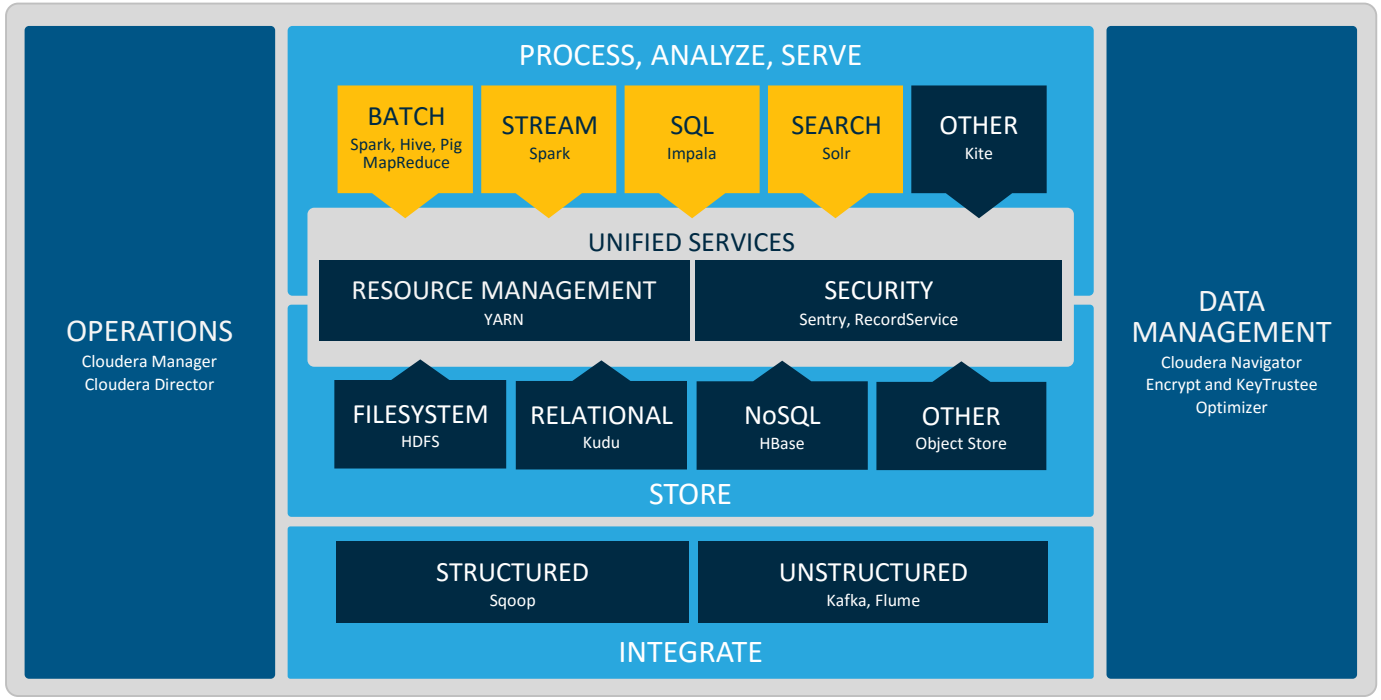
One Platform, Many Workloads



Batch, Interactive, and Real-Time.

- End-to-end analytic workflows
- Access more data
- Work with data in new ways
- Enable new users

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One Platform. Many Applications.

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Apache Impala

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What is Impala ?

- Apache Impala is a high-performance, low-latency SQL queries engine on data stored on the popular Apache Hadoop file system (HDFS) .

- Impala integrates with the existing CDH ecosystem & shares same hive meta-store

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Apache Impala: Open Source & Open Standard

1. > 1 MM downloads since GA
2. Majority adoption across Cloudera customers
3. Certification across key application partners:

4. De facto standard with multi-vendor support:

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Database Cost per TB

MPP Database

- Massively Parallel Processing
- Specialty Database Appliances
- $30-$50K per TB
- Expensive

Apache Impala on Hadoop

- Massively Parallel Processing
- Really all Commodity Hardware
- $2K per TB
- At least 10x Cheaper

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What is it good at?

