Apache HBase

Understanding HBase

An open source, non-relational, distributed database

HBase is an open source, non-relational, distributed database modeled after Google's BigTable and is written in Java. It is developed as part of Apache Software Foundation's Apache Hadoop project and runs on top of HDFS providing BigTable-like capabilities for Hadoop. That is, it provides a fault-tolerant way of storing large quantities of sparse data.

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HBase Features

- **Hadoop database modelled after Google's Bigtable**

- **Column oriented data store, known as Hadoop Database**

- **Support random realtime CRUD operations (unlike HDFS)**

- **No SQL Database**

- **Opensource, written in Java**

- **Run on a cluster of commodity hardware**

Hive.apache.org

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When to use HBase ?

- When you need high volume data to be stored

- Un-structured data

- Sparse data

- Column-oriented data

- Versioned data (same data template, captured at various time, time-elapse data)

- When you need high scalability

Hive.apache.org

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Which one to use ?

HDFS

Only append dataset (no random write)

Read the whole dataset (no random read)

HBase

Need random write and/or read

Has thousands of operation per second on TB+ of data

RDBMS

Data fits on one big node

Need full transaction support

Need real-time query capabilities

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HBase Components

Region

    Row of table are stores

Region Server

    Hosts the tables
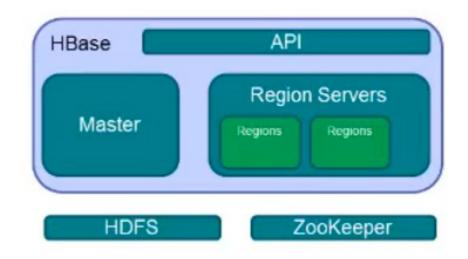
Master

    Coordinating the Region Servers

ZooKeeper

HDFS

API

    The Java Client API

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HBase Shell Commands

List all tables in hbase.

hbase> list

Create table; pass table name

hbase> create 'ns1:t1', {NAME => 'f1', VERSIONS => 5}

hbase> create 't1', {NAME => 'f1'}, {NAME => 'f2'}, {NAME => 'f3'}

Put a cell 'value' at specified table/row/column

hbase> put 't1', 'r1', 'c1', 'value', ts1

Get row or cell contents

hbase> get 't1', 'r1'

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Running HBase

$ hbase shell

hbase(main):001:0> create 'employee', 'personal data', 'professional data'

hbase(main):002:0> list

```
[cloudera@quickstart guest1]$ hbase shell
2016-10-13 00:39:51,901 INFO  [main] Configuration.deprecation: hadoop.native.lib is deprecated. Instead, use io.native.lib.available
HBase Shell; enter 'help<RETURN>' for list of supported commands.
Type "exit<RETURN>" to leave the HBase Shell
Version 1.2.0-cdh5.8.0, rUnknown, Thu Jun 16 12:46:57 PDT 2016

hbase(main):001:0> create 'employee', 'personal data','professional data'
0 row(s) in 1.6860 seconds

=> Hbase::Table - employee
hbase(main):002:0> list
TABLE
employee
1 row(s) in 0.0180 seconds

=> ["employee"]
hbase(main):003:0> █
```

Row key	personal data	professional data

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Create Data

COLUMN FAMILIES

Row key	personal data		professional data	
empid	name	city	designation	salary
1	raju	hyderabad	manager	50,000
2	ravi	chennai	sr.engineer	30,000
3	rajesh	delhi	jr.engineer	25,000

hbase(main):004:0> put 'employee','1','personal data:name','raju'

hbase(main):005:0> put 'employee','1','personal data:city','hyderabad'

hbase(main):006:0> put 'employee','1','professional data:designation','manager'

