

HareQL：快速HBase查詢工具的發展過程

Development of HBase Client and HareQL

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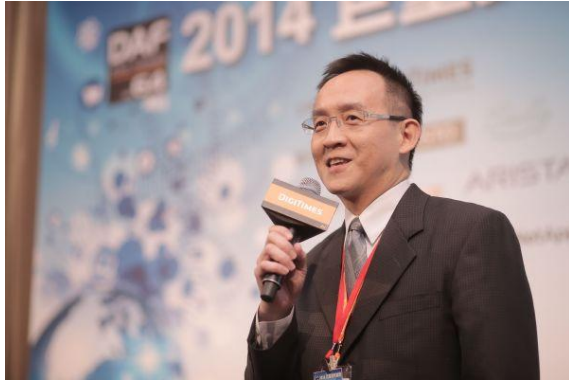
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林恬仔



About Us



- **Providing IT solutions**

- System development for big data solutions
- Smart manufacturing related services
- Financial data systems
- Telecommunication data systems
- We are the Cloudera certificated professional services team

- **Big data Product since 2011**

- Hare Data platform
- 2013 HSP Innovative Product Award
- 2014 Golden Award of the TOP 100 Innovative Products
- Cloudera Certified Technology (Only one in Taiwan)



What is Hare

- It's a NoSQL Database which is based on HBase
- Support SQL to HBase directly
- Provide DBMS-like Web UI
- Provide JDBC/ODBC and Restful Service

Why Hare ?



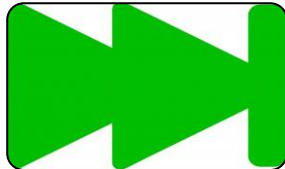
Easy

- Click and start to use it
- Friendly user interface
- To involve your big data rapidly



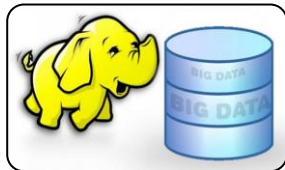
Comfortable

- SQL language supported
- Data type management
- Multi-Cluster in one client



Faster

- Quick access to the data in HBase
- Powerful query engine for better performance



