一、HBase安装（核心调整：账户为bigdata，下载目录为Downloads）

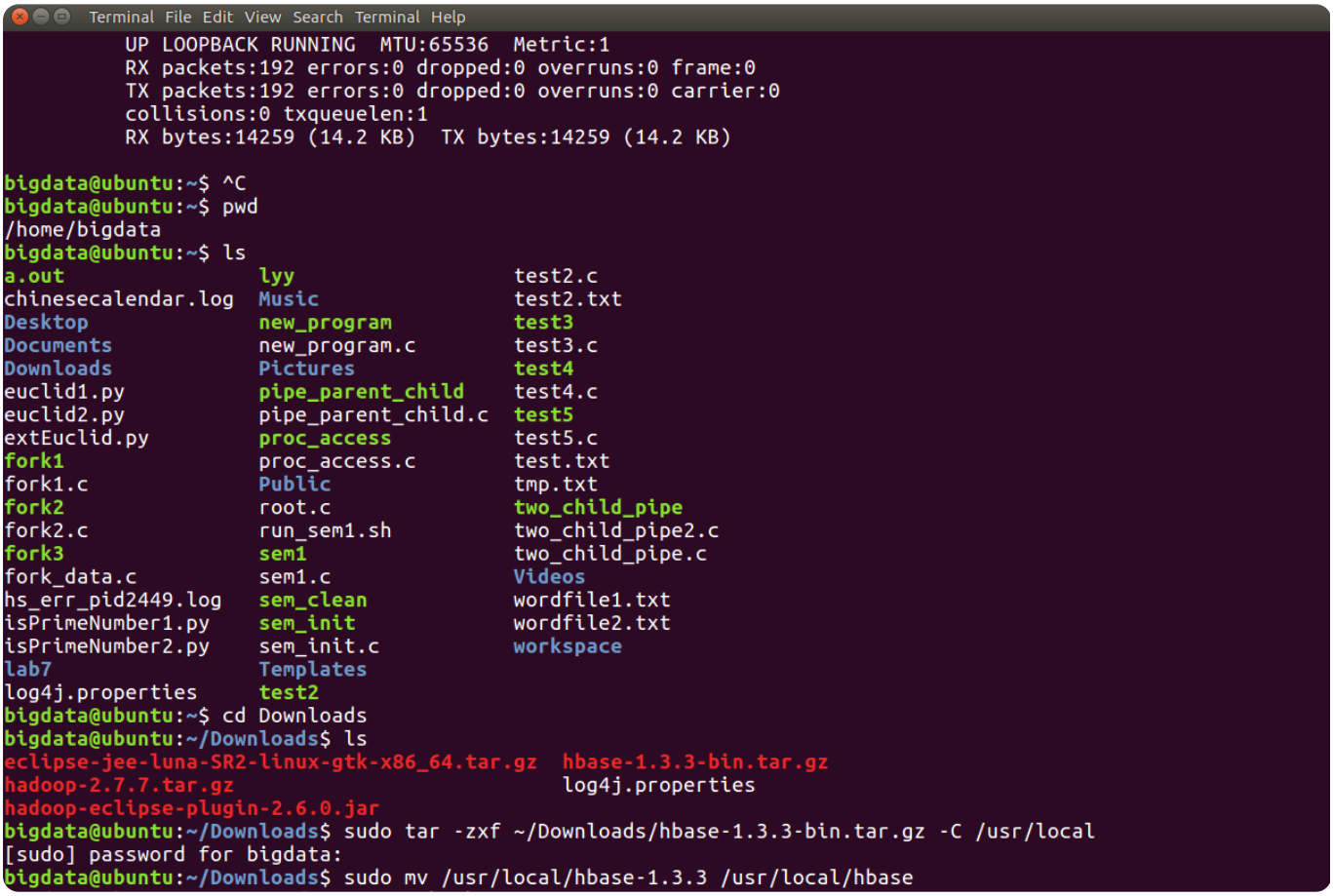
步骤1：准备安装文件

1. 先将`hbase-1.3.3-bin.tar.gz`文件传输到Ubuntu系统的`~/Downloads`目录。

步骤2：解压并移动安装文件

打开Ubuntu终端，执行以下指令：

```
sudo tar -zxf ~/Downloads/hbase-1.3.3-bin.tar.gz -C /usr/local
sudo mv /usr/local/hbase-1.3.3 /usr/local/hbase
```



