# Hadoop技術工程師 – 實作Lab

2015-XX-XX

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Cookie Tsai

# Resources

- CookeTsai 的手記
  - http://tsai-cookie.blogspot.tw/

CookieTsai 的手記

Cookie's Blogger

**2015年9月1日 星期二**

Hadoop + HBase + Hive 建置手冊（完全分布式）

```
注意事項：
     1. 所有指令皆使用 root 身份執行，僅供練習使用。
     2. 前置步驟在 master, slaver1, slaver2 都必須做一遍。
     3. PDF 格式部分文字會失真，輸入時請注意符號是否正確。
```

目錄

- Hadoop + HBase + Hive 建置手冊（完全分布式）
  - 目錄
  - 套件清單
  - 環境配置
  - 前置步驟

**關於我自己**

蔡秉文

檢視我的完整簡介

**搜尋此網誌**

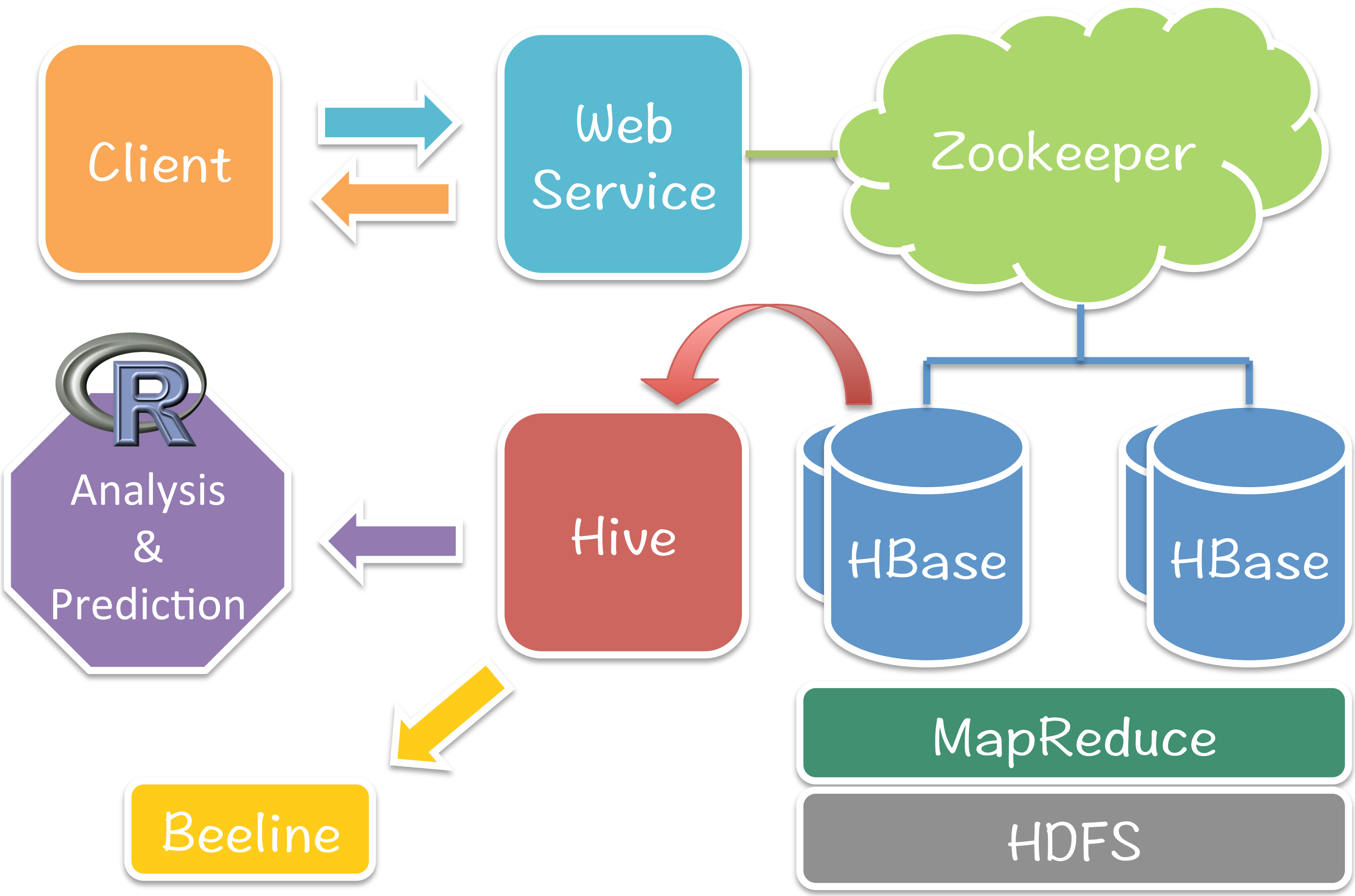
**網誌存檔**

▼ 2015 (3)
▼ 九月 (1)
Hadoop + HBase + Hive 建置手

# About Me

- Education
  - III
  - NUTC
- Experience
  - Mitake
  - JC Software Services
- Honors & Awards
  - The Winner of Etu Hadoop Competition 2015
  - 2011 電信創新應用大賽 智慧家庭組 優選
  - 2010 電信奧斯卡 MOD應用組 佳作

# Lab deploment



# System architecture

- Virtual Box

| Host Name | IP | OS |
|---|---|---|
| master | 192.168.60.100 | CentOS 6.7 |
| slaver1 | 192.168.60.101 | CentOS 6.7 |
| slaver2 | 192.168.60.102 | CentOS 6.7 |

- Packages

| Package | Package Name | Version |
|---|---|---|
| Apache Hadoop | hadoop-2.4.1.tar.gz | 2.4.1 |
| Apache HBase | hbase-0.98.13-hadoop2-bin.tar.gz | 0.98.13 |
| Apache Hive | apache-hive-1.2.1.tar.gz | 1.2.1 |
| Apache Zookeeper | zookeeper-3.4.6.tar.gz | 3.4.6 |

# Setup for testing hosts (3 VMs)

- Install Virtual Box
- Import Virtual Box VM
- Modify to the static IP and try a test

# You will learn

- Basic hadoop
  - HDFS, MapReduce, HBase(NoSQL)
- Basic hadoop ecosystem
  - Hive, R
- Back end
  - Web Service, Shell Script
- Front end
  - HTML, CSS and JQuery