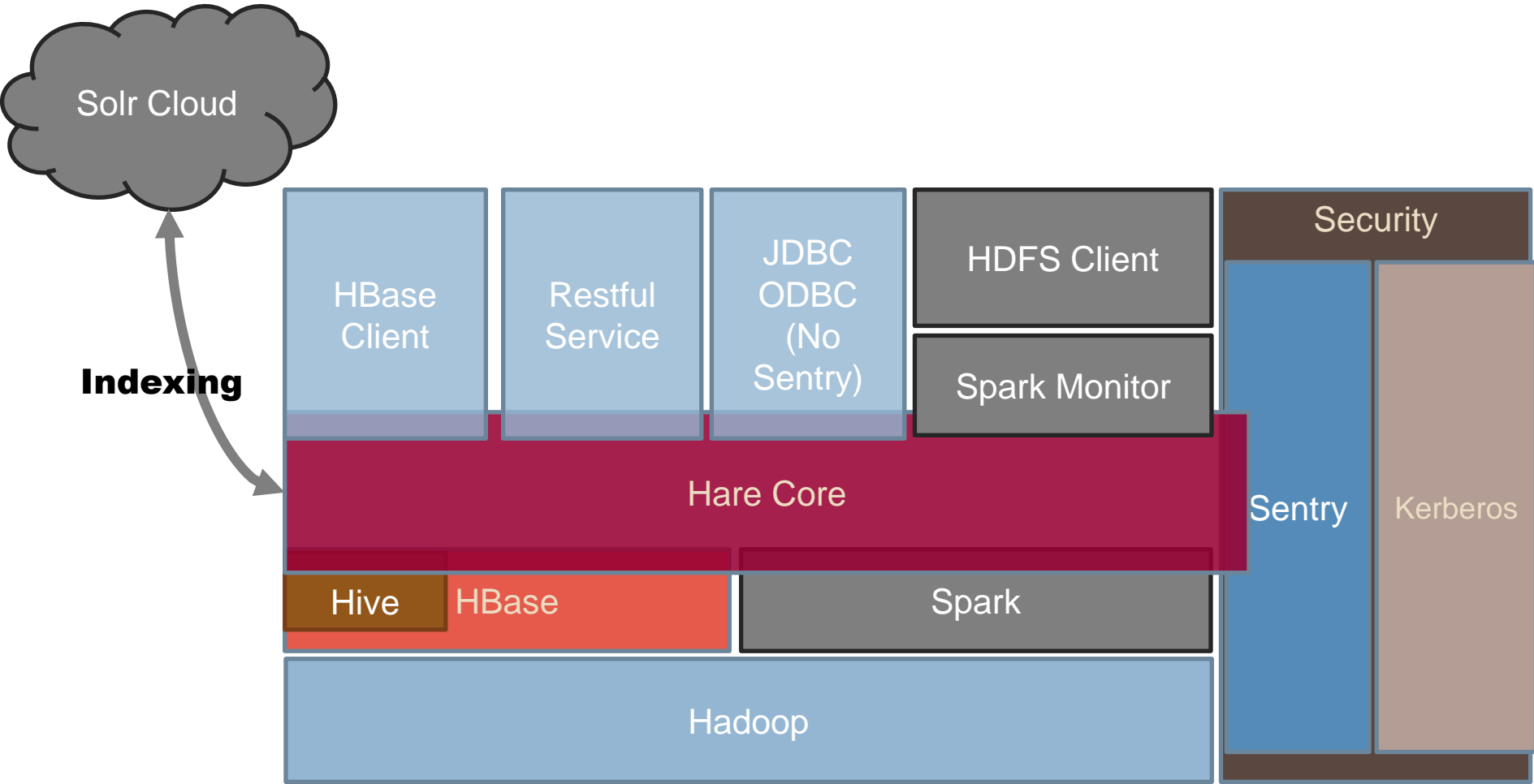
Compatible

- Based on the Hadoop/HBase System
- Highly compatible in ecosystem

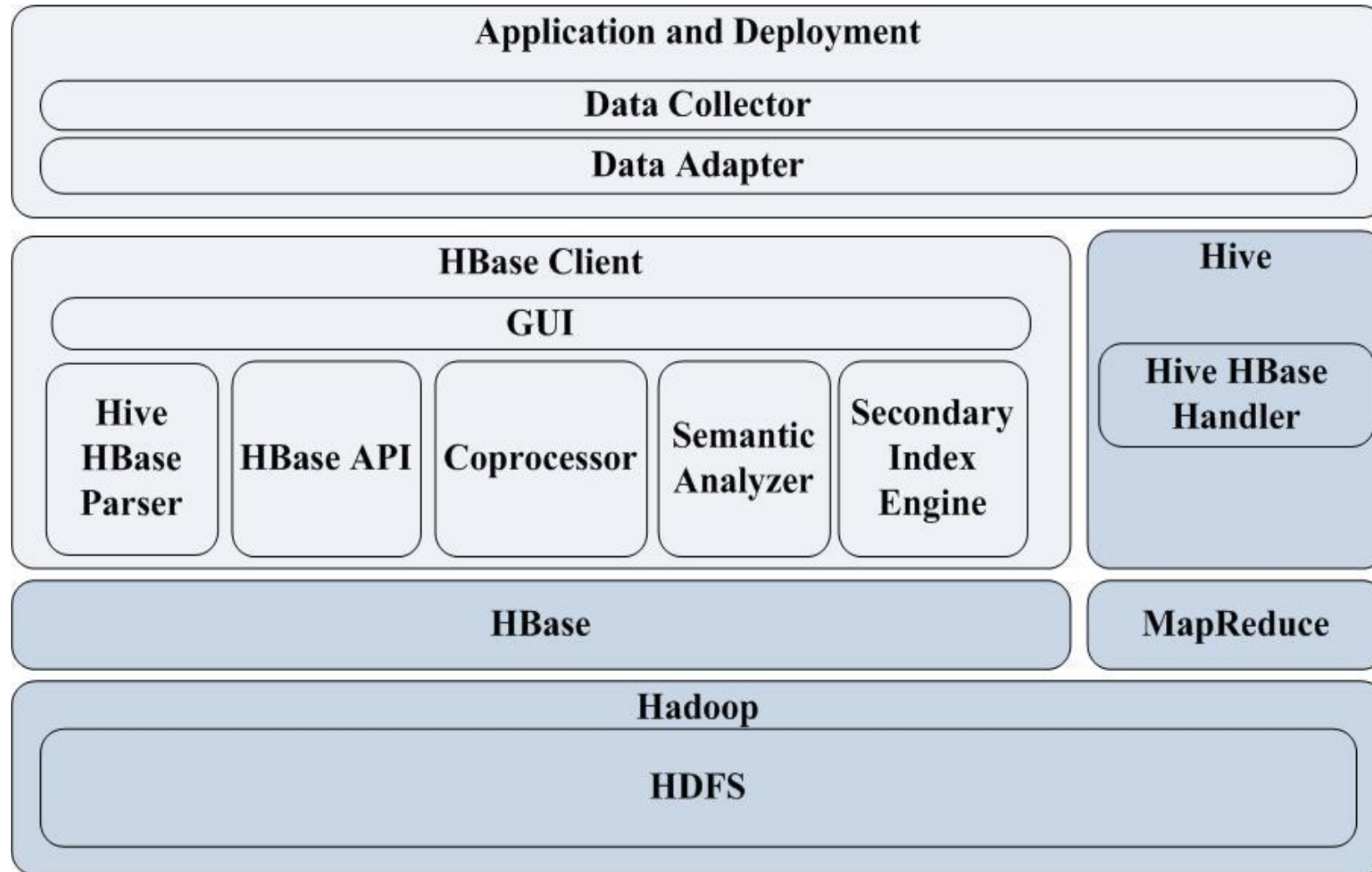
Features

- **Easy use (Web UI)**
 - Easy install
 - Friendly UI
- **One Client ; Many Clusters (Connection Manager)**
- **Bulkload UI**
- **Meta Manager (Schema Manager)**
- **Relation between HBase Table and Hive Table**
- **HareQL (High Speed SQL Query in HBase)**
 - JDBC Driver
 - ODBC Driver (not support sentry)
 - Restful Services