步骤3：配置环境变量

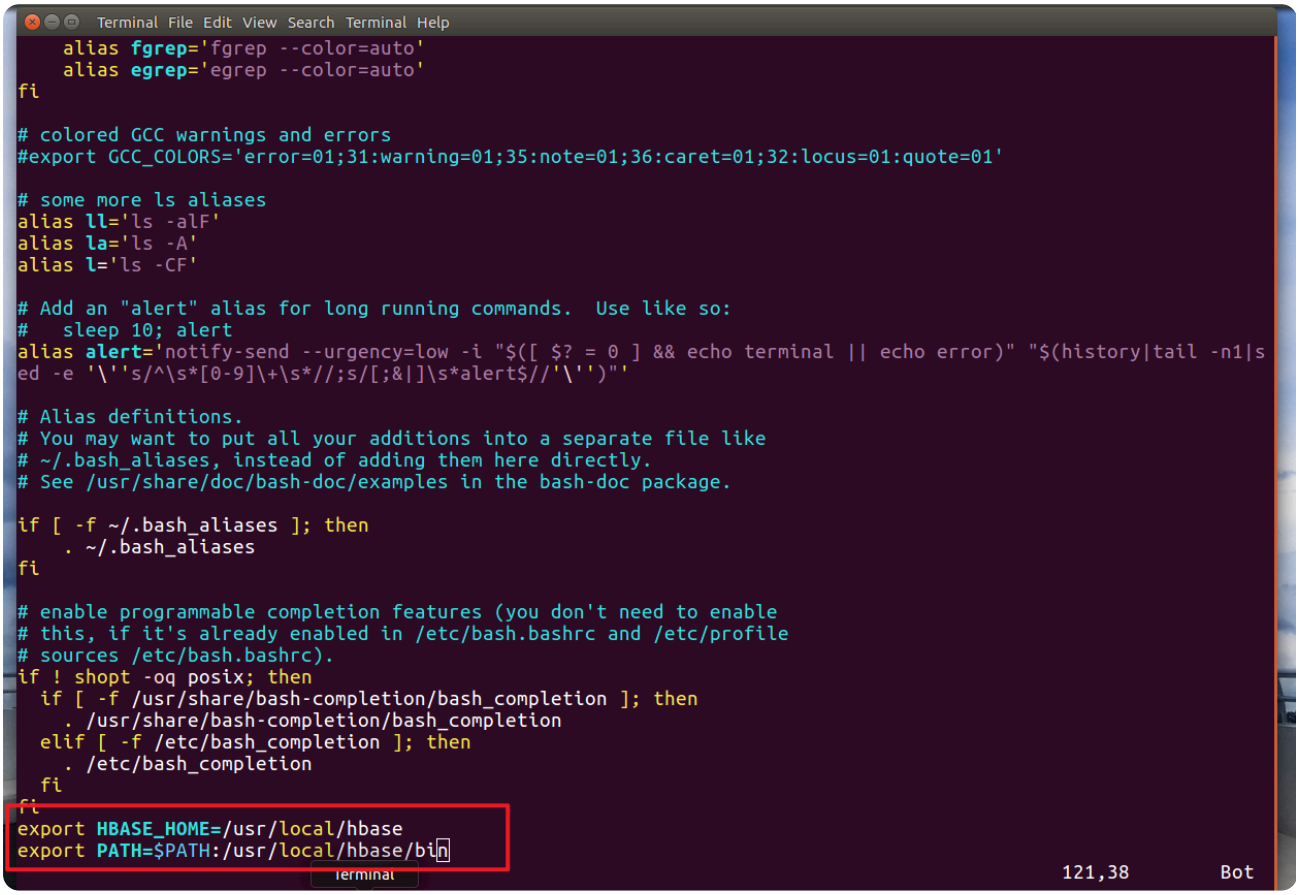
1. 打开环境变量配置文件：

```
vim ~/.bashrc
```

1. 按`i`进入编辑模式，在文件末尾粘贴以下内容：

```
export HBASE_HOME=/usr/local/hbase
export PATH=$PATH:/usr/local/hbase/bin
```

1. 按`Esc`键退出编辑，输入`:wq`并回车保存退出。



2. 使环境变量配置生效：

```
source ~/.bashrc
```

步骤4：添加bigdata用户权限

为当前`bigdata`账户赋予HBase目录操作权限：

```
cd /usr/local
sudo chown -R bigdata ./hbase
```

```
bigdata@ubuntu:~/Downloads$ cd /usr/local
bigdata@ubuntu:/usr/local$ ls
bin  etc  games  hadoop  hbase  include  lib  man  sbin  share  src
bigdata@ubuntu:/usr/local$ sudo chown -R bigdata ./hbase
big LibreOffice Calc /usr/local$
```

步骤5：验证安装（查看HBase版本）

```
hbase version
```

```
bigdata@ubuntu:/usr/local$ hbase version
HBase 1.3.3
Source code repository git://apurtell-ltm4.internal.salesforce.com/Users/apurtell/src/hbase revision=a75a458e
c8f3c60db57f30ec4b06a606c9027b4
Compiled by apurtell on Fri Dec 14 16:02:53 PST 2018
From source with checksum df0c355e338d1ce786b7be214a4dbb63
```

如图所示，执行后显示HBase版本信息（1.3.3），安装成功。

二、HBase单机模式配置

步骤1：配置hbase-env.sh文件

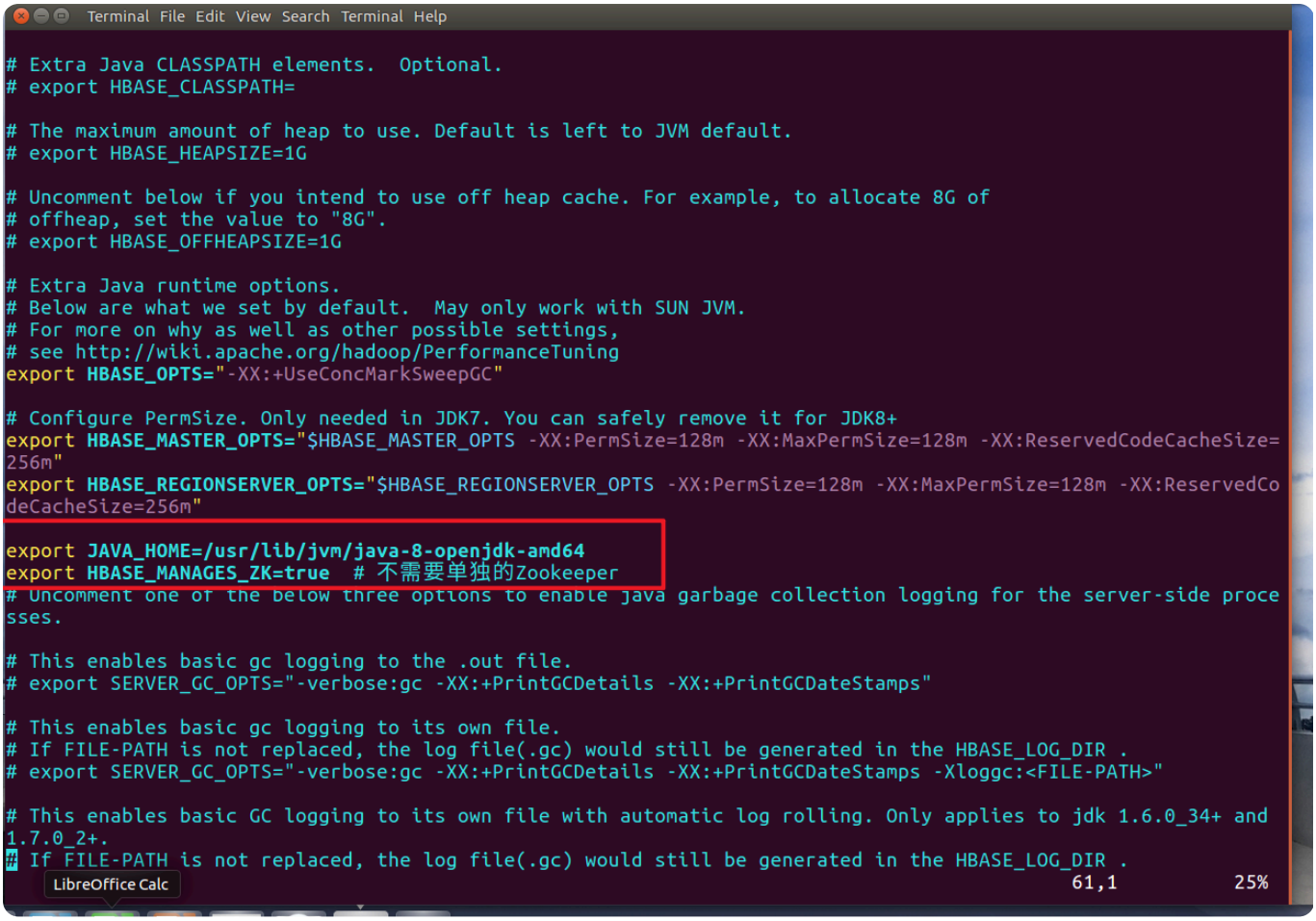
1. 打开配置文件：

```
vim /usr/local/hbase/conf/hbase-env.sh
```