# What is hadoop

- A big-data platform for data manipulation
- Store data in distributed repositories
- Distributed job process to deal with big-data
- Dig out the data insight and data analytics
- High availability and stabilized
- Many ecosystems supports

# Install Hadoop

# What is Zookeeper

- Used for message management in distributed system, such like naming, synchronization service, clustering management
- Considering to HA, ZK also provides clustering mode
- In Hadoop, it manages Namenode, HBase... for message passing and sync

# Install Zookeeper

# What is HBase

- A kind of NoSQL
- Manipulation in HDFS
- Using column family qualifier
- Each Row-Key is also a indexed column

| Row-Key | Column | | Timestamp | Value |
|---|---|---|---|---|
| | Family | Qualifier | | |
| row1 | cf | name | 1442053885486 | Tom |
| row2 | cf | name | 1442053885487 | Mary |
| row2 | cf | phone | 1442053885487 | 0999XXXXXX |
| row3 | cf | name | 1442053885486 | John |

# Install HBase

# What is Hive

- Data warehouse software facilitates querying and managing large datasets residing in distributed storage.
- SQL-like language called HiveQL
- At the same time this language also allows traditional map/reduce

# Install Hive

# What is R

- R is a free software environment for statistical computing and graphics.
- It compiles and runs on a wide variety of UNIX platforms, Windows and MacOS.
- It provides an unparalleled platform for programming new statistical methods in an easy and straightforward manner.

# Install R Lib & RStudio

# Web Service

- What is myApp
  - It's a Simple Java Project
  - It's a RESTful Service
  - Using Jersey