Software Stack

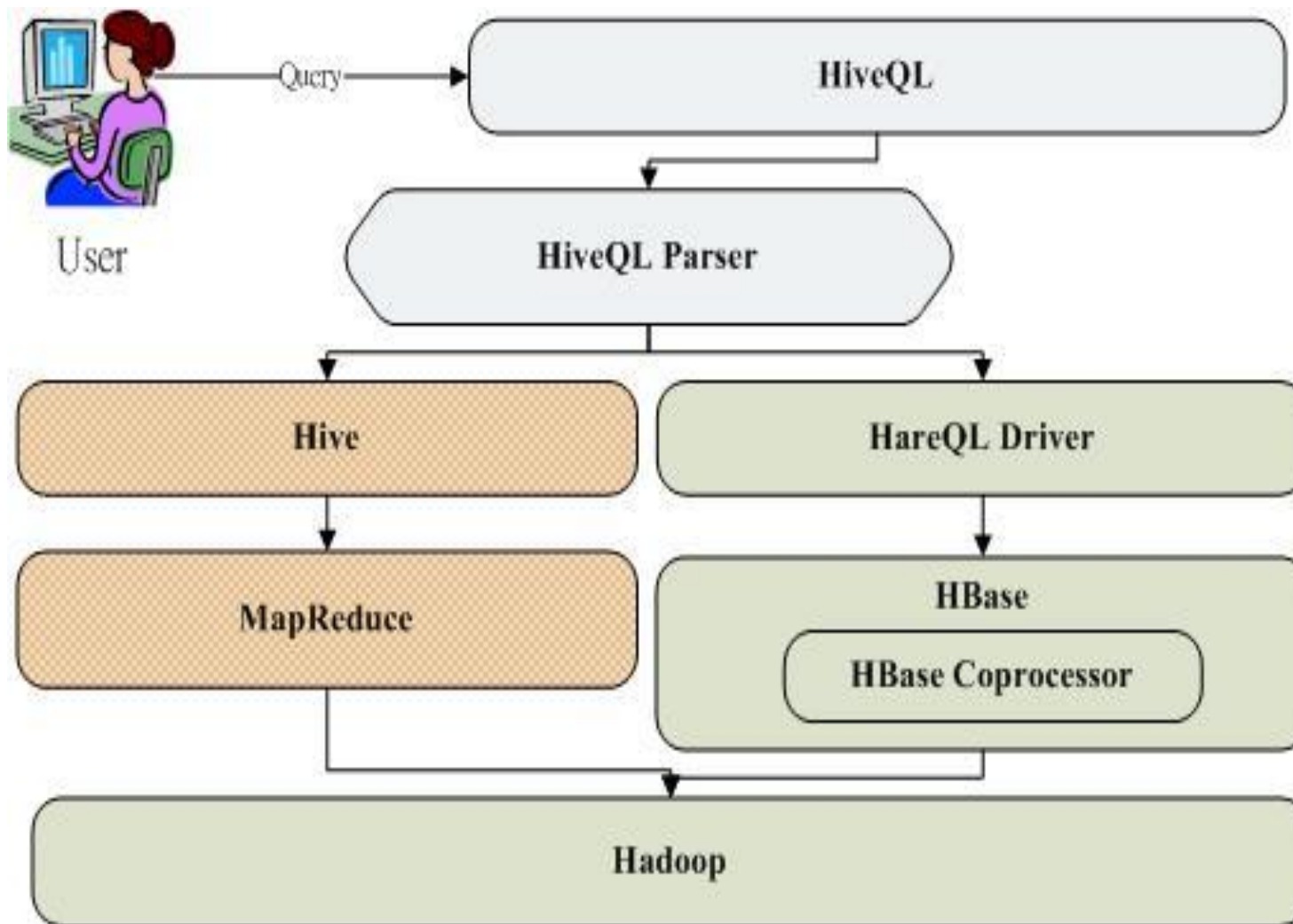


System Architecture



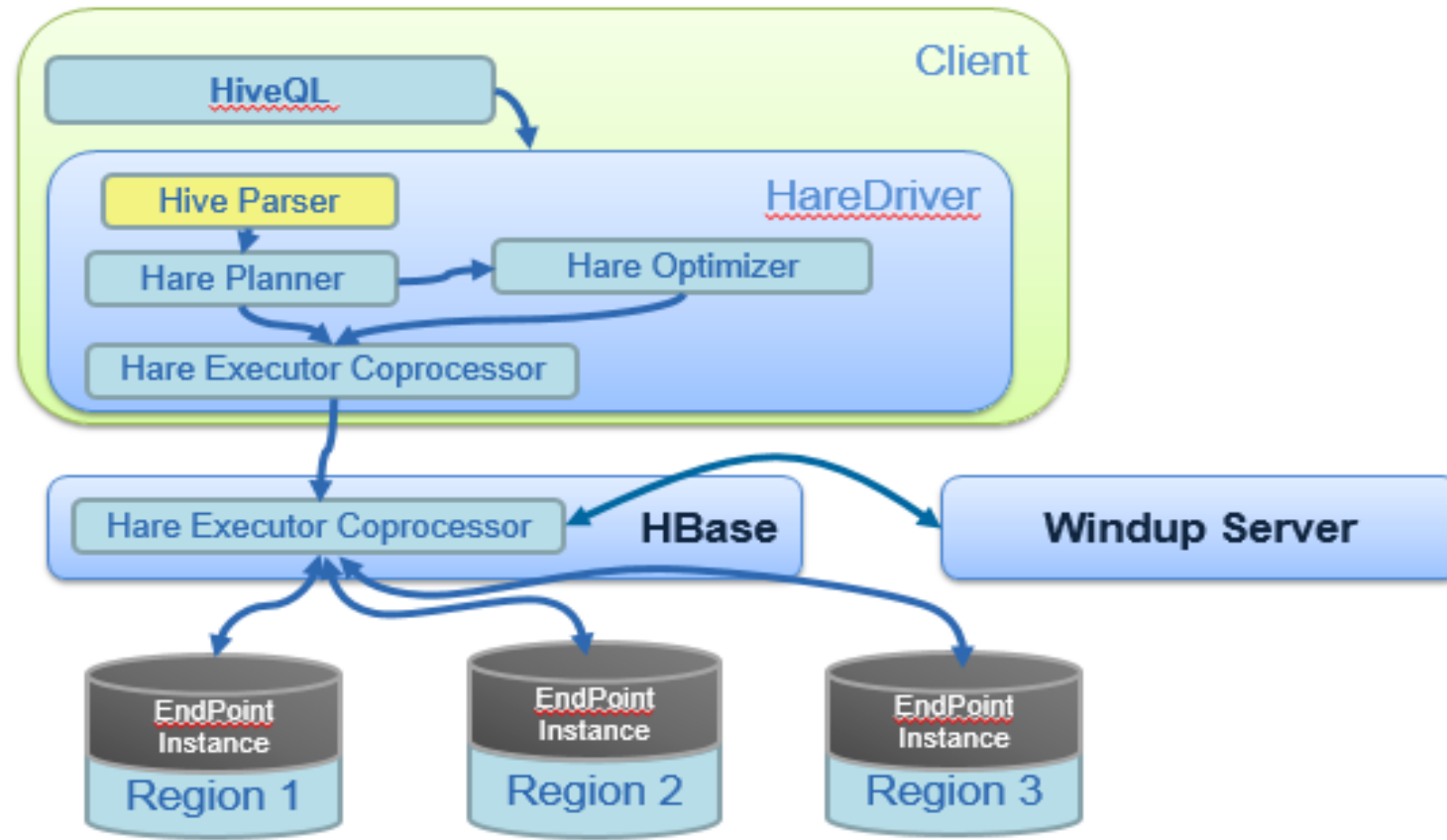
HareQL

- **Hive: MapReduce**
- **We replace MapReduces in Hive to HBase coprocessors.
We call the language “HareQL”.**
- **HareQL has some advantages as below.**
 - Low- latency
 - Query HBase table directly
 - High performance