1. 按`i`进入编辑模式，找到对应位置并粘贴以下配置（设置JAVA路径和Zookeeper管理）：

```
export JAVA_HOME=/usr/lib/jvm/java-8-openjdk-amd64
export HBASE_MANAGES_ZK=true
```

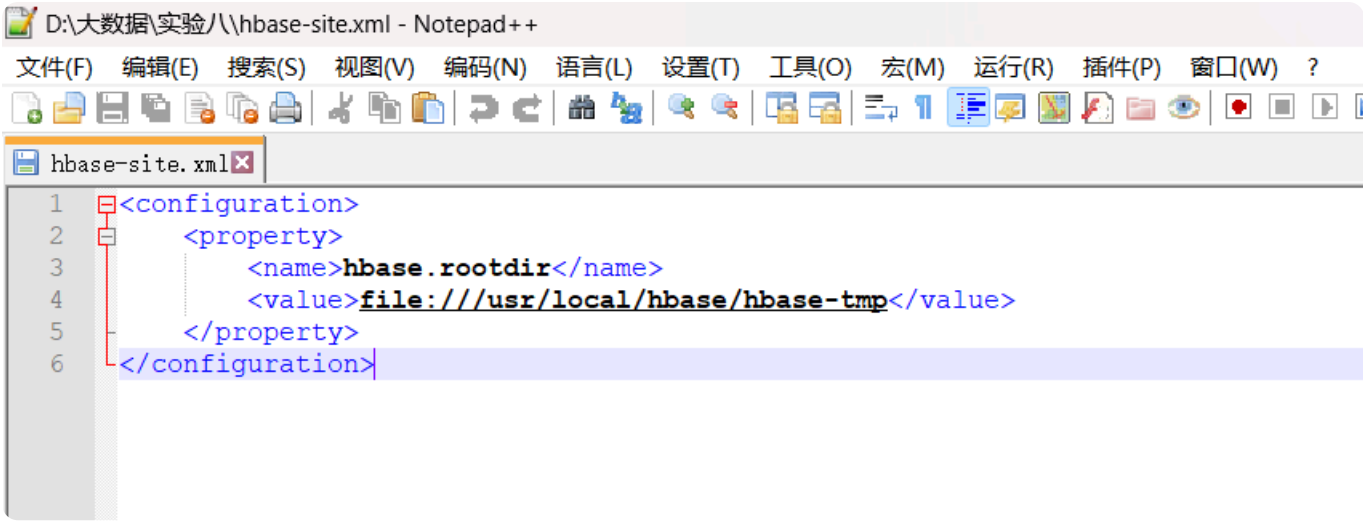
1. 按`Esc`键，输入`:wq`保存退出。



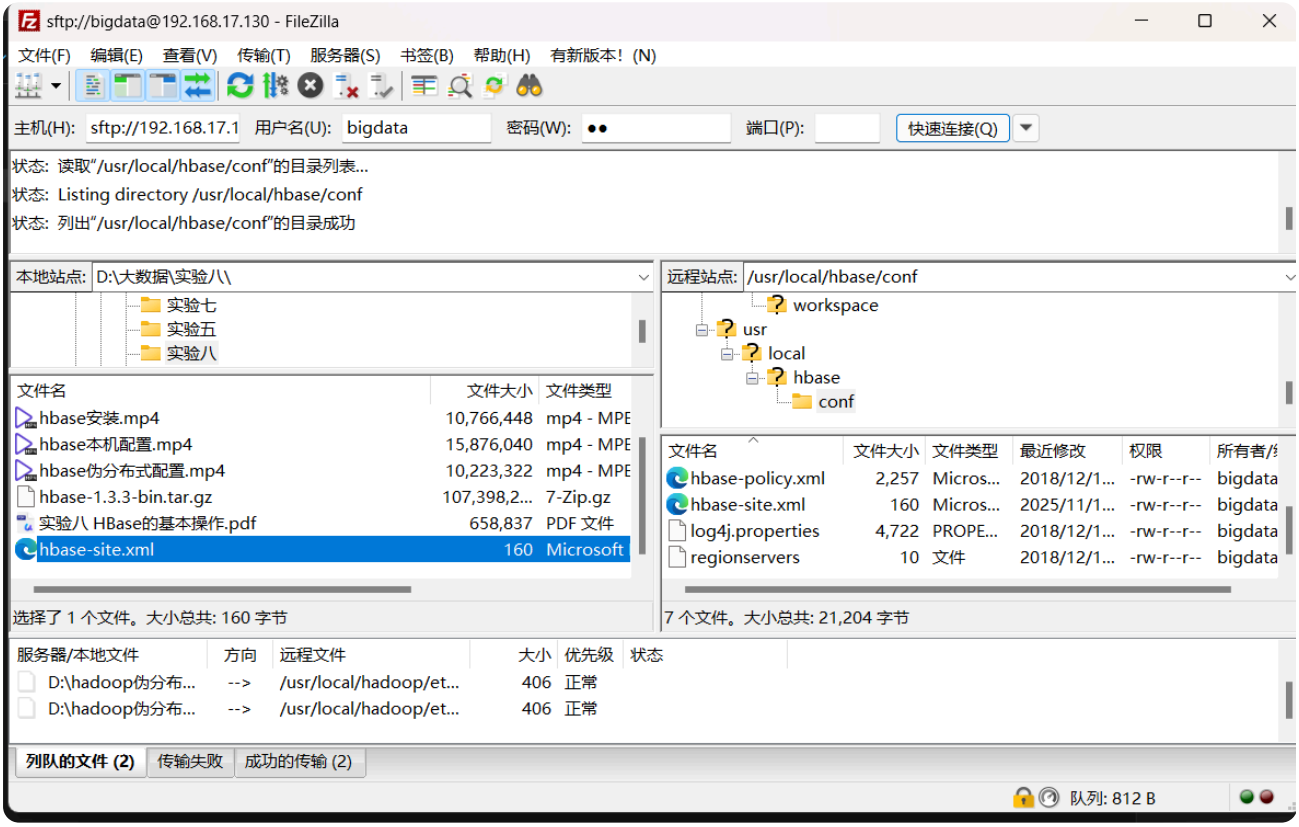
步骤2：配置hbase-site.xml文件

1. 在Windows系统中新建文本文件，粘贴以下配置内容并保存为`hbase-site.xml`：

```
<configuration>
    <property>
        <name>hbase.rootdir</name>
        <value>file:///usr/local/hbase/hbase-tmp</value>
    </property>
</configuration>
```



1. 将Windows中的`hbase-site.xml`传输到Ubuntu的`/usr/local/hbase/conf`目录，覆盖原有文件



步骤3：启动HBase并验证

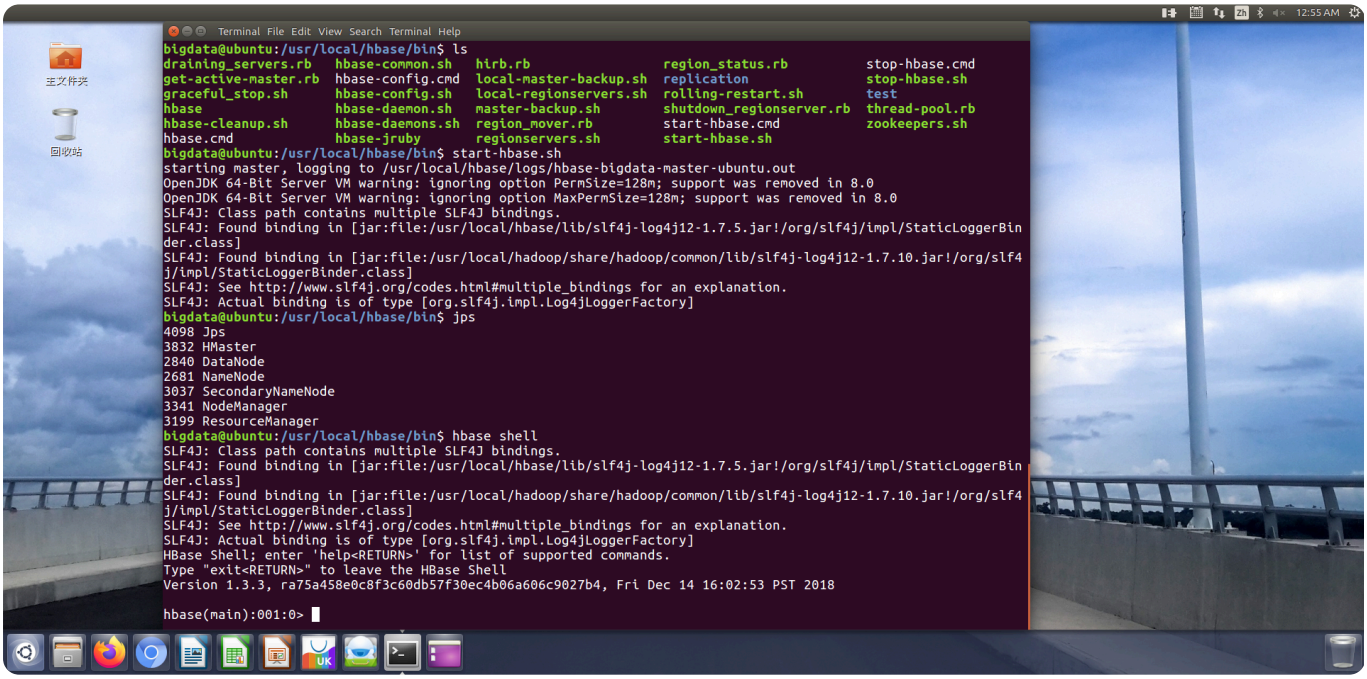
1. 启动HBase服务：

```
start-hbase.sh
```

```
bigdata@ubuntu:/usr/local$ cd hbase
bigdata@ubuntu:/usr/local/hbase$ ls
bin  CHANGES.txt  conf  docs  hbase-webapps  LEGAL  lib  LICENSE.txt  NOTICE.txt  README.txt
bigdata@ubuntu:/usr/local/hbase$ cd bin
bigdata@ubuntu:/usr/local/hbase/bin$ ls
draining_servers.rb   hbase-common.sh   hirb.rb                region_status.rb          stop-hbase.cmd
get-active-master.rb  hbase-config.cmd  local-master-backup.sh replication               stop-hbase.sh
graceful_stop.sh      hbase-config.sh   local-regionservers.sh rolling-restart.sh        test