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Good at

- Schema on read – changing schemas
- Columnar Compression
- Ugly Wide tables
- Big data that doesn’t fit anywhere else
- Interactive analysis at Scale
- Performance at 5-10% of the cost
- Data Consolidation – Data Lake, Data Hub

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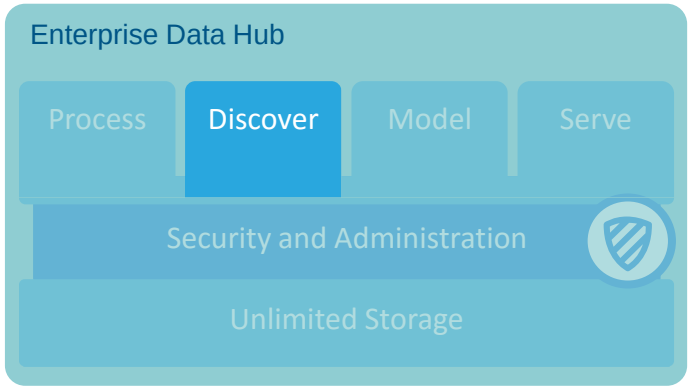
Successful Use Cases

- Interactive BI/analytics on “big data”
- Data discovery – Understanding your data
- Exploratory analytics – Top N , Percentiles etc.
- Queryable operational data store
- Active Archive



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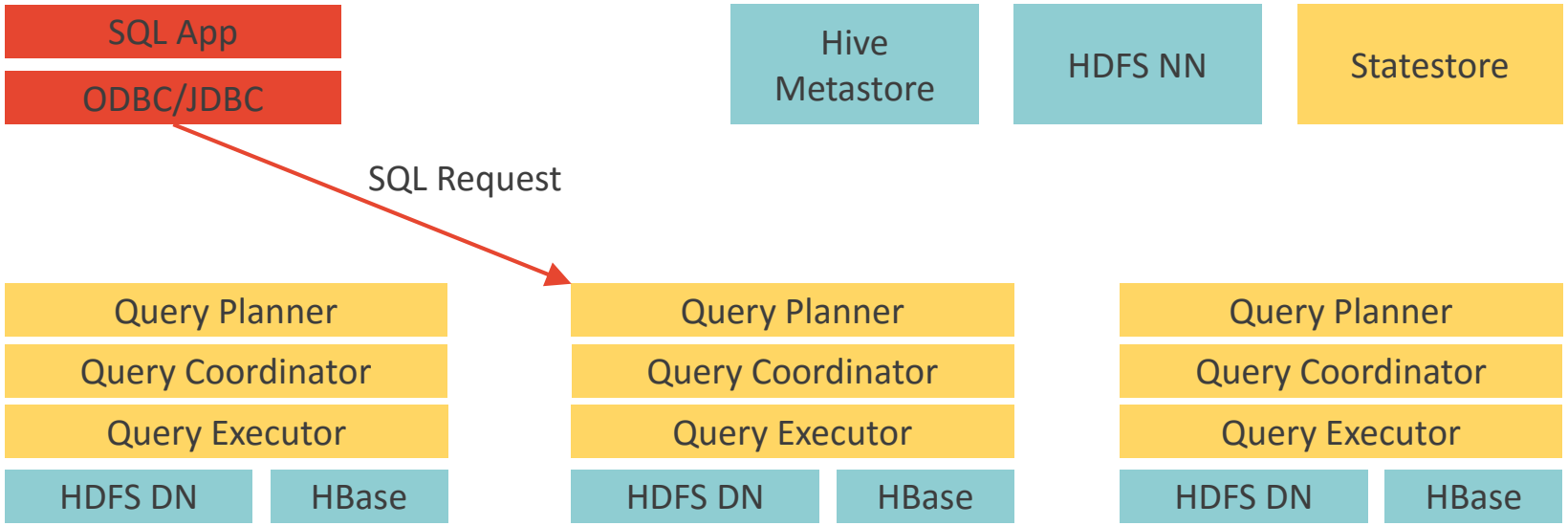
Impala Architecture