hbase(main):007:0> put 'employee','1','professional data:salary','5000'

```
hbase(main):004:0> put 'employee','1','personal data:name','raju'
0 row(s) in 0.0190 seconds

hbase(main):005:0> put 'employee','1','personal data:city','hyderabad'
0 row(s) in 0.0050 seconds

hbase(main):006:0> put 'employee','1','professional data:designation','manager'
0 row(s) in 0.0110 seconds

hbase(main):007:0> put 'employee','1','professional data:salary','5000'
0 row(s) in 0.0050 seconds
```
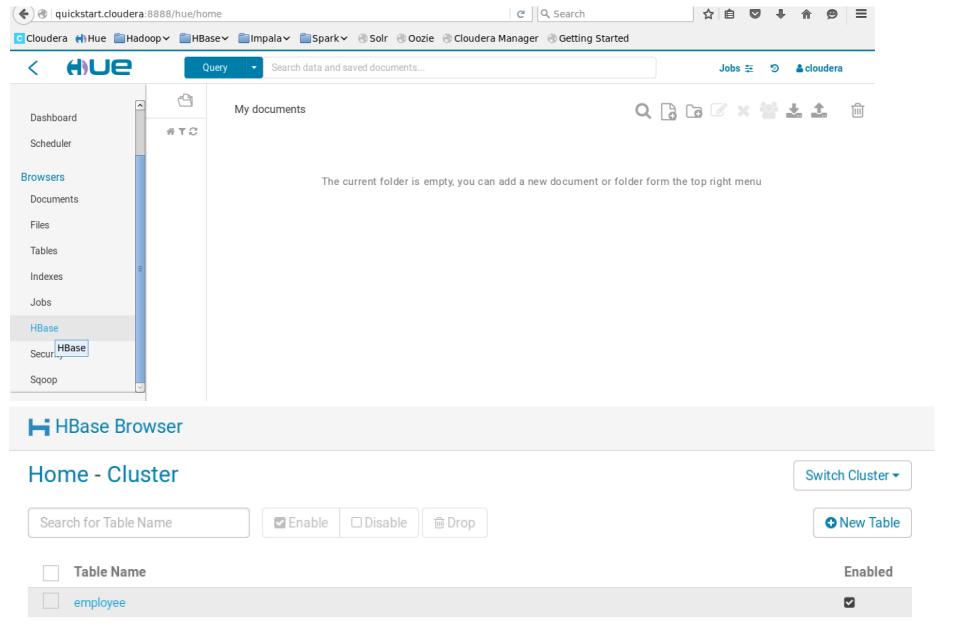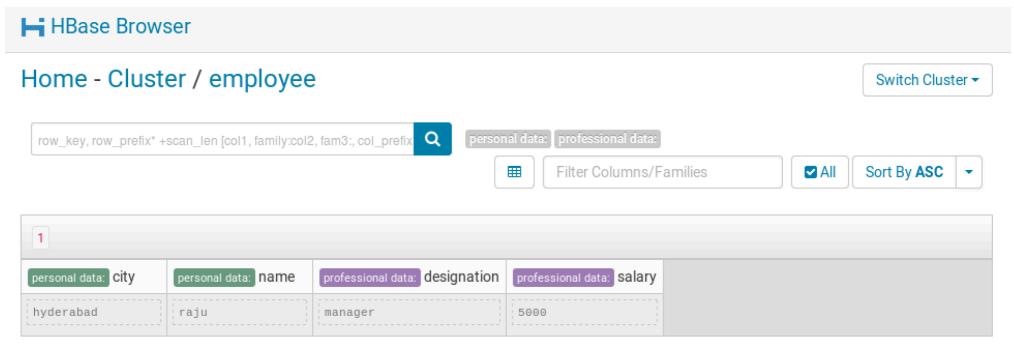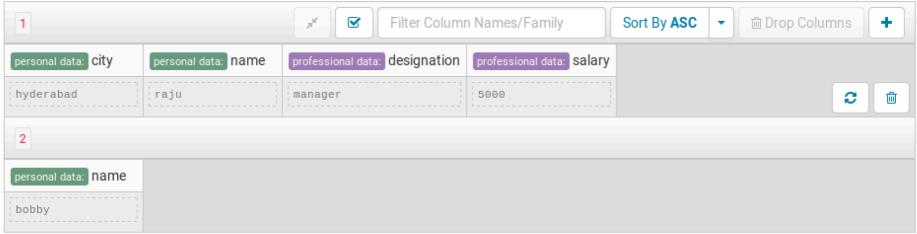
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Running HBase Browser