HareQL Architecture

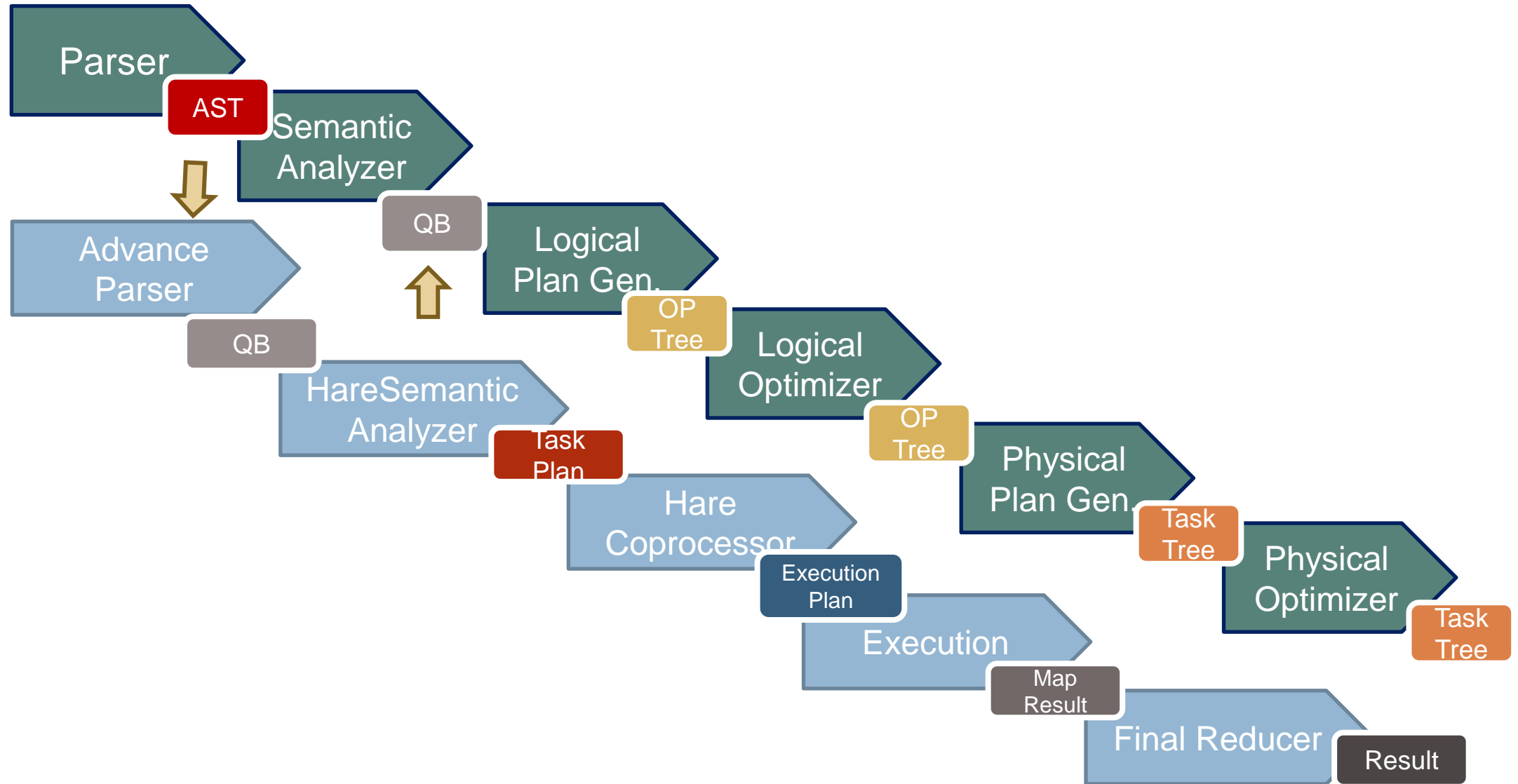
- Hive Parser make us support HiveQL



From Hive to Hare

Hive
Flow

Hare
Flow

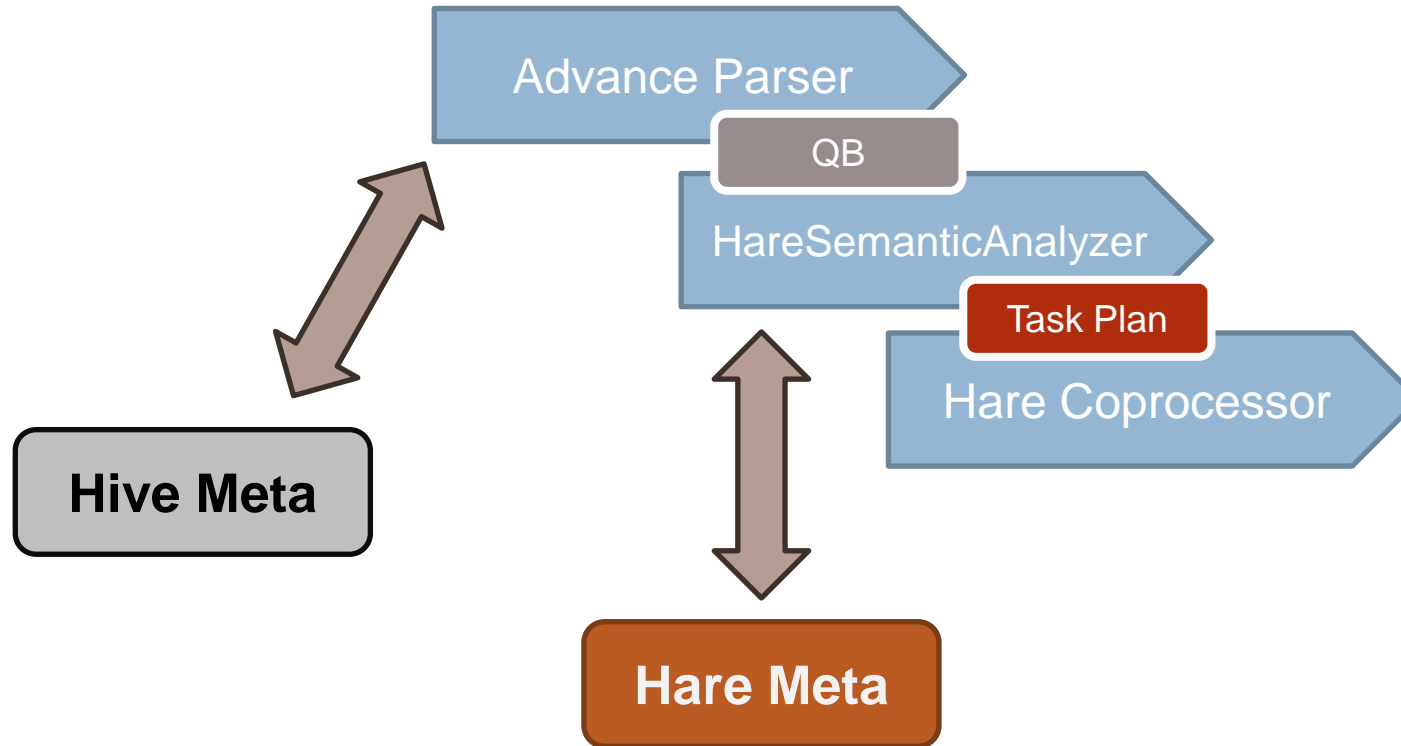


Metadata

- As we know, anything that can be converted to an array of bytes can be stored in HBase. However, we have to convert the data back correctly, or we can't recognize the data.
- We integrated meta-store of Hive to HBase Client. We call the data type of HBase column "Meta data".

Up	Down	Insert Column	Modify Column	Remove Column
Column Name	Type	ColumnFamily	Qualifier	
hubertkey	string		key	
customerid	string	cf1	customer	
po_amount	string	cf1	sales_name	

When to get Metadata ?