- MPP query engine built natively into Hadoop



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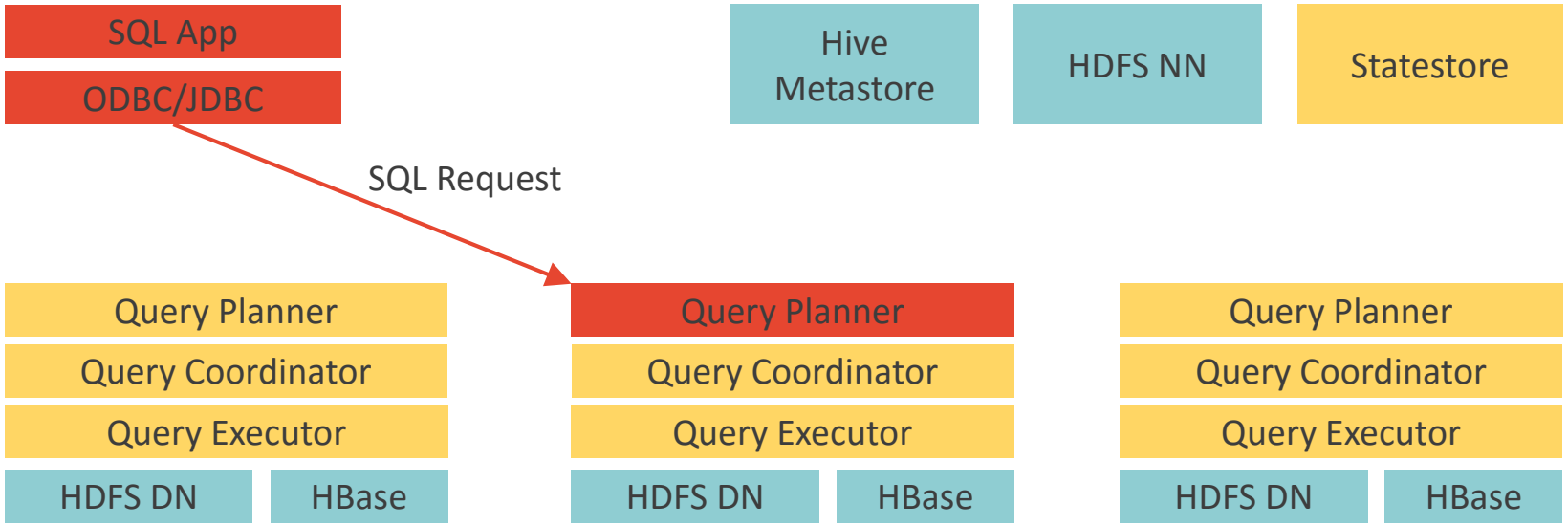
Impala Architecture: Query Execution

- Request arrives via ODBC/JDBC/Hue GUI/Shell



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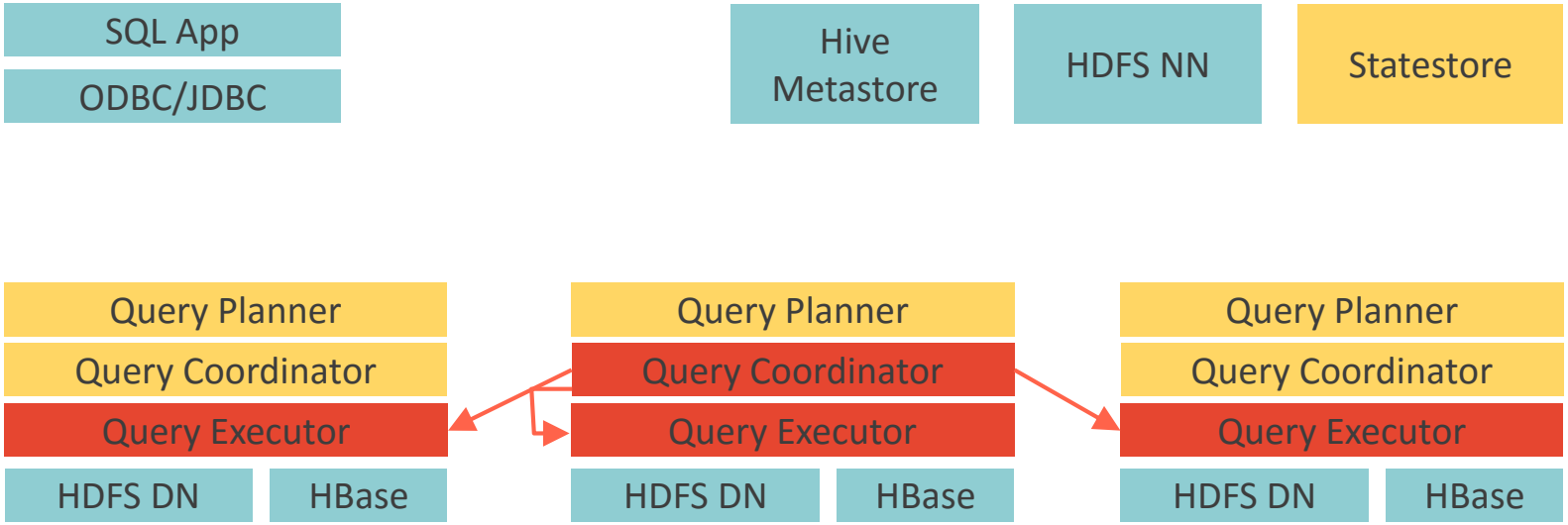
Impala Architecture: Query Execution

- Planner turns request into collections of plan fragments
- Coordinator initiates execution on impalad's local to data