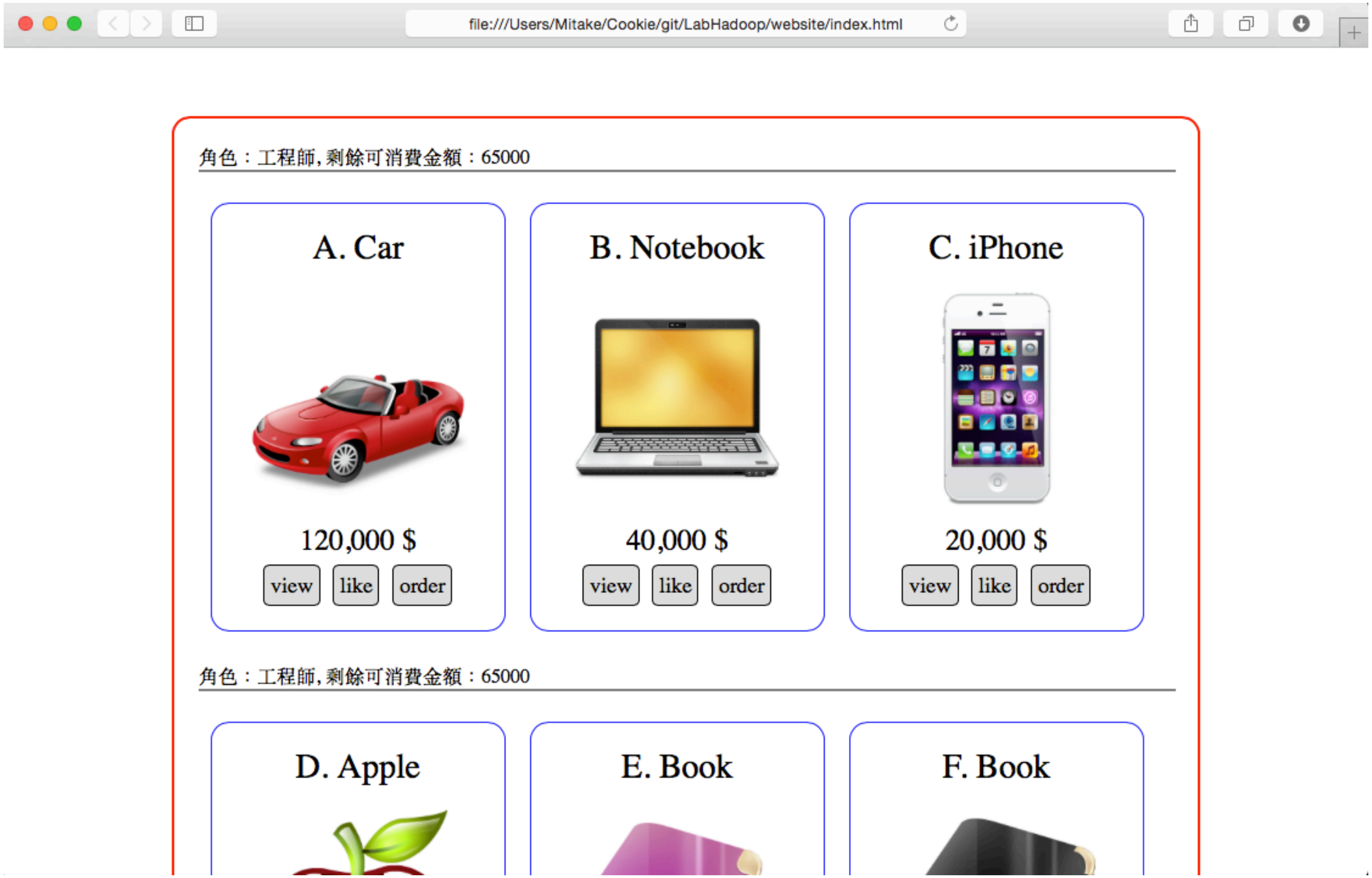
- Install myApp
  - $ tar -zxvf /tmp/myApp.tar.gz
  - $ java -jar myApp/application-1.0-SNAPSHOT.jar

# What WampServer

- WampServer is a Windows web development environment.
- It allows you to create web applications with Apache2, PHP and a MySQL database. Alongside, PhpMyAdmin allows you to manage easily your databases.

