

实验三实验报告

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1.伪分布模式步骤与结果

HBase 安装

下载并解压 hbase 文件

```
txy@txy-virtual-machine:~/桌面$ ls
hadoop_installs  hbase-2.2.5-bin.tar.gz  java  mnist.py
txy@txy-virtual-machine:~/桌面$ tar xzvf hbase-2.2.5-bin.tar.gz
hbase-2.2.5/LICENSE.txt
hbase-2.2.5/NOTICE.txt
hbase-2.2.5/LEGAL
hbase-2.2.5/CHANGES.md
hbase-2.2.5/README.txt
hbase-2.2.5/RELEASENOTES.md
hbase-2.2.5/conf/
hbase-2.2.5/conf/hadoop-metrics2-hbase.properties
hbase-2.2.5/conf/hbase-env.cmd
hbase-2.2.5/conf/hbase-env.sh
hbase-2.2.5/conf/hbase-policy.xml
hbase-2.2.5/conf/hbase-site.xml
hbase-2.2.5/conf/log4j-hbtop.properties
hbase-2.2.5/conf/log4j.properties
hbase-2.2.5/conf/regionserver
hbase-2.2.5/bin/
hbase-2.2.5/bin/replication/
hbase-2.2.5/bin/test/
hbase-2.2.5/bin/considerAsDead.sh
hbase-2.2.5/bin/draining_servers.rb
hbase-2.2.5/bin/get-active-master.rb
hbase-2.2.5/bin/graceful_stop.sh
hbase-2.2.5/bin/hbase
hbase-2.2.5/bin/hbase-clean.sh
hbase-2.2.5/bin/hbase-common.sh
hbase-2.2.5/bin/hbase-config.sh
hbase-2.2.5/bin/hbase-daemon.sh
```

获取 java 地址

```
txy@txy-virtual-machine:~/桌面/hbase-2.2.5$ whereis java
java: /usr/share/java /home/txy/桌面/java/jdk1.8.0_261/bin/java
```

配置环境变量

添加 HBASE_HOME

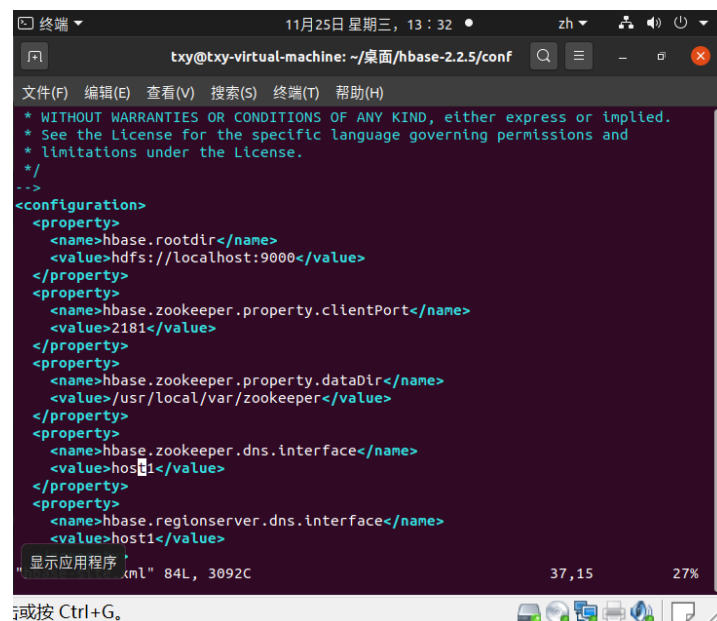
```
export HBASE_HOME=/opt/install/hbase
```

修改 PATH

```
export PATH=$JAVA_HOME/bin:$HBASE_HOME/bin:$HADOOP_HOME/bin:$PATH
```

修改\$HBASE_HOME/conf/hbase-env.sh

修改\$HBASE_HOME/conf/hbase-site.xml



```
txy@txy-virtual-machine: ~/桌面/hbase-2.2.5/conf
文件(F) 编辑(E) 查看(V) 搜索(S) 终端(T) 帮助(H)
* WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
* See the License for the specific language governing permissions and
* limitations under the License.
*/
-->
<configuration>
  <property>
    <name>hbase.rootdir</name>
    <value>hdfs://localhost:9000</value>
  </property>
  <property>
    <name>hbase.zookeeper.property.clientPort</name>
    <value>2181</value>
  </property>
  <property>
    <name>hbase.zookeeper.property.dataDir</name>
    <value>/usr/local/var/zookeeper</value>
  </property>
  <property>
    <name>hbase.zookeeper.dns.interface</name>
    <value>host1</value>
  </property>
  <property>
    <name>hbase.regionserver.dns.interface</name>
    <value>host1</value>
  </property>
</configuration>
显示应用程序 84L, 3092C 37,15 27%
```