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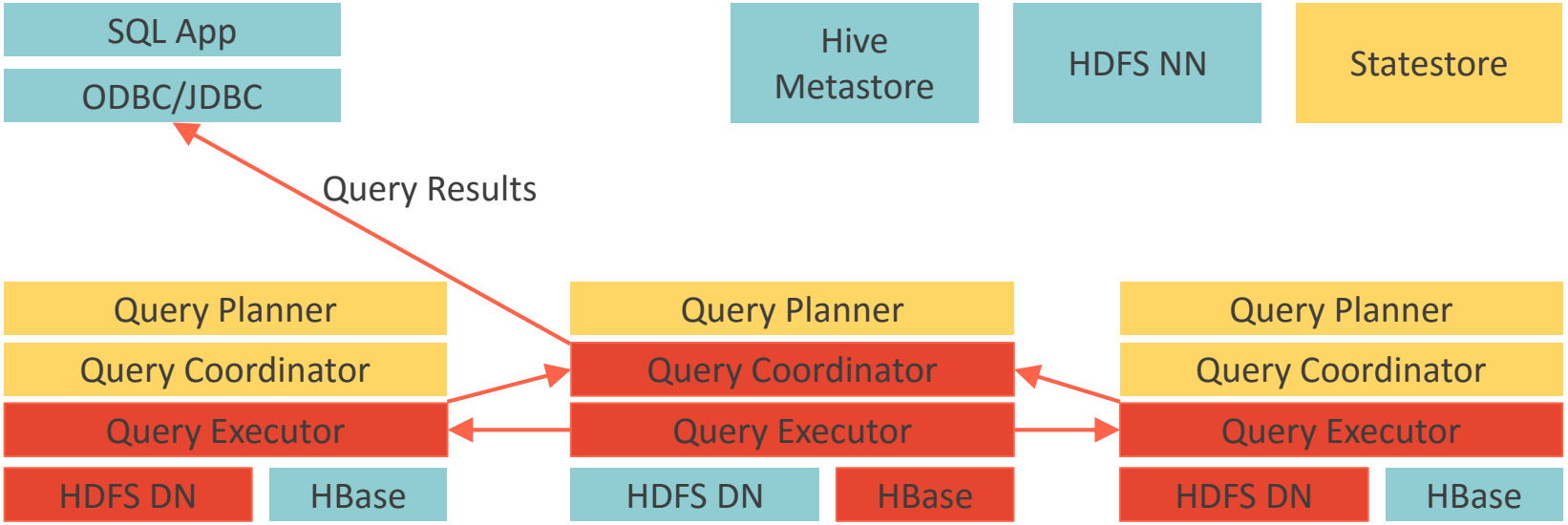
Impala Architecture: Query Execution

- Intermediate results are streamed between impalad's
- Query results are streamed back to client



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Performance

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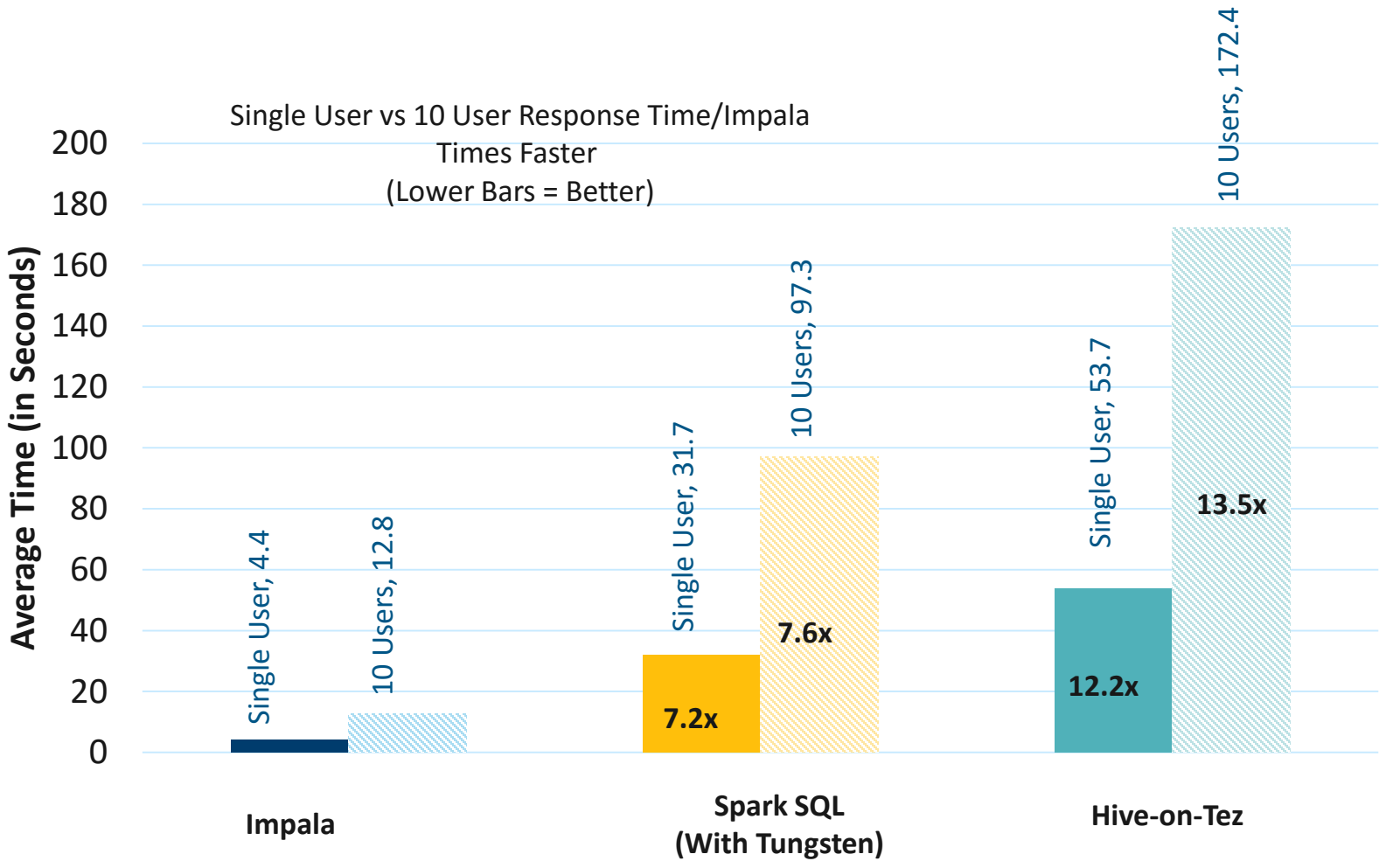