hbase                 hbase-daemon.sh   master-backup.sh       shutdown_regionserver.rb  thread-pool.rb
hbase-cleanup.sh      hbase-daemons.sh  region_mover.rb        start-hbase.cmd           zookeepers.sh
hbase.cmd             hbase-jruby       regionservers.sh       start-hbase.sh
bigdata@ubuntu:/usr/local/hbase/bin$ start-hbase.sh
starting master, logging to /usr/local/hbase/logs/hbase-bigdata-master-ubuntu.out
OpenJDK 64-Bit Server VM warning: ignoring option PermSize=128m; support was removed in 8.0
OpenJDK 64-Bit Server VM warning: ignoring option MaxPermSize=128m; support was removed in 8.0
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/usr/local/hbase/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticLoggerBin
der.class]
SLF4J: Found binding in [jar:file:/usr/local/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.10.jar!/org/slf4
j/impl/StaticLoggerBinder.class]
SLF4J: See http://www.slf4j.org/codes.html#multiple_bindings for an explanation.
SLF4J: Actual binding is of type [org.slf4j.impl.Log4jLoggerFactory]
bigdata@ubuntu:/usr/local/hbase/bin$ jps
4098 Jps
3832 HMaster
2840 DataNode
2681 NameNode
3037 SecondaryNameNode
3341 NodeManager
3199 ResourceManager
```