或按 Ctrl+G。

修改文件 regionserver 为主机名 启动 hbase

伪分布模式

Java 代码用到的库

```
import java.io.IOException;
import java.util.*;

import org.apache.hadoop.conf.Configuration;
import org.apache.hadoop.hbase.*;
import org.apache.hadoop.hbase.client.*;
import org.apache.hadoop.hbase.util.Bytes;
```

用到的函数

创建表

```
// 创建表

public static void creatTable(String tableName, String[] familys) throws IOException {

    if (admin.tableExists(org.apache.hadoop.hbase.TableName.valueOf(tableName))) {

        System.out.println("table " + tableName + " already exists");

    }
    else {

        HTableDescriptor tableDesc = new HTableDescriptor(org.apache.hadoop.hbase.TableName.valueOf(tableName));

        for (int i=0;i<familys.length;i++) {

            tableDesc.addFamily(new HColumnDescriptor(familys[i]));

        }
        admin.createTable(tableDesc);
        System.out.println("create table " + tableName + " success");

    }
}
```

插入数据

```
// 插入数据

public static void addData(String tableName, String rowKey, String family, String qualifier, String value) throws Exception{

    Table table=connection.getTable(TableName.valueOf(tableName));
    Put put = new Put(Bytes.toBytes(rowKey));
    put.addColumn(Bytes.toBytes(family),Bytes.toBytes(qualifier),Bytes.toBytes(value));
    table.put(put);
    System.out.println("insert record success");

}
```

扫描

```
// 扫描

public static void scan(String tableName) throws IOException{

    Table table = connection.getTable(TableName.valueOf(tableName));
    Scan s = new Scan();
    ResultScanner ss = table.getScanner(s);

    for(Result r:ss){

        byte[] row=r.getRow();
        System.out.println("Row key :"+new String(row));

        List<Cell> listCells=r.listCells();

        for(Cell cell : listCells){

            byte[] familyArray = cell.getFamilyArray();
            byte[] qualifierArray = cell.getQualifierArray();
            byte[] valueArray = cell.getValueArray();

            System.out.print("row: "+new String(row)+" ");
            System.out.print("family: "+new String(familyArray,cell.getFamilyOffset(),cell.getFamilyLength())+" ");
            System.out.print("qualifier: "+new String(qualifierArray,cell.getQualifierOffset(),cell.getQualifierLength())+" ");
            System.out.print("timestamp: "+cell.getTimestamp()+" ");
            System.out.println("value: "+new String(valueArray,cell.getValueOffset(),cell.getValueLength()));

        }

    }

}
```

查询数据

```
// 查询数据

public static void selectData(String tableName,String family, String qualifier) throws IOException{

    Table table = connection.getTable(TableName.valueOf(tableName));
    Scan s = new Scan();
    ResultScanner ss = table.getScanner(s);

    s.addColumn(Bytes.toBytes(family),Bytes.toBytes(qualifier));

    Iterator<Result> results = ss.iterator();

    int count=1; //

    while (results.hasNext()){

        Result r = results.next();

        for (Cell cell : r.listCells()) {
            String column = Bytes.toString(CellUtil.cloneQualifier(cell));
            String value = Bytes.toString(CellUtil.cloneValue(cell));
            System.out.print("row: 00"); //
            System.out.print(count); //
            System.out.println(" "+column + ": " + value);
            //count=count+1;
        }

        count=count+1; //
    }

}
```

增加新列族

```
// 增加新列族

public static void addFamily(String tableName, String newFamily) throws IOException{

    HColumnDescriptor newColumnFamliy = new HColumnDescriptor(newFamily);
    admin.addColumn(TableName.valueOf(tableName), newColumnFamliy);

}
```

删除表

```
// 删除表

public static void dropTable(String tableName) throws IOException{

    admin.disableTable(TableName.valueOf(tableName));
    admin.deleteTable(TableName.valueOf(tableName));

}
```