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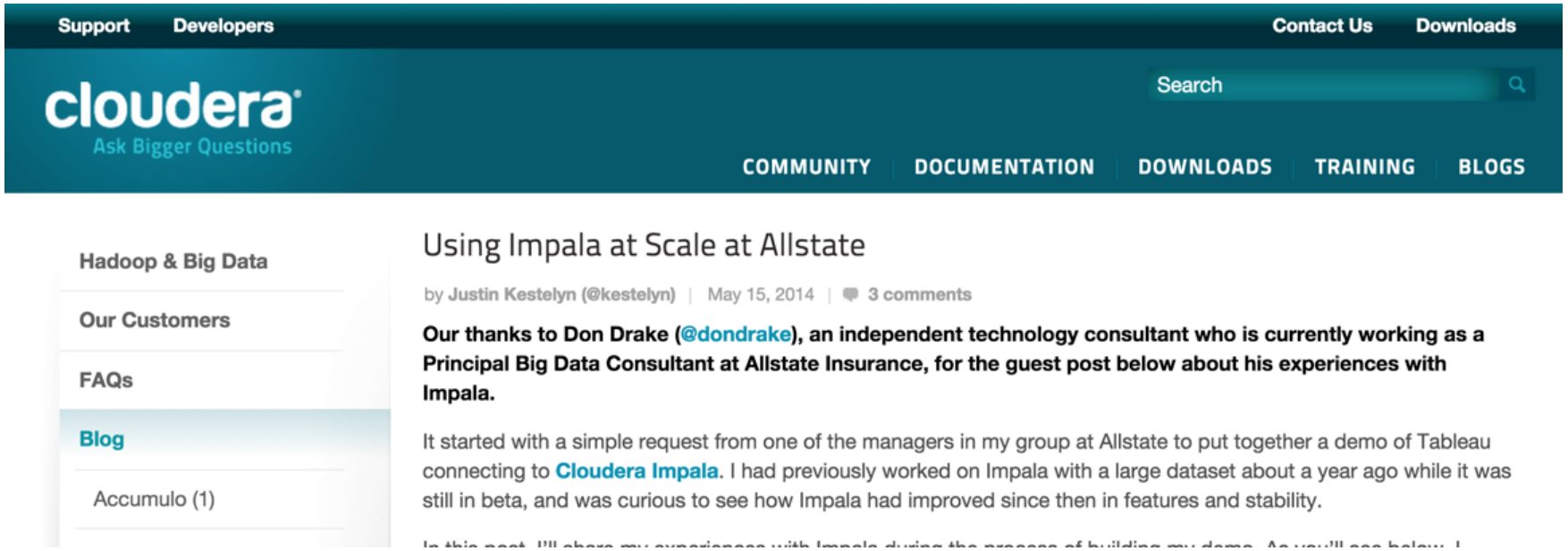