# Install WampServer

# Using Web Client



file:///Users/Mitake/Cookie/git/LabHadoop/website/index.html

角色：工程師, 剩餘可消費金額：65000

A. Car

120,000 $

B. Notebook

40,000 $

C. iPhone

20,000 $

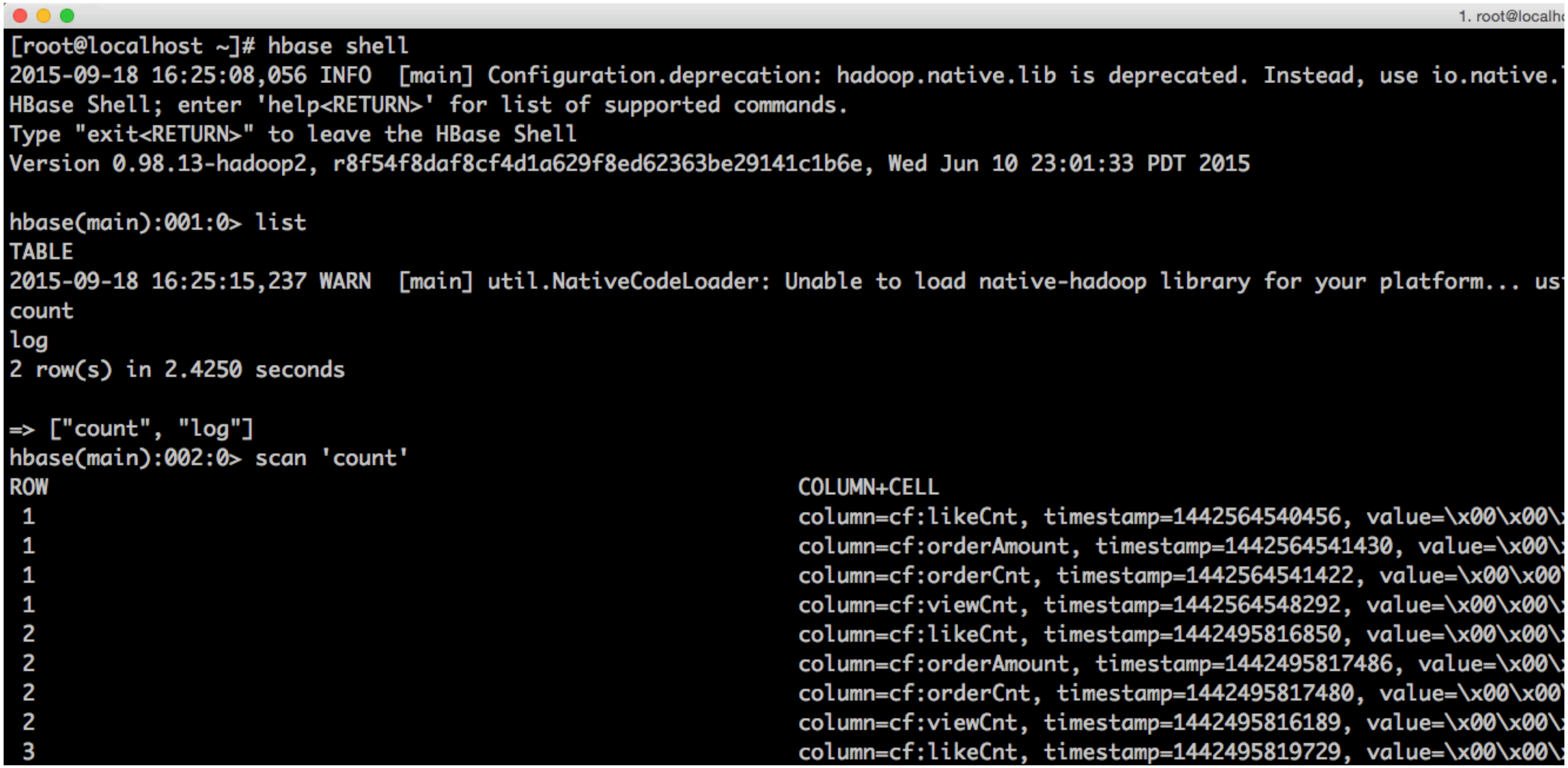
角色：工程師, 剩餘可消費金額：65000

D. Apple

E. Book

F. Book

# Using HBase Shell



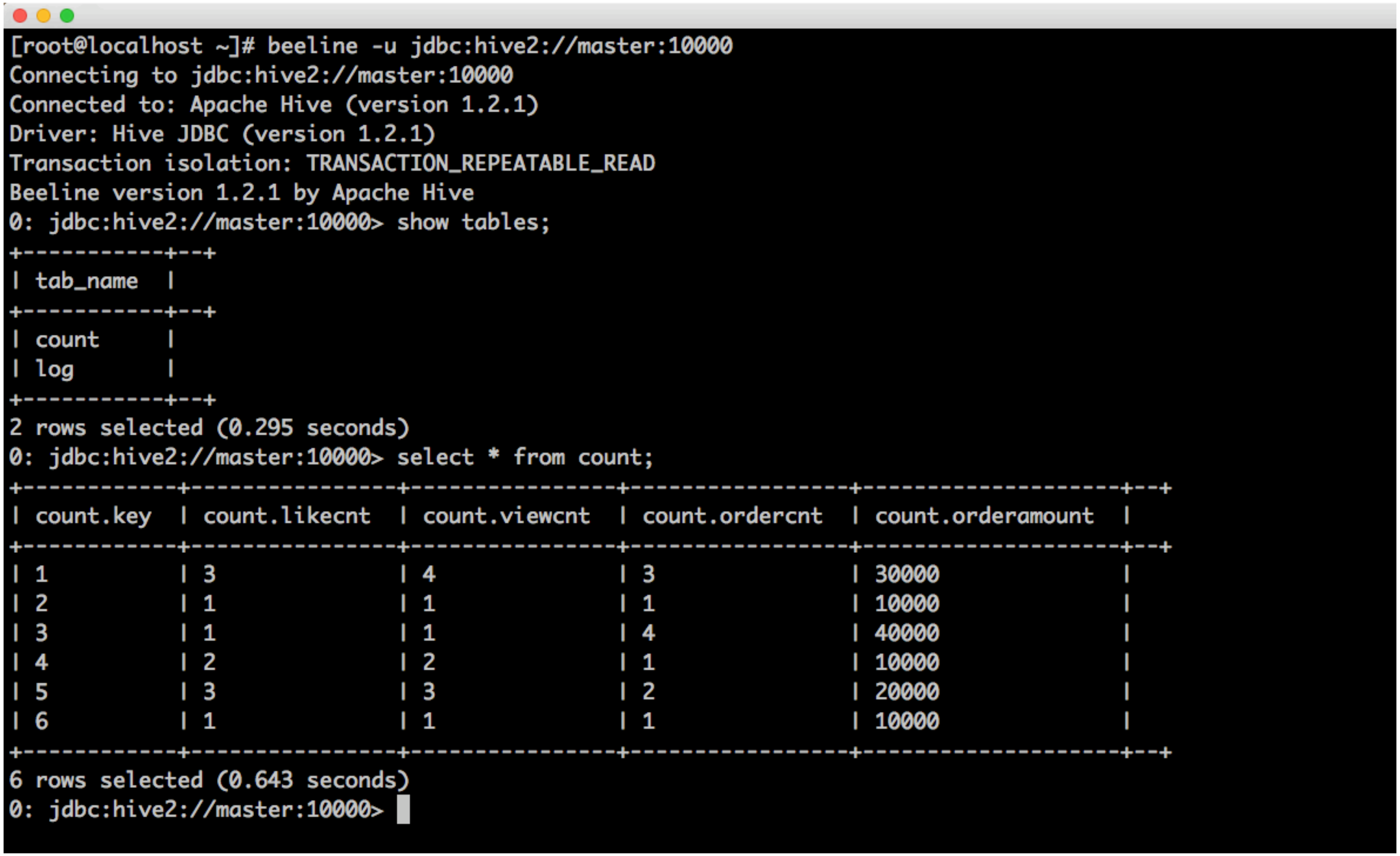
```
[root@localhost ~]# hbase shell
2015-09-18 16:25:08,056 INFO  [main] Configuration.deprecation: hadoop.native.lib is deprecated. Instead, use io.native.
HBase Shell; enter 'help<RETURN>' for list of supported commands.
Type "exit<RETURN>" to leave the HBase Shell
Version 0.98.13-hadoop2, r8f54f8daf8cf4d1a629f8ed62363be29141c1b6e, Wed Jun 10 23:01:33 PDT 2015

hbase(main):001:0> list
TABLE
2015-09-18 16:25:15,237 WARN  [main] util.NativeCodeLoader: Unable to load native-hadoop library for your platform... us
count
log
2 row(s) in 2.4250 seconds

=> ["count", "log"]
hbase(main):002:0> scan 'count'
ROW                                                          COLUMN+CELL
 1                                                           column=cf:likeCnt, timestamp=1442564540456, value=\x00\x00\
 1                                                           column=cf:orderAmount, timestamp=1442564541430, value=\x00\
 1                                                           column=cf:orderCnt, timestamp=1442564541422, value=\x00\x00
 1                                                           column=cf:viewCnt, timestamp=1442564548292, value=\x00\x00\
 2                                                           column=cf:likeCnt, timestamp=1442495816850, value=\x00\x00\
 2                                                           column=cf:orderAmount, timestamp=1442495817486, value=\x00\
 2                                                           column=cf:orderCnt, timestamp=1442495817480, value=\x00\x00
 2                                                           column=cf:viewCnt, timestamp=1442495816189, value=\x00\x00\
 3                                                           column=cf:likeCnt, timestamp=1442495819729, value=\x00\x00\
```