main 函数操作

```
// 1 创建 students 表并添加数据

System.out.println(" ");
System.out.println("Task1");
System.out.println(" ");

String[] column = {"ID", "Description", "Courses", "Home"};
creatTable("students",column);

addData("students","001","Description","Name","Li Lei");
addData("students","001","Description","Height","176");
addData("students","001","Courses","Chinese","80");
addData("students","001","Courses","Math","90");
addData("students","001","Courses","Physics","95");
addData("students","001","Home","Province","Zhejiang");

addData("students","002","Description","Name","Han Meimei");
addData("students","002","Description","Height","183");
addData("students","002","Courses","Chinese","88");
addData("students","002","Courses","Math","77");
addData("students","002","Courses","Physics","66");
addData("students","002","Home","Province","Beijing");

addData("students","003","Description","Name","Xiao Ming");
addData("students","003","Description","Height","162");
addData("students","003","Courses","Chinese","90");
addData("students","003","Courses","Math","90");
addData("students","003","Courses","Physics","90");
addData("students","003","Home","Province","Shanghai");
```

```
// 2 扫描 students 表

System.out.println(" ");
System.out.println("Task2");
System.out.println(" ");

scan("students");

// 3 查询学生来自的省

System.out.println(" ");
System.out.println("Task3");
System.out.println(" ");

selectData("students", "Home", "Province");

// 4 增加新的列 Courses:English 并添加数据

System.out.println(" ");
System.out.println("Task4");
System.out.println(" ");

addData("students", "001", "Courses", "English", "95");
addData("students", "002", "Courses", "English", "85");
addData("students", "003", "Courses", "English", "98");

scan("students");
```

```
// 5 增加新的列族 Contact 和新列 Contact:Email 并添加数据

System.out.println(" ");
System.out.println("Task5");
System.out.println(" ");

addFamily("students", "Contact");

addData("students", "001", "Contact", "Email", "lilei@qq.com");
addData("students", "002", "Contact", "Email", "hanmeimei@qq.com");
addData("students", "003", "Contact", "Email", "xiaoming@qq.com");

scan("students");

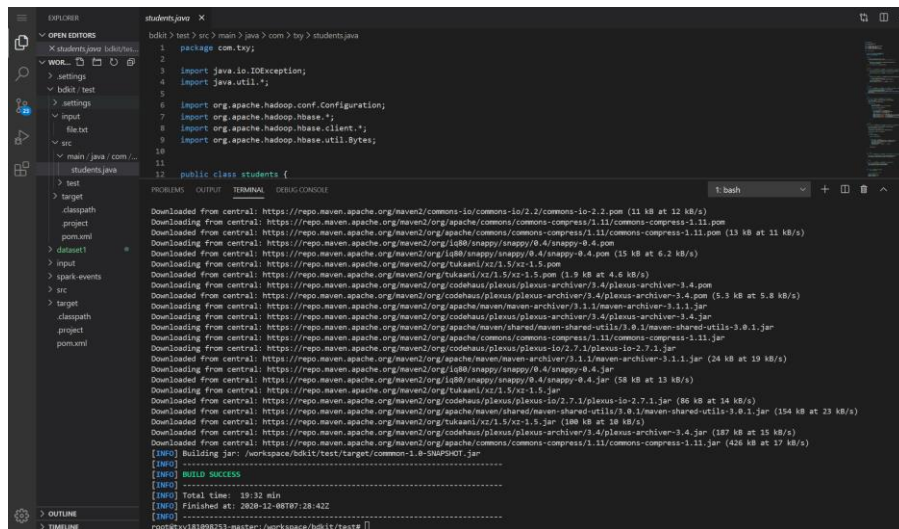
// 6 删除 students 表

System.out.println(" ");
System.out.println("Task6");
System.out.println(" ");

dropTable("students");

admin.close();
connection.close();
```

在 bdkit 上打包成功



Java 代码运行结果

Task2

```
Row key: 001
row: 001 family: Courses qualifier: Chinese timestamp: 1607406586963 value: 80
row: 001 family: Courses qualifier: Math timestamp: 1607406586970 value: 90
row: 001 family: Courses qualifier: Physics timestamp: 1607406586977 value: 95
row: 001 family: Description qualifier: Height timestamp: 1607406586955 value: 176
row: 001 family: Description qualifier: Name timestamp: 1607406586941 value: Li Lei
row: 001 family: Home qualifier: Province timestamp: 1607406586984 value: Zhejiang
Row key: 002
row: 002 family: Courses qualifier: Chinese timestamp: 1607406587003 value: 88
row: 002 family: Courses qualifier: Math timestamp: 1607406587010 value: 77
row: 002 family: Courses qualifier: Physics timestamp: 1607406587020 value: 66
row: 002 family: Description qualifier: Height timestamp: 1607406586997 value: 183
row: 002 family: Description qualifier: Name timestamp: 1607406586991 value: Han Meimei
row: 002 family: Home qualifier: Province timestamp: 1607406587028 value: Beijing
Row key: 003
row: 003 family: Courses qualifier: Chinese timestamp: 1607406587053 value: 90
row: 003 family: Courses qualifier: Math timestamp: 1607406587060 value: 90
row: 003 family: Courses qualifier: Physics timestamp: 1607406587069 value: 90
row: 003 family: Description qualifier: Height timestamp: 1607406587045 value: 162
row: 003 family: Description qualifier: Name timestamp: 1607406587035 value: Xiao Ming
row: 003 family: Home qualifier: Province timestamp: 1607406587078 value: Shanghai
```