- http://blog.cloudera.com/blog/2014/05/using-impala-at-scale-at-allstate/

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Blog Summary

- Earned Premium Dataset – 800 columns, 1.1B Rows, 2.3TB
- 35 node cluster – scans text table in 3 minutes
- Add Partitioning (time, geo, org, line) and Parquet Format
- Runs like lightning – where'd my 2TB go? Now 100GB
- Can scan the whole table in 10 seconds
- Partitioned queries run in 1 or 2 seconds

```
DROP TABLE IF EXISTS default.datasetp_2010_2013;
CREATE EXTERNAL TABLE IF NOT EXISTS default.datasetp_2010_2013
(
PROC_MONTH STRING, PROC_YEAR STRING, POLCT STRING, STATST STRING, [800+ column definit
EEXP REAL, EPREM REAL, EXP REAL, PREM REAL
)
PARTITIONED BY (ACTYR STRING, GEOST STRING, ALINE STRING, COMPNY STRING)
STORED AS PARQUET
LOCATION '/user/drake/cdf_impala_part';
```


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Tuning & Best Practices

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Partitioning

- Large tables can be partitioned
- Common partition field is date
- Partitions should be > 1GB
- Common where clause criteria

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Why create a bunch of tables?

- 80% of data modeling is to save space or create performance
- Making Impala do a join is often a waste of time
- Parquet lets you build big ugly tables that work well
- Lazy data modeling advocate

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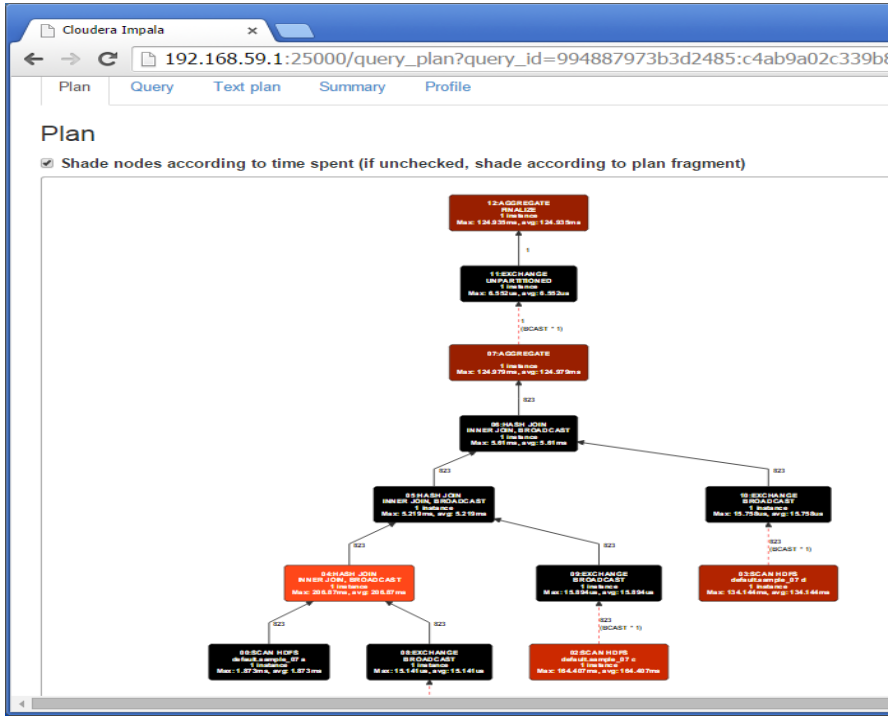
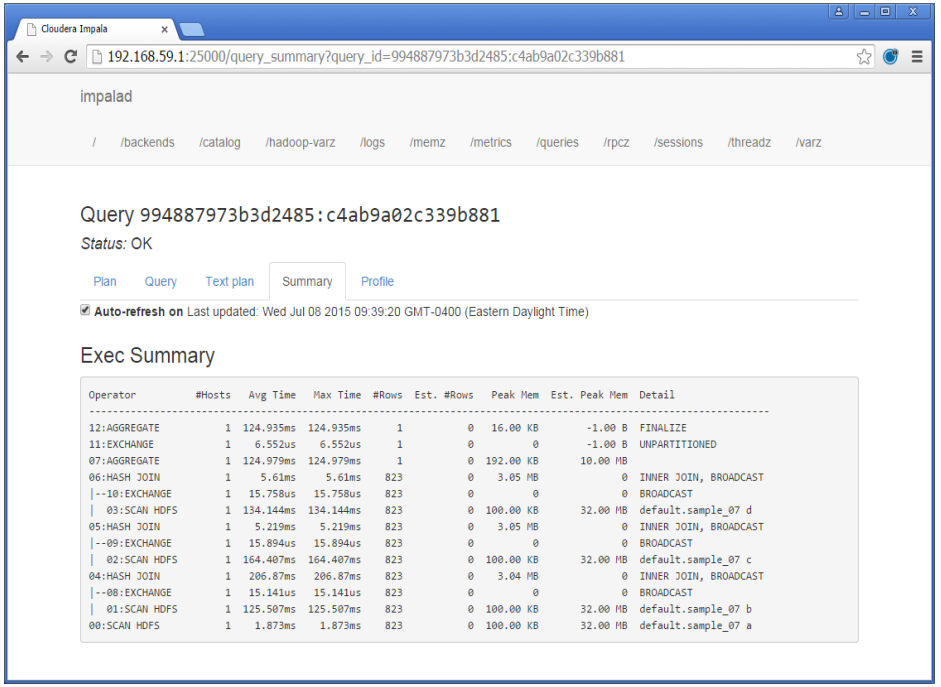
Impala query analysis