Hare Restful Service

Table manipulation

Row manipulation

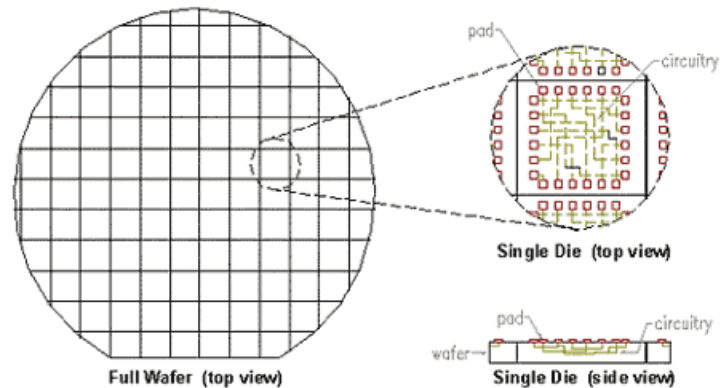
Bulkload data

Sending SQL

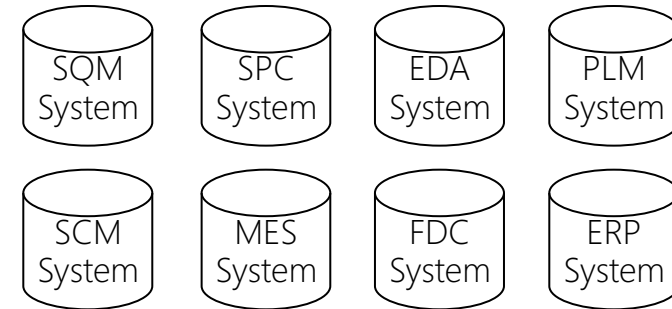
Scanning

Metadata manipulation

Semiconductor application

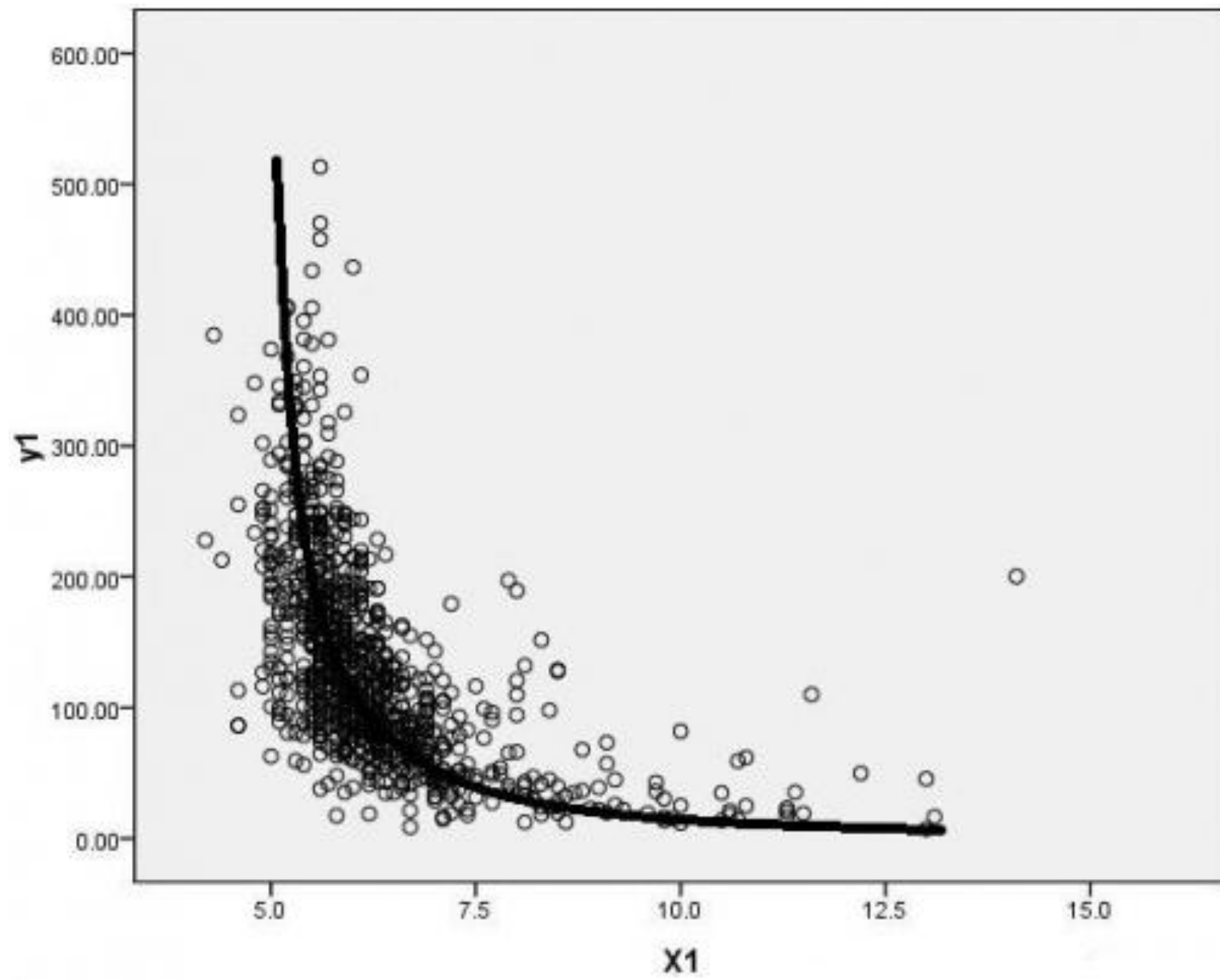


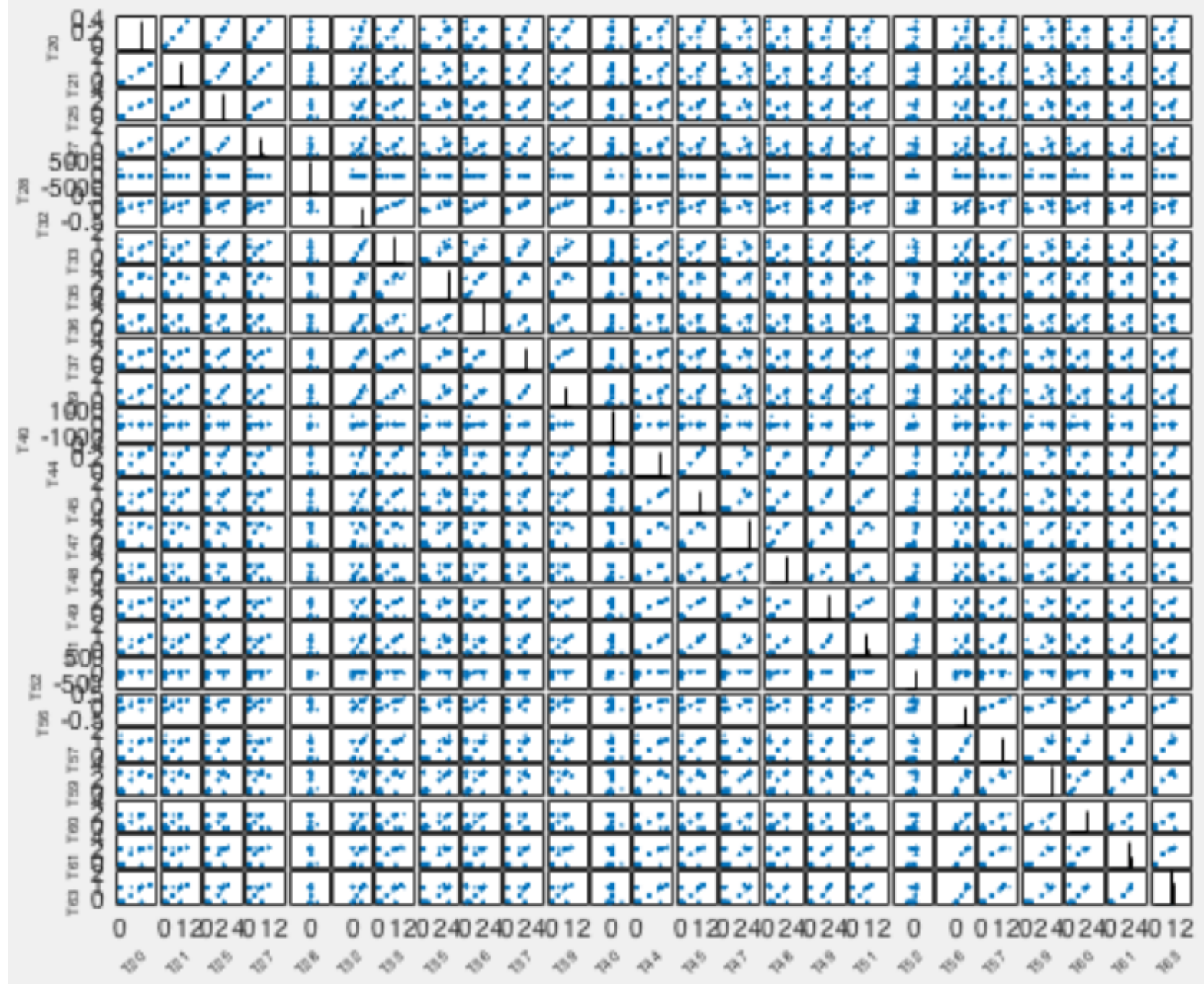
Structured Data



Un-Structured Data







Schema Design in HBase

- Designed the row key according to the access request

Table	fdcTrace		
Rowkey	[salt][Lot prefix][OperNo][EQID][ChamberID][Stb slot][DateTime][ID]		
	name	type & size	desc
	salt	char	value: 64+week_no(1..52)
	Lot prefix	String(8)	ex: AC418075
	OperNo	String(64)	ex: 010.00010
	EQID	String(64)	ex: OXED204
	ChamberID	String(64)	ex: A
	Stb slot	String(2)	ex: 02
	DateTime	String(15)	ex: 140622000036630 => 2014-06-22 00:00:36.630
	ID	String(10)	ex: 155560

Application – Yielddata

Yielddata Adapter

Form

Setting Good/Bad rule

Route : ROUTE1

Product : ABC0000A00

Operation List : ALLOY

MLX ADI
MLX AEI REVIEW
MLX ECD
MLX ETCH
MLX PHOTO
MLX WET STRIP

Process : ☒

Measurement : ☒

Rule : ☐ Custom

☒ WAT Yield

☐ CP Yield

☐ WAT

Start Date

End Date

☒ Process

Select Operation : ALLOY

Start Date : 2014-10-25

End Date : 2014-10-27

Query

- ☒ 11 (100%)
- ☒ 27 (100%)
- ☒ 28 (100%)
- ☒ 36 (92%)
- ☒ 38 (100%)
- ☒ 6 (100%)
- ☒ 8 (100%)
- ☒ 16 (88%)
- ☒ 40 (88%)
- ☒ 7 (91.66666666666667%)
- ☒ 9 (100%)

Lot	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
27	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
28	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
36	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
38	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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16	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
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7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
9	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

11 rows

Submit

Yielddata – Root Cause Ranking

Yielddata Adapter

Form

Result #1 x

Setting

Operation

Sort Result

MLX ETCH

MTE11#0

RF Phase Err

Cl2 Flow

He Press

Pressure

RF Btm Pwr

RF Btm Rfl Pwr

RF Impedance

RF Load

Endpt A

RF Pwr

RF Tuner

TCP Impedance

TCP Load

TCP Rfl Pwr

TCP Top Pwr

Vat Valve

MTE13#0

PSX ETCH

Result

Lot

☒ Wafer

28

☒ 1

36

☒ 2

16

☒ 3

40

☒ 4

7

☒ 5

☒ 6

Value

800

600

400

200

0

-200

-400

-600

-800

-1,000

Time

Thank you

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