Task3

```
row: 001 Province: Zhejiang
row: 002 Province: Beijing
row: 003 Province: Shanghai
```

Task4

```
insert record success
insert record success
insert record success
Row key:001
row: 001 family: Courses qualifier: Chinese timestamp: 1607406586963 value: 80
row: 001 family: Courses qualifier: English timestamp: 1607406587127 value: 95
row: 001 family: Courses qualifier: Math timestamp: 1607406586970 value: 90
row: 001 family: Courses qualifier: Physics timestamp: 1607406586977 value: 95
row: 001 family: Description qualifier: Height timestamp: 1607406586955 value: 176
row: 001 family: Description qualifier: Name timestamp: 1607406586941 value: Li Lei
row: 001 family: Home qualifier: Province timestamp: 1607406586984 value: Zhejiang
Row key:002
row: 002 family: Courses qualifier: Chinese timestamp: 1607406587003 value: 88
row: 002 family: Courses qualifier: English timestamp: 1607406587146 value: 85
row: 002 family: Courses qualifier: Math timestamp: 1607406587010 value: 77
row: 002 family: Courses qualifier: Physics timestamp: 1607406587020 value: 66
row: 002 family: Description qualifier: Height timestamp: 1607406586997 value: 183
row: 002 family: Description qualifier: Name timestamp: 1607406586991 value: Han Meimei
row: 002 family: Home qualifier: Province timestamp: 1607406587028 value: Beijing
Row key:003
row: 003 family: Courses qualifier: Chinese timestamp: 1607406587053 value: 90
row: 003 family: Courses qualifier: English timestamp: 1607406587158 value: 98
row: 003 family: Courses qualifier: Math timestamp: 1607406587060 value: 90
row: 003 family: Courses qualifier: Physics timestamp: 1607406587069 value: 90
row: 003 family: Description qualifier: Height timestamp: 1607406587045 value: 162
row: 003 family: Description qualifier: Name timestamp: 1607406587035 value: Xiao Ming
row: 003 family: Home qualifier: Province timestamp: 1607406587078 value: Shanghai
```

Task5

```
insert record success
insert record success
insert record success
Row key:001
row: 001 family: Contact qualifier: Email timestamp: 1607406589623 value: lilei@qq.com
row: 001 family: Courses qualifier: Chinese timestamp: 1607406586963 value: 80
row: 001 family: Courses qualifier: English timestamp: 1607406587127 value: 95
row: 001 family: Courses qualifier: Math timestamp: 1607406586970 value: 90
row: 001 family: Courses qualifier: Physics timestamp: 1607406586977 value: 95
row: 001 family: Description qualifier: Height timestamp: 1607406586955 value: 176
row: 001 family: Description qualifier: Name timestamp: 1607406586941 value: Li Lei
row: 001 family: Home qualifier: Province timestamp: 1607406586984 value: Zhejiang
Row key:002
row: 002 family: Contact qualifier: Email timestamp: 1607406589628 value: hanmeimei@qq.com
row: 002 family: Courses qualifier: Chinese timestamp: 1607406587003 value: 88
row: 002 family: Courses qualifier: English timestamp: 1607406587146 value: 85
row: 002 family: Courses qualifier: Math timestamp: 1607406587010 value: 77
row: 002 family: Courses qualifier: Physics timestamp: 1607406587020 value: 66
row: 002 family: Description qualifier: Height timestamp: 1607406586997 value: 183
row: 002 family: Description qualifier: Name timestamp: 1607406586991 value: Han Meimei
row: 002 family: Home qualifier: Province timestamp: 1607406587028 value: Beijing
```

```
Row key:003
row: 003 family: Contact qualifier: Email timestamp: 1607406589633 value: xiaoming@qq.com
row: 003 family: Courses qualifier: Chinese timestamp: 1607406587053 value: 90
row: 003 family: Courses qualifier: English timestamp: 1607406587158 value: 98
row: 003 family: Courses qualifier: Math timestamp: 1607406587060 value: 90
row: 003 family: Courses qualifier: Physics timestamp: 1607406587069 value: 90
row: 003 family: Description qualifier: Height timestamp: 1607406587045 value: 162
row: 003 family: Description qualifier: Name timestamp: 1607406587035 value: Xiao Ming
row: 003 family: Home qualifier: Province timestamp: 1607406587078 value: Shanghai
```