Operator	#Hosts	Avg Time	Max Time	#Rows	Est. #Rows	Peak Mem	Est. Peak Mem	Detail
12:AGGREGATE	1	124.935ms	124.935ms	1	0	16.00 KB	-1.00 B	FINALIZE
11:EXCHANGE	1	6.552us	6.552us	1	0	0	-1.00 B	UNPARTITIONED
07:AGGREGATE	1	124.979ms	124.979ms	1	0	192.00 KB	10.00 MB	
06:HASH JOIN	1	5.61ms	5.61ms	823	0	3.05 MB	0	INNER JOIN, BROADCAST
|--10:EXCHANGE	1	15.758us	15.758us	823	0	0	0	BROADCAST
| 03:SCAN HDFS	1	134.144ms	134.144ms	823	0	100.00 KB	32.00 MB	default.sample_07 d
05:HASH JOIN	1	5.219ms	5.219ms	823	0	3.05 MB	0	INNER JOIN, BROADCAST
|--09:EXCHANGE	1	15.894us	15.894us	823	0	0	0	BROADCAST
| 02:SCAN HDFS	1	164.407ms	164.407ms	823	0	100.00 KB	32.00 MB	default.sample_07 c
04:HASH JOIN	1	206.87ms	206.87ms	823	0	3.04 MB	0	INNER JOIN, BROADCAST
|--08:EXCHANGE	1	15.141us	15.141us	823	0	0	0	BROADCAST
| 01:SCAN HDFS	1	125.507ms	125.507ms	823	0	100.00 KB	32.00 MB	default.sample_07 b
00:SCAN HDFS	1	1.873ms	1.873ms	823	0	100.00 KB	32.00 MB	default.sample_07 a

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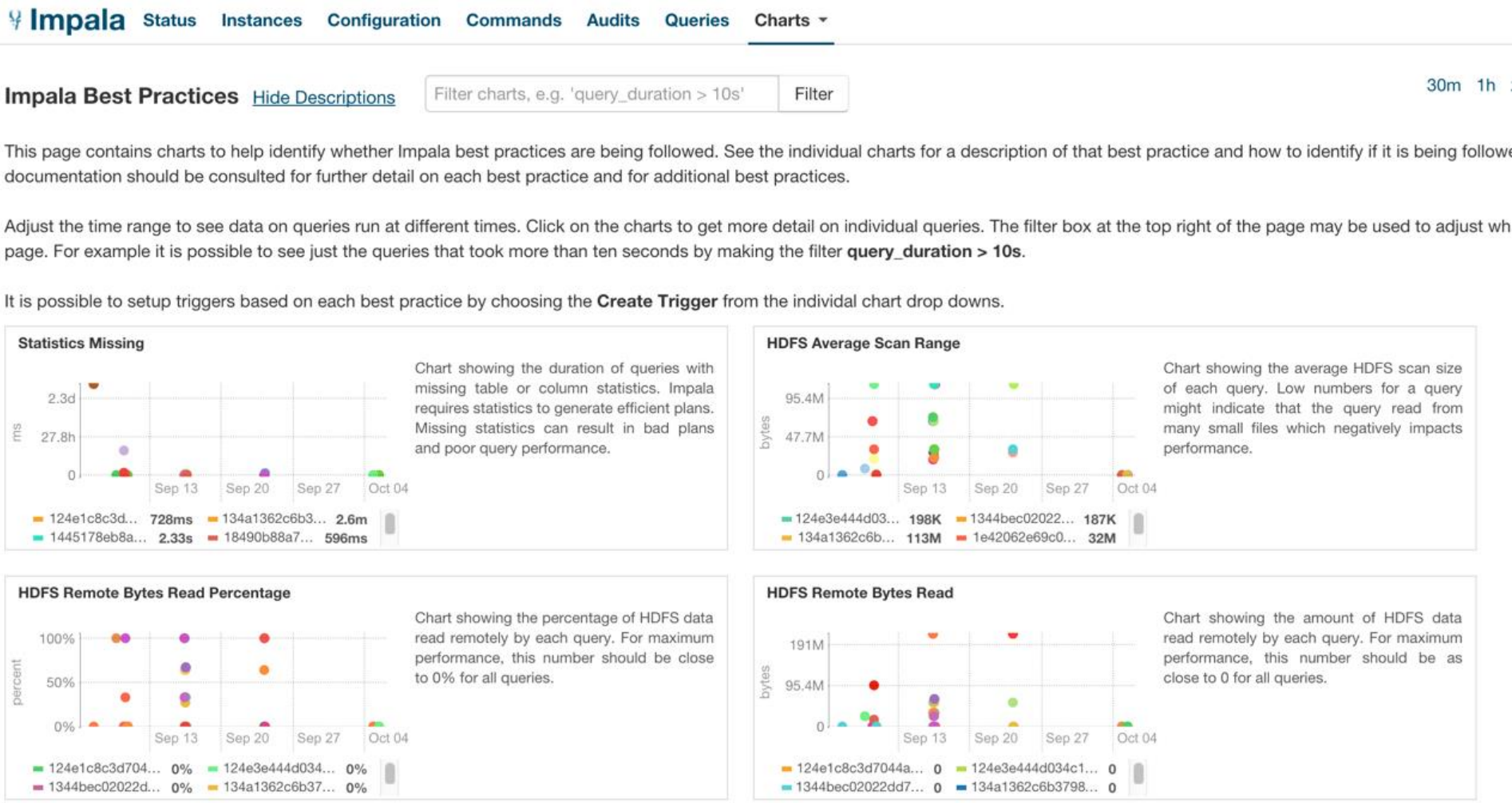