1. 进入HBase Shell命令行：

```
hbase shell
```



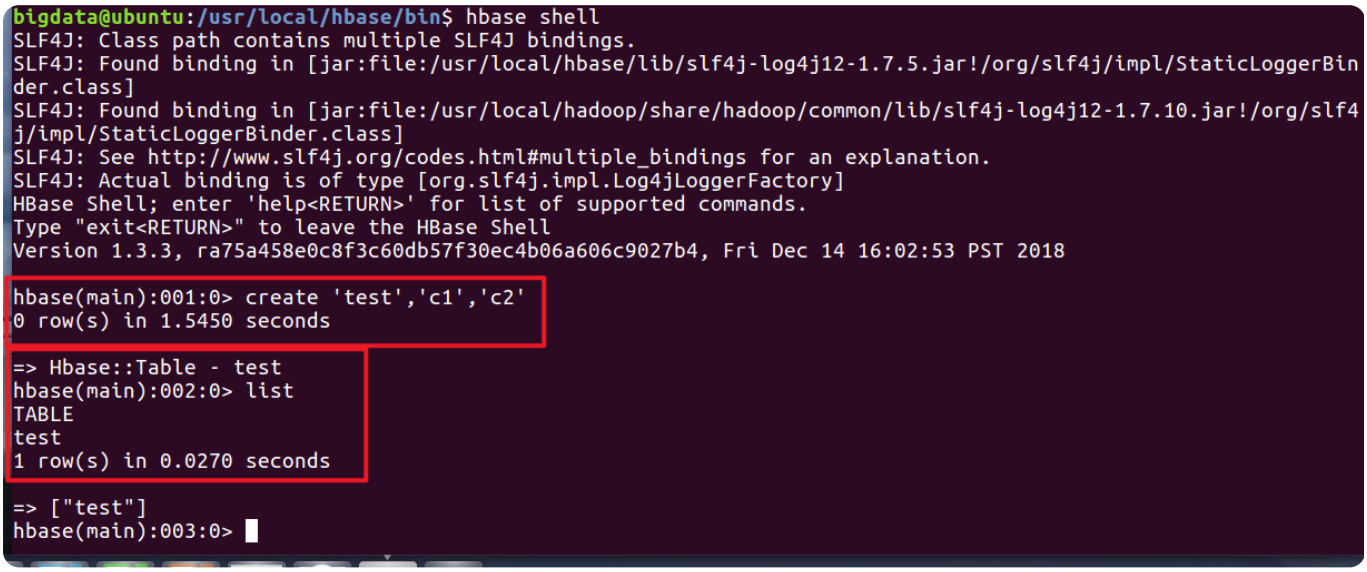
此时说明已经进入了HBaseShell交互界面

1. 在HBase Shell中创建`test`表（含`c1`、`c2`列族）：

```
create 'test','c1','c2'
```

1. 查看当前所有表，验证创建成功：

```
list
```

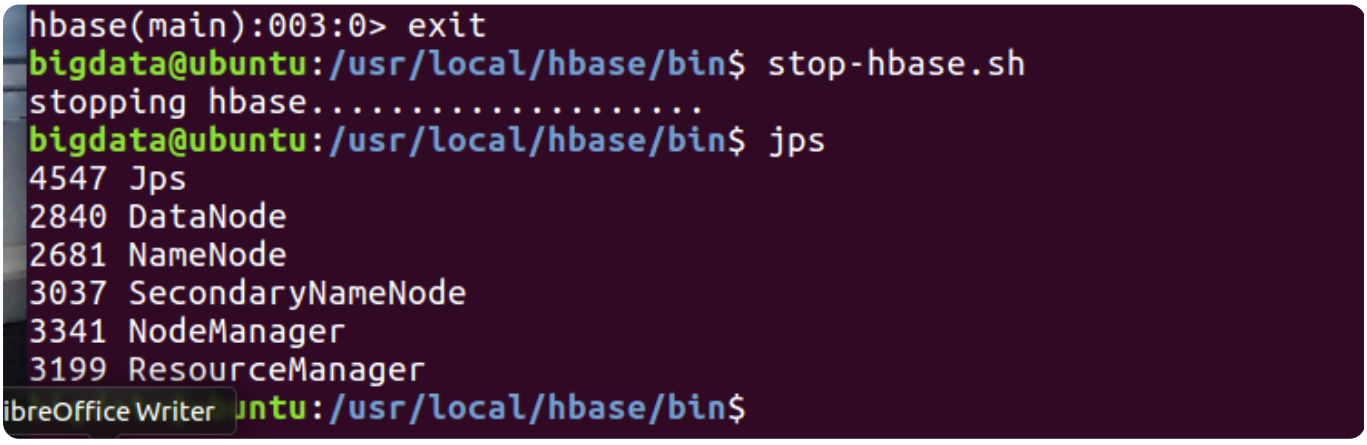


1. 退出HBase Shell：

```
exit
```

步骤4：停止HBase服务

```
stop-hbase.sh
```



三、HBase伪分布式配置（基于单机模式基础）

步骤1：修改hbase-env.sh文件

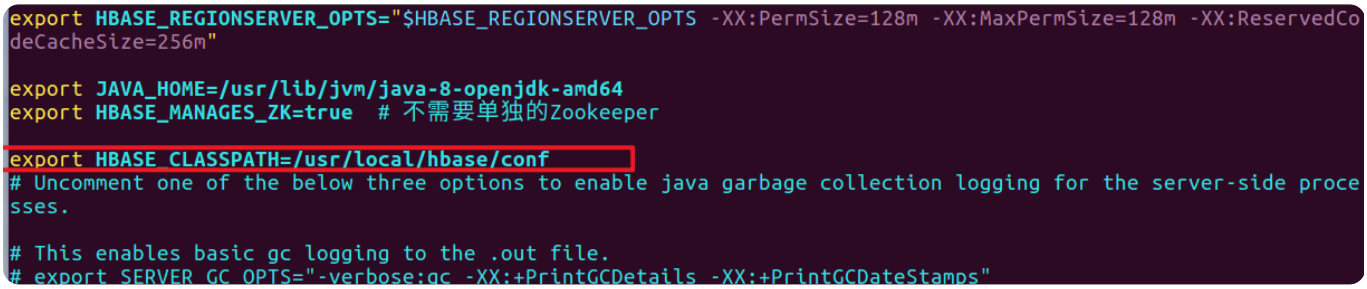
1. 打开配置文件：

```
vim /usr/local/hbase/conf/hbase-env.sh
```

1. 按`i`进入编辑模式，在单机模式配置基础上，新增以下内容（设置HBase类路径）：

```
export HBASE_CLASSPATH=/usr/local/hbase/conf
```

1. 按`Esc`键，输入`:wq`保存退出。



步骤2：修改hbase-site.xml文件

1. 打开配置文件：

```
vim /usr/local/hbase/conf/hbase-site.xml
```

1. 按`i`进入编辑模式，删除原有内容，粘贴以下伪分布式配置：

```
<configuration>
    <property>
        <name>hbase.rootdir</name>
        <value>hdfs://localhost:9000/hbase</value>
    </property>
    <property>
        <name>hbase.cluster.distributed</name>
        <value>true</value>
    </property>
</configuration>
```