Task6

```
2020-12-08 13:49:49,663 INFO client.HBaseAdmin: Started disable of students
2020-12-08 13:49:50,440 INFO client.HBaseAdmin: Operation: DISABLE, Table Name: default:students, procId: 15 completed
2020-12-08 13:49:50,898 INFO client.HBaseAdmin: Operation: DELETE, Table Name: default:students, procId: 18 completed
2020-12-08 13:49:50,899 INFO client.ConnectionImplementation: Closing master protocol: MasterService

Process finished with exit code 0
```


Shell 操作

启动 hbase

```
txy@txy-virtual-machine:~/桌面/hbase-2.2.5$ bin/start-hbase.sh
running master, logging to /home/txy/桌面/hbase-2.2.5/bin/../logs/hbase-txy-master-txy-virtual-machine.out
txy@txy-virtual-machine:~/桌面/hbase-2.2.5$ jps
102769 Jps
102500 HMaster
```

启动 shell

```
2020-11-25 16:47:44,716 WARN [main] util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
HBase Shell
Use "help" to get list of supported commands.
Use "exit" to quit this interactive shell.
For Reference, please visit: http://hbase.apache.org/2.0/book.html#shell
Version 2.3.3, r3e4bf4bee3a08b25591b9c22fea0518686a7e834, Wed Oct 28 06:36:25 UTC 2020
Took 0.0014 seconds
```

创建表格

```
hbase(main):001:0> create 'student','ID','Description','Courses','Home'
Created table student
Took 3.1809 seconds
=> Hbase::Table - student
hbase(main):002:0> list
TABLE
student
1 row(s)
Took 0.0595 seconds
=> ["student"]
hbase(main):003:0>
```

输入第一位学生信息

```
For usage try 'help "put"'

Took 0.2664 seconds
hbase(main):004:0> put 'student','001','Description:Name','Li Lei'
Took 0.1178 seconds
hbase(main):005:0> put 'student','001','Description:Height','176'
Took 0.0361 seconds
hbase(main):006:0> put 'student','001','Courses:Chinese','80'

Took 0.0169 seconds
hbase(main):007:0> put 'student','001','Courses:Math','90'
Took 0.0105 seconds
hbase(main):008:0> put 'student','001','Courses:Physics','95'

Took 0.0161 seconds
hbase(main):009:0> put 'student','001','Home:Province','ZheJiang'
Took 0.0129 seconds
hbase(main):010:0>
```

显示表格信息

```
hbase(main):010:0> scan 'student'
ROW          COLUMN+CELL
 001          column=Courses:Chinese, timestamp=2020-11-25
              T17:00:54.017, value=80
 001          column=Courses:Math, timestamp=2020-11-25T17
              :01:09.789, value=90
 001          column=Courses:Physics, timestamp=2020-11-25
              T17:01:34.054, value=95
 001          column=Description:Height, timestamp=2020-11
              -25T17:00:20.332, value=176
 001          column=Description:Name, timestamp=2020-11-2
              5T16:59:56.275, value=Li Lei
 001          column=Home:Province, timestamp=2020-11-25T1
              7:01:58.467, value=ZheJiang

1 row(s)
Took 0.1495 seconds
hbase(main):011:0>
```

输入第二位学生信息

```
hbase(main):011:0> put 'student','002','Description:Name','Ha
n Meimei'
Took 0.0310 seconds
hbase(main):012:0> put 'student','002','Description:Height','
183'
Took 0.0217 seconds
hbase(main):013:0> put 'student','002','Courses:Chinese','88'

Took 0.0322 seconds
hbase(main):014:0> put 'student','002','Courses:Math','77'
Took 0.0151 seconds
hbase(main):015:0> put 'student','002','Courses:Physics','66'

Took 0.0684 seconds
hbase(main):016:0> put 'student','002','Home:Province','Beiji
ng'
Took 0.0191 seconds
hbase(main):017:0>
```