# Learning HBase Shell

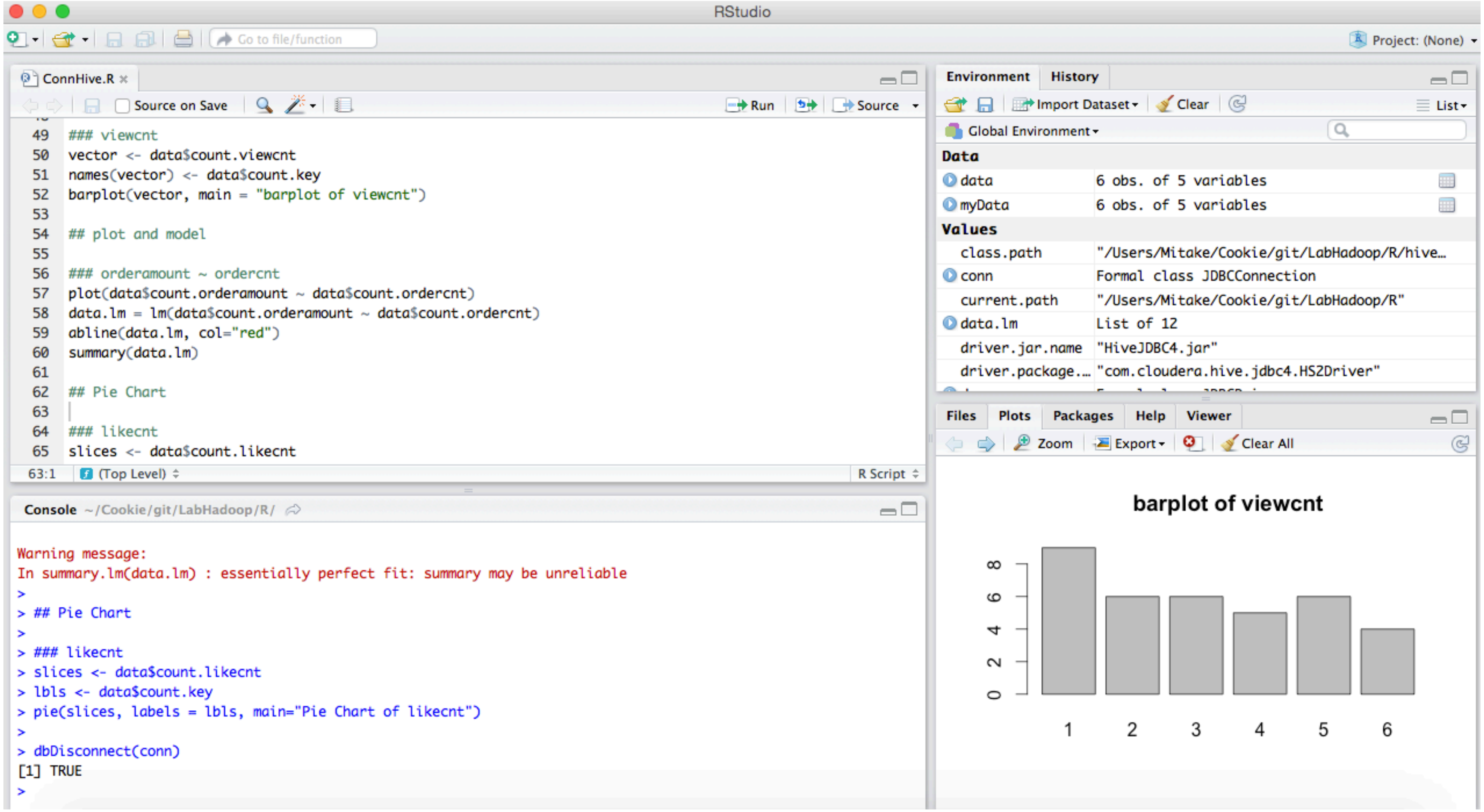
# Using Beeline



```
[root@localhost ~]# beeline -u jdbc:hive2://master:10000
Connecting to jdbc:hive2://master:10000
Connected to: Apache Hive (version 1.2.1)
Driver: Hive JDBC (version 1.2.1)
Transaction isolation: TRANSACTION_REPEATABLE_READ
Beeline version 1.2.1 by Apache Hive
0: jdbc:hive2://master:10000> show tables;
+-----------+--+
| tab_name  |
+-----------+--+
| count     |
| log       |
+-----------+--+
2 rows selected (0.295 seconds)
0: jdbc:hive2://master:10000> select * from count;
+------------+----------------+----------------+-----------------+--------------------+--+
| count.key  | count.likecnt  | count.viewcnt  | count.ordercnt  | count.orderamount  |
+------------+----------------+----------------+-----------------+--------------------+--+
| 1          | 3              | 4              | 3               | 30000              |
| 2          | 1              | 1              | 1               | 10000              |
| 3          | 1              | 1              | 4               | 40000              |
| 4          | 2              | 2              | 1               | 10000              |
| 5          | 3              | 3              | 2               | 20000              |
| 6          | 1              | 1              | 1               | 10000              |
+------------+----------------+----------------+-----------------+--------------------+--+
6 rows selected (0.643 seconds)
0: jdbc:hive2://master:10000>
```