1. 按`Esc`键，输入`:wq`保存退出。

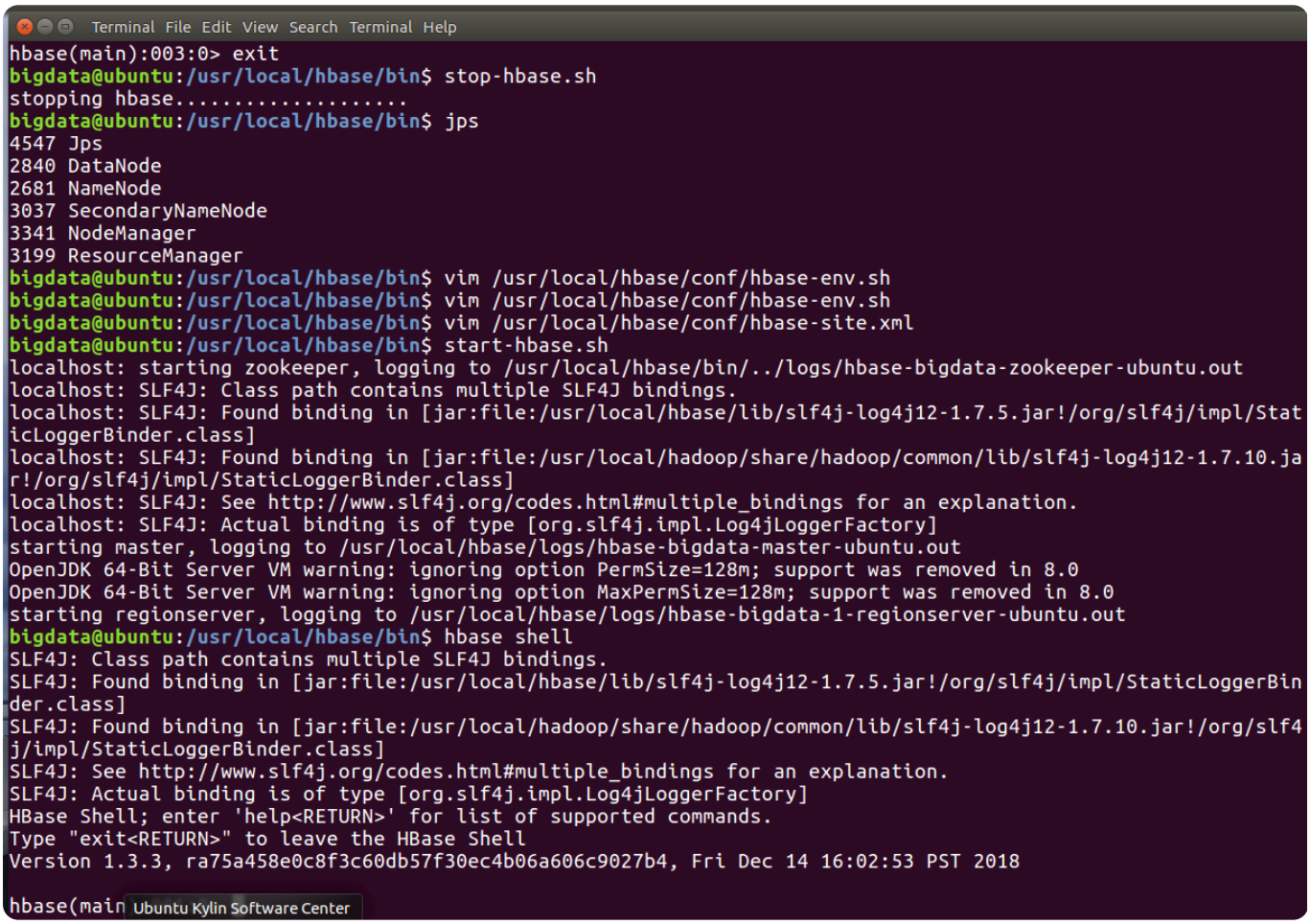
步骤3：启动伪分布式HBase

1. 确保Hadoop已启动（若未启动，先执行`start-dfs.sh`），再启动HBase：

```
start-hbase.sh
```

1. 进入HBase Shell验证：

```
hbase shell
```



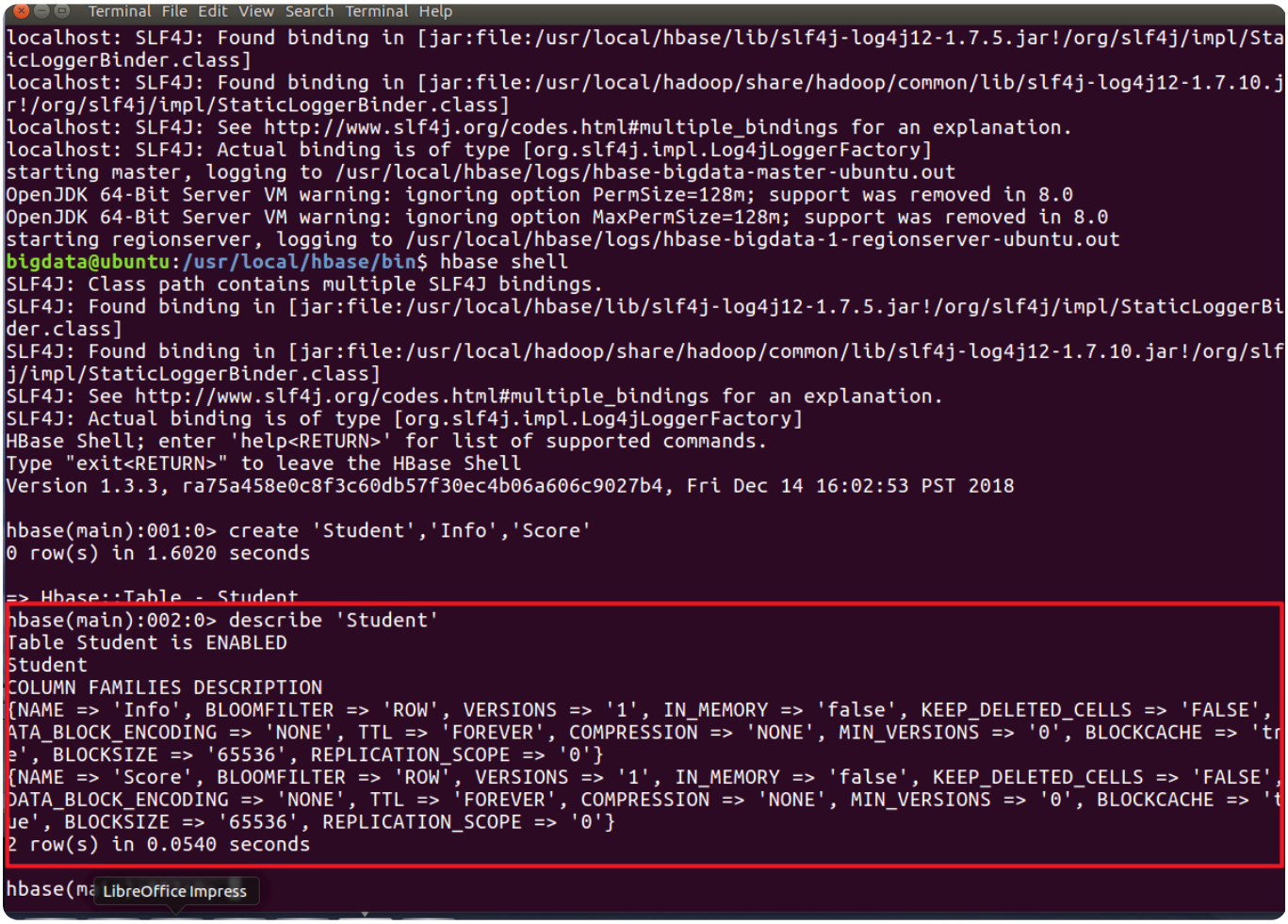
四、HBase基本操作（在伪分布式/单机模式Shell中执行）

步骤1：创建表（以Student表为例，含Info、Score列族）

```
create 'Student','Info','Score'
```

步骤2：查看表结构信息

```
describe 'Student'
```



步骤3：添加数据（主键为201612345）

逐行执行以下指令，为Student表添加数据：

```
put 'Student','201612345','Info:Sname','ZhangSan'
put 'Student','201612345','Info:Ssex','male'
put 'Student','201612345','Score:Chinese','89'
put 'Student','201612345','Score:Math','98'
```

步骤4：查看数据

1. 查看指定行（主键201612345）数据：

```
get 'Student','201612345'
```

```
hbase(main):003:0> put 'Student','201612345','Info:Sname','ZhangSan'
0 row(s) in 0.1000 seconds

hbase(main):004:0> put 'Student','201612345','Info:Ssex','male'
0 row(s) in 0.0240 seconds

hbase(main):005:0> put 'Student','201612345','Score:Chinese','89'
0 row(s) in 0.0190 seconds

hbase(main):006:0> put 'Student','201612345','Score:Math','98'
0 row(s) in 0.0120 seconds

hbase(main):007:0> get 'Student','201612345'
COLUMN                          CELL
 Info:Sname                     timestamp=1763024790140, value=ZhangSan
 Info:Ssex                      timestamp=1763024798995, value=male
 Score:Chinese                  timestamp=1763024806938, value=89
 Score:Math                     timestamp=1763024814537, value=98
1 row(s) in 0.0310 seconds
```