输出表格信息

```
hbase(main):017:0> scan 'student'
ROW          COLUMN+CELL
 001          column=Courses:Chinese, timestamp=2020-11-25
              T17:00:54.017, value=80
 001          column=Courses:Math, timestamp=2020-11-25T17
              :01:09.789, value=90
 001          column=Courses:Physics, timestamp=2020-11-25
              T17:01:34.054, value=95
 001          column=Description:Height, timestamp=2020-11
              -25T17:00:20.332, value=176
 001          column=Description:Name, timestamp=2020-11-2
              5T16:59:56.275, value=Li Lei
 001          column=Home:Province, timestamp=2020-11-25T1
              7:01:58.467, value=ZheJiang
 002          column=Courses:Chinese, timestamp=2020-11-25
              T17:04:18.192, value=88
 002          column=Courses:Math, timestamp=2020-11-25T17
              :04:41.176, value=77
 002          column=Courses:Physics, timestamp=2020-11-25
              T17:05:01.176, value=66
 002          column=Description:Height, timestamp=2020-11
              -25T17:03:59.748, value=183
 002          column=Description:Name, timestamp=2020-11-2
```

创建第三位学生信息

```

hbase(main):018:0> put 'student','003','Description:Name','Xi
ao Ming'
Took 0.0346 seconds
hbase(main):019:0> put 'student','003','Description:Height','
162'
Took 0.0246 seconds
hbase(main):020:0> put 'student','003','Courses:Chinese','90'

Took 0.0252 seconds
hbase(main):021:0> put 'student','003','Courses:Math','90'
Took 0.0182 seconds
hbase(main):022:0> put 'student','003','Courses:Physics','90'

Took 0.0251 seconds
hbase(main):023:0> put 'student','003','Home:Province','Shang
hai'
Took 0.0150 seconds

```

输出表格信息

```

hbase(main):024:0> scan 'student'
ROW          COLUMN+CELL
001          column=Courses:Chinese, timestamp=2020-11-25
T17:00:54.017, value=80
001          column=Courses:Math, timestamp=2020-11-25T17
:01:09.789, value=90
001          column=Courses:Physics, timestamp=2020-11-25
T17:01:34.054, value=95
001          column=Description:Height, timestamp=2020-11
-25T17:00:20.332, value=176
001          column=Description:Name, timestamp=2020-11-2
5T16:59:56.275, value=Li Lei
001          column=Home:Province, timestamp=2020-11-25T1
7:01:58.467, value=ZheJiang
002          column=Courses:Chinese, timestamp=2020-11-25
T17:04:18.192, value=88
002          column=Courses:Math, timestamp=2020-11-25T17
:04:41.176, value=77
002          column=Courses:Physics, timestamp=2020-11-25
T17:05:01.176, value=66
002          column=Description:Height, timestamp=2020-11
-25T17:03:59.748, value=183
002          column=Description:Name, timestamp=2020-11-2
5T17:03:32.822, value=Han Meimei
002          column=Home:Province, timestamp=2020-11-25T1
7:05:25.691, value=Beijing
003          column=Courses:Chinese, timestamp=2020-11-25
T17:07:37.486, value=90
003          column=Courses:Math, timestamp=2020-11-25T17
:07:50.343, value=90
003          column=Courses:Physics, timestamp=2020-11-25
T17:08:13.385, value=90
003          column=Description:Height, timestamp=2020-11
-25T17:07:16.426, value=162
003          column=Description:Name, timestamp=2020-11-2
5T17:06:58.455, value=Xiao Ming
003          column=Home:Province, timestamp=2020-11-25T1
7:08:34.009, value=Shanghai
3 row(s)
Took 0.1843 seconds

```

查询学生住址

```

hbase(main):002:0> scan 'student',{COLUMNS=>'Home'}
ROW          COLUMN+CELL
001          column=Home:Province, timestamp=2020-11-25T17:01:58.467, value=
ZheJiang
002          column=Home:Province, timestamp=2020-11-25T17:05:25.691, value=
Beijing
003          column=Home:Province, timestamp=2020-11-25T17:08:34.009, value=
Shanghai
3 row(s)
Took 0.0511 seconds

```

增加新的列 Courses:English 并添加数据

```

hbase(main):003:0> put 'student','001','Courses:English','95'

Took 0.1112 seconds
hbase(main):004:0> put 'student','002','Courses:English','85'

Took 0.0285 seconds
hbase(main):005:0> put 'student','003','Courses:English','98'

Took 0.0165 seconds