# Learning HiveQL

# Using RStudio



```
### viewcnt
vector <- data$count.viewcnt
names(vector) <- data$count.key
barplot(vector, main = "barplot of viewcnt")

## plot and model

### orderamount ~ ordercnt
plot(data$count.orderamount ~ data$count.ordercnt)
data.lm = lm(data$count.orderamount ~ data$count.ordercnt)
abline(data.lm, col="red")
summary(data.lm)

## Pie Chart

### likecnt
slices <- data$count.likecnt
```

```
Warning message:
In summary.lm(data.lm) : essentially perfect fit: summary may be unreliable
>
> ## Pie Chart
>
> ### likecnt
> slices <- data$count.likecnt
> lbls <- data$count.key
> pie(slices, labels = lbls, main="Pie Chart of likecnt")
>
> dbDisconnect(conn)
[1] TRUE
>
```

| | |
|---|---|
| **Data** | |
| data | 6 obs. of 5 variables |
| myData | 6 obs. of 5 variables |
| **Values** | |
| class.path | "/Users/Mitake/Cookie/git/LabHadoop/R/hive… |
| conn | Formal class JDBCConnection |
| current.path | "/Users/Mitake/Cookie/git/LabHadoop/R" |
| data.lm | List of 12 |
| driver.jar.name | "HiveJDBC4.jar" |
| driver.package.… | "com.cloudera.hive.jdbc4.HS2Driver" |

# Learning R

# Download

- Hadoop-2.5.2
  - http://apache.stu.edu.tw/hadoop/common/hadoop-2.5.2/hadoop-2.5.2.tar.gz
- Zookeeper-3.4.6
  - http://apache.stu.edu.tw/zookeeper/zookeeper-3.4.6/zookeeper-3.4.6.tar.gz
- HBase-0.98.13
  - http://ftp.tc.edu.tw/pub/Apache/hbase/0.98.13/hbase-0.98.13-hadoop2-bin.tar.gz
- Hive-1.2.1
  - http://apache.stu.edu.tw/hive/hive-1.2.1/apache-hive-1.2.1-bin.tar.gz
- R-3.1.3
  - http://cran.r-project.org/src/base/R-3/R-3.1.3.tar.gz

Thank you for your listening