1. 查看全表数据：

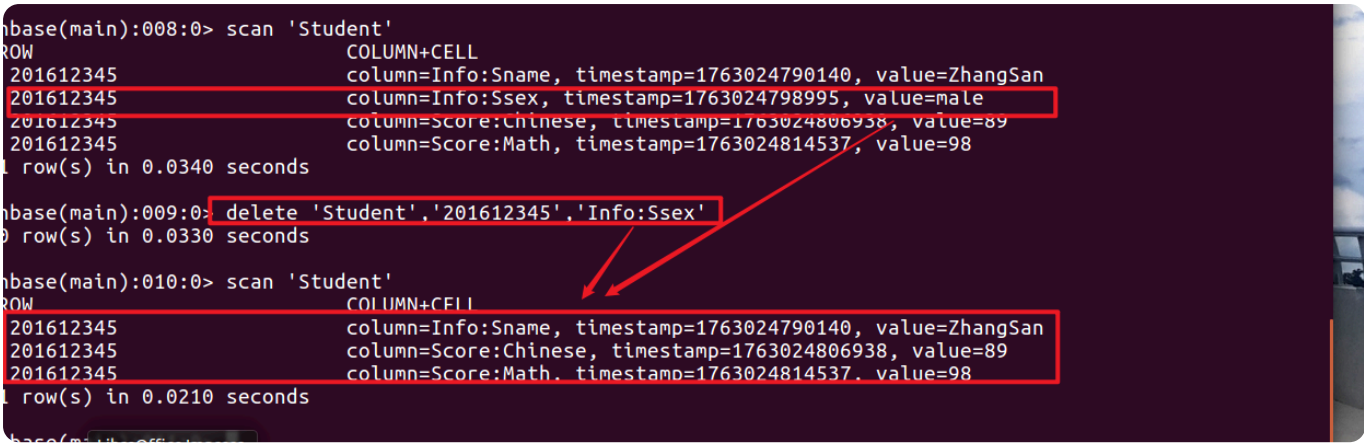
```
scan 'Student'
```

```
hbase(main):008:0> scan 'Student'
ROW                             COLUMN+CELL
 201612345                      column=Info:Sname, timestamp=1763024790140, value=ZhangSan
 201612345                      column=Info:Ssex, timestamp=1763024798995, value=male
 201612345                      column=Score:Chinese, timestamp=1763024806938, value=89
 201612345                      column=Score:Math, timestamp=1763024814537, value=98
1 row(s) in 0.0340 seconds
```

步骤5：删除数据

1. 删除指定单元格（201612345行的Info:Ssex列）：

```
delete 'Student','201612345','Info:Ssex'
```



如图所示，删除单元格成功

1. 删除指定行（201612345行所有数据）：

```
deleteall 'Student','201612345'
```

```
hbase(main):011:0> deleteall 'Student','201612345'
0 row(s) in 0.0130 seconds

hbase(main):012:0> scan 'Student'
ROW                                   COLUMN+CELL
0 row(s) in 0.0150 seconds
```

1. 删除表（需先禁用表）：

```
disable 'Student'
drop 'Student'
```

```
hbase(main):013:0> disable 'Student'
0 row(s) in 2.3140 seconds

hbase(main):014:0> drop 'Student'
0 row(s) in 1.2780 seconds
```

步骤6：查询历史数据（以Teacher表为例）

1. 创建表并指定版本数（保存5个版本）：

```
create 'Teacher',{NAME=>'Info',VERSIONS=>5}
```

2. 多次更新同一单元格数据（产生历史版本）：

```
put 'Teacher','200612345','Info:Tname','Jane'
put 'Teacher','200612345','Info:Tname','Jane1'
put 'Teacher','200612345','Info:Tname','Jane2'
put 'Teacher','200612345','Info:Tname','Jane3'
put 'Teacher','200612345','Info:Tname','Jane4'
put 'Teacher','200612345','Info:Tname','Jane5'
```

3. 查询最近5个版本数据：

```
get 'Teacher','200612345',{COLUMN=>'Info:Tname',VERSIONS=>5}
```

```
hbase(main):015:0> create 'Teacher',{NAME=>'Info',VERSIONS=>5}
0 row(s) in 1.2680 seconds

=> Hbase::Table - Teacher
hbase(main):016:0> put 'Teacher','200612345','Info:Tname','Jane'
0 row(s) in 0.0640 seconds

hbase(main):017:0> put 'Teacher','200612345','Info:Tname','Jane1'
0 row(s) in 0.0070 seconds

hbase(main):018:0> put 'Teacher','200612345','Info:Tname','Jane2'
0 row(s) in 0.0080 seconds

hbase(main):019:0> put 'Teacher','200612345','Info:Tname','Jane3'
0 row(s) in 0.0050 seconds

hbase(main):020:0> put 'Teacher','200612345','Info:Tname','Jane4'
0 row(s) in 0.0100 seconds

hbase(main):021:0> put 'Teacher','200612345','Info:Tname','Jane5'
0 row(s) in 0.0080 seconds

hbase(main):022:0> get 'Teacher','200612345',{COLUMN=>'Info:Tname',VERSIONS=>5}
COLUMN                          CELL
 Info:Tname                     timestamp=1763025129124, value=Jane5
 Info:Tname                     timestamp=1763025124601, value=Jane4
 Info:Tname                     timestamp=1763025121300, value=Jane3
 Info:Tname                     timestamp=1763025117811, value=Jane2
 Info:Tname                     timestamp=1763025113794, value=Jane1
1 row(s) in 0.0290 seconds
```

4. 查询最近2个版本数据：

```
get 'Teacher','200612345',{COLUMN=>'Info:Tname',VERSIONS=>2}
```

```
hbase(main):023:0> get 'Teacher','200612345',{COLUMN=>'Info:Tname',VERSIONS=>2}
COLUMN                          CELL
 Info:Tname                     timestamp=1763025129124, value=Jane5
 Info:Tname                     timestamp=1763025124601, value=Jane4
1 row(s) in 0.0170 seconds
```

步骤7：退出与停止服务

1. 退出HBase Shell：

```
exit
```

1. 停止HBase服务：

```
stop-hbase.sh
```