```

```

hbase(main):006:0> scan 'student'
ROW          COLUMN+CELL
001          column=Courses:Chinese, timestamp=2020-11-25
             T17:00:54.017, value=80
001          column=Courses:English, timestamp=2020-11-25
             T17:13:07.762, value=95
001          column=Courses:Math, timestamp=2020-11-25T17
             :01:09.789, value=90
001          column=Courses:Physics, timestamp=2020-11-25
             T17:01:34.054, value=95
001          column=Description:Height, timestamp=2020-11
             -25T17:00:20.332, value=176
001          column=Description:Name, timestamp=2020-11-2
             5T16:59:56.275, value=Li Lei
001          column=Home:Province, timestamp=2020-11-25T1
             7:01:58.467, value=ZheJiang
002          column=Courses:Chinese, timestamp=2020-11-25
             T17:04:18.192, value=88
002          column=Courses:English, timestamp=2020-11-25
             T17:13:17.072, value=85
002          column=Courses:Math, timestamp=2020-11-25T17
             :04:41.176, value=77
002          column=Courses:Physics, timestamp=2020-11-25
             T17:05:01.176, value=66
002          column=Description:Height, timestamp=2020-11
             -25T17:03:59.748, value=183
002          column=Description:Name, timestamp=2020-11-2
             5T17:03:32.822, value=Han Meimei
002          column=Home:Province, timestamp=2020-11-25T1
             7:05:25.691, value=Beijing
003          column=Courses:Chinese, timestamp=2020-11-25
             T17:07:37.486, value=90
003          column=Courses:English, timestamp=2020-11-25
             T17:13:26.587, value=98
003          column=Courses:Math, timestamp=2020-11-25T17
             :07:50.343, value=90
003          column=Courses:Physics, timestamp=2020-11-25
             T17:08:13.385, value=90
003          column=Description:Height, timestamp=2020-11
             -25T17:07:16.426, value=162
003          column=Description:Name, timestamp=2020-11-2
             5T17:06:58.455, value=Xiao Ming
003          column=Home:Province, timestamp=2020-11-25T1

```

增加新的列族 Contact 和新列 Contact: Email 并添加数据

```

hbase(main):007:0> alter 'student',{NAME=>'Contact'}
Updating all regions with the new schema...
1/1 regions updated.
Done.
Took 7.5246 seconds

```



```

hbase(main):008:0> put 'student','001','Contact:Email','lilei@163.com'
Took 0.0326 seconds
hbase(main):009:0> put 'student','002','Contact:Email','hanmeimei@163.com'
Took 0.0197 seconds
hbase(main):010:0> put 'student','003','Contact:Email','xiaoming@163.com'
Took 0.0180 seconds

```

```

hbase(main):011:0> scan 'student'
ROW COLUMN+CELL
001 column=Contact:Email, timestamp=2020-11-25T17:17:46.609, value=lilei@163.com
001 column=Courses:Chinese, timestamp=2020-11-25T17:00:54.017, value=80
001 column=Courses:English, timestamp=2020-11-25T17:13:07.762, value=95
001 column=Courses:Math, timestamp=2020-11-25T17:01:09.789, value=90
001 column=Courses:Physics, timestamp=2020-11-25T17:01:34.054, value=95
001 column=Description:Height, timestamp=2020-11-25T17:00:20.332, value=176
001 column=Description:Name, timestamp=2020-11-25T16:59:56.275, value=Li Lei
001 column=Home:Province, timestamp=2020-11-25T17:01:58.467, value=ZheJiang
002 column=Contact:Email, timestamp=2020-11-25T17:18:04.106, value=hanmeimei@163.com
002 column=Courses:Chinese, timestamp=2020-11-25T17:04:18.192, value=88
002 column=Courses:English, timestamp=2020-11-25T17:13:17.072, value=85
002 column=Courses:Math, timestamp=2020-11-25T17:04:41.176, value=77
002 column=Courses:Physics, timestamp=2020-11-25T17:05:01.176, value=66
002 column=Description:Height, timestamp=2020-11-25T17:03:59.748, value=183
002 column=Description:Name, timestamp=2020-11-25T17:03:32.822, value=Han Meimei
002 column=Home:Province, timestamp=2020-11-25T17:05:25.691, value=Beijing
003 column=Contact:Email, timestamp=2020-11-25T17:18:17.006, value=xiaoming@163.com
003 column=Courses:Chinese, timestamp=2020-11-25T17:07:37.486, value=90
003 column=Courses:English, timestamp=2020-11-25T17:13:26.587, value=98
003 column=Courses:Math, timestamp=2020-11-25T17:07:50.343, value=90
003 column=Courses:Physics, timestamp=2020-11-25T17:08:13.385, value=90

```

删除表

```

hbase(main):012:0> list
TABLE
student
1 row(s)
Took 0.0711 seconds
=> ["student"]
hbase(main):013:0> disable 'student'
Took 2.6828 seconds
hbase(main):014:0> drop 'student'
Took 1.5452 seconds
hbase(main):015:0> list
TABLE
0 row(s)
Took 0.0323 seconds
=> []
hbase(main):016:0>