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Cloudera ODBC and JDBC Drivers

- Written by Simba Technologies
- Standard BI data access

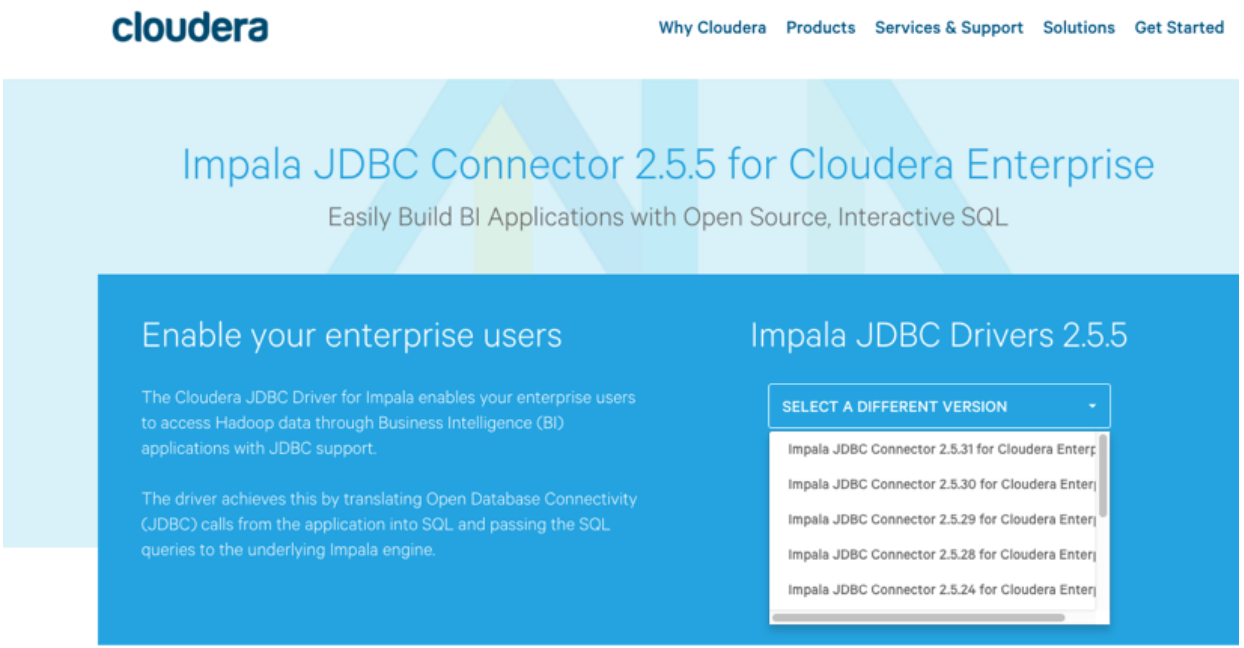

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Tableau

URL: ec2-54-201-244-144.us-west-2.compute.amazonaws.com
Port: 21050

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Demo

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Thank You

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