Viewing Employee Table

CHULALONGKORN
BUSINESS SCHOOL
FLAGSHIP FOR LIFE

H HBase Browser

Home - **Cluster** / **employee**   Switch Cluster ▾

| row_key, row_prefix* +scan_len [col1, family:col2, fam3:, col_prefix | 🔍 |

personal data: | professional data:

⊞ | Filter Columns/Families | ☑ All | Sort By ASC | ▾

| 1 |

personal data: city	personal data: name	professional data: designation	professional data: salary
hyderabad	raju	manager	5000

hbase(main):025:0> put 'employee','2','personal data:name','bobby'

| 1 | | ⟋⟍ | ☑ | Filter Column Names/Family | Sort By ASC ▾ | 🗑 Drop Columns | + |

personal data: city	personal data: name	professional data: designation	professional data: salary		
hyderabad	raju	manager	5000	🔄	🗑

| 2 |

personal data: name
bobby

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Create a table in HBase

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⊢ HBase Browser

Home - HBase / Student   Switch Cluster ⌄

row_key, row_prefix* +scan_len [col1, family:col2, fam3:, col_prefix* +3, fam: 🔍   cf: ⊞ Filter Columns/Families   ☑ All Sort By DESC ⌄

No rows to display.

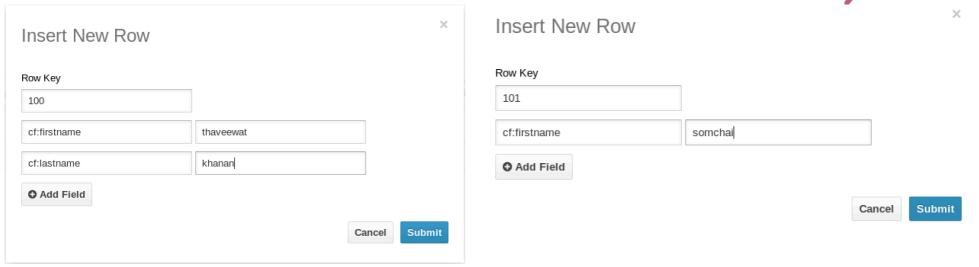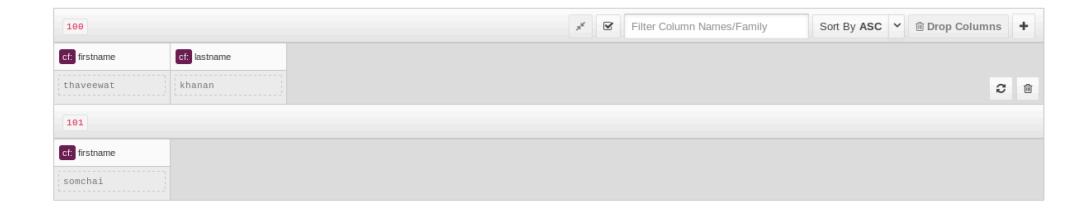Fetched 123 in 0.374 seconds.   🗑 Drop Rows   ⬆ Bulk Upload   ⊕ New Row

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Add field into a new row

Insert New Row   ×

Row Key

| 100 |

| cf:firstname | thaveewat |
| cf:lastname | khanan |

⊕ Add Field

Cancel   **Submit**

Insert New Row   ×

Row Key

| 101 |

| cf:firstname | somchai |

⊕ Add Field

Cancel   **Submit**

| 100 | | | ↙ | ☑ | Filter Column Names/Family | Sort By **ASC** ⌄ | 🗑 Drop Columns | + |

| **cf:** firstname | **cf:** lastname | | |
| thaveewat | khanan | | ⟳ 🗑 |

| 101 |

| **cf:** firstname |
| somchai |

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