```

退出 shell

```
hbase(main):016:0> quit
```

退出 hbase

```
stopping hbase.....
```

遇到的问题

1.启动 hadoop 失败

```
txy@txy-virtual-machine:~/桌面/hbase-2.2.5/conf$ vim hbase-env.sh
txy@txy-virtual-machine:~/桌面/hbase-2.2.5/conf$ sudo apt-get install jruby -y
[sudo] txy 的密码:
正在读取软件包列表... 完成
正在分析软件包的依赖关系树
正在读取状态信息... 完成
将会同时安装下列软件:
  ant ant-optional ca-certificates-java default-jre default-jre-headless
  fonts-dejavu-extra fonts-lato java-common javascript-common jruby-openssl
  junit4 libasm-java libatk-wrapper-java libatk-wrapper-java-jni
  libbcpkix-java libbcpv-prov-java libbsf-java libbytestlist-java libdirgra-java
  libhamcrest-java libhawtjni-runtime-java libheadius-options-java
  libinvokebinder-java libjansi-java libjansi-native-java libjcodings-java
  libjffi-java libjffi-jni libjitescript-java libjna-java libjna-jni
  libjna-platform-java libjnr-constants-java libjnr-enxio-java
  libjnr-ffi-java libjnr-netdb-java libjnr-posix-java libjnr-unixsocket-java
  libjnr-x86asm-java libjoda-time-java libjruby-joni-java libjs-jquery
  libjzlib-java libmodulator-java libosgi-annotation-java libosgi-core-java
  libpsych-java libruby2.7 libunsafe-fences-java libunsafe-mock-java
  libyaml-snake-java nailgun openjdk-11-jre openjdk-11-jre-headless rake ri
  ruby ruby-diff-lcs ruby-jar-dependencies ruby-minitest ruby-net-telnet
  ruby-power-assert ruby-rspec ruby-rspec-core ruby-rspec-expectations
  ruby-rspec-mocks ruby-rspec-support ruby-test-unit ruby-xmlrpc ruby2.7
  ruby2.7-doc rubygems-integration
建议安装:
  default-jdk | java-compiler | java-sdk antlr javacc junit jython
  libactivation-java libbcel-java libcommons-logging-java libcommons-net-java
  libcommons-pool2-java libcommons-text-java libcommons-validator-java libdom4j-
txy@txy-virtual-machine:~/桌面/hbase-2.2.5/bin$ ./start-hbase.sh
host1: ssh: Could not resolve hostname host1: Temporary failure in name resolution
master running as process 13838. Stop it first.
master: ssh: Could not resolve hostname master: Temporary failure in name resolution
txy@txy-virtual-machine:~/桌面/hbase-2.2.5/bin$
```

```
txy@txy-virtual-machine:~/桌面/hadoop_installs/hadoop-3.2.1/sbin$ ./start-all.sh
WARNING: Attempting to start all Apache Hadoop daemons as txy in 10 seconds.
WARNING: This is not a recommended production deployment configuration.
WARNING: Use CTRL-C to abort.
Starting namenodes on [host-0]
host-0: ssh: Could not resolve hostname host-0: Temporary failure in name resolution
Starting datanodes
Starting secondary namenodes [txy-virtual-machine]
Java HotSpot(TM) Server VM warning: You have loaded library /home/txy/桌面/hadoop_installs/hadoop-3.2.1/lib/native/libhadoop.so.1.0.0 which might have disabled stack guard. The VM will try to fix the stack guard now.
It's highly recommended that you fix the library with 'execstack -c <libfile>', or link it with '-z noexecstack'.
2020-11-25 12:27:34,388 WARN util.NativeCodeLoader: Unable to load native-hadoop library for your platform... using builtin-java classes where applicable
Starting resource manager
Starting nodemanagers
txy@txy-virtual-machine:~/桌面/hadoop_installs/hadoop-3.2.1/sbin$
```

```
txy@txy-virtual-machine:~/桌面/hbase-2.2.5/bin$ ssh-keygen -t rsa
Generating public/private rsa key pair.
Enter file in which to save the key (/home/txy/.ssh/id_rsa):
/home/txy/.ssh/id_rsa already exists.
Overwrite (y/n)? n
txy@txy-virtual-machine:~/桌面/hbase-2.2.5/bin$
```

换用外源的 zookeeper, 改变 hbase 版本, 使之与 hadoop 版本适配

[illegible]

在 pom.xml 文件里添加依赖

做实验之前，要充分了解实验原理，查阅 hbase 和 hadoop 对应版本，实验过程中，遇到问题不要慌，检查是否每个步骤都做对了，是否文件内容正确。实验结束后，总结遇到的问题与改进方法。