

## Section 2.2

```
[root@week1 ~]# cd /opt
[root@week1 opt]# ls
jdk1.8.0_65  jdk-8u65-linux-x64.tar.gz
[root@week1 opt]# wget http://apache.arvix.com/hbase/1.1.2/hbase-1.1.2-bin.tar.gz
--2016-01-25 14:44:48--  http://apache.arvix.com/hbase/1.1.2/hbase-1.1.2-bin.tar.gz
Resolving apache.arvix.com [apache.arvix.com] ... 198.58.87.62
Connecting to apache.arvix.com [apache.arvix.com]:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 102754526 (98M) [application/x-gzip]
Saving to: 'hbase-1.1.2-bin.tar.gz'

100%[*****] 102754526 4.64 MB/s  in 21s

2016-01-25 14:45:09 (4.64 MB/s) : 'hbase-1.1.2-bin.tar.gz' saved [102754526/102754526]

[root@week1 opt]# tar -xvf hbase-1.1.2-bin.tar.gz
hbase-1.1.2/LICENSE.txt
hbase-1.1.2/NOTICE.txt
hbase-1.1.2/LEGAL
hbase-1.1.2/lib/hbase-annotations-1.1.2.jar
hbase-1.1.2/lib/hbase-protocol-1.1.2.jar
hbase-1.1.2/lib/hbase-common-1.1.2.jar
hbase-1.1.2/lib/hbase-procedure-1.1.2.jar
hbase-1.1.2/lib/hbase-client-1.1.2.jar
hbase-1.1.2/lib/hbase-hadoop-compat-1.1.2.jar
hbase-1.1.2/lib/hbase-hadoop2-compat-1.1.2.jar
hbase-1.1.2/lib/hbase-prefix-free-1.1.2.jar
hbase-1.1.2/lib/hbase-server-1.1.2.jar
hbase-1.1.2/lib/hbase-thrift-1.1.2.jar
```

```
[root@weeek1 opt]# which java
/usr/bin/java
[root@weeek1 opt]# vi hbase-1.1.2/conf/hbase-env.sh
[root@weeek1 opt]# cat hbase-1.1.2/conf/hbase-env.sh |grep ^C 2 JAVA_HOME

# The java implementation to use. Java 1.7+ required.
export JAVA_HOME=/usr/bin/java

# Extra Java CLASSPATH elements. Optional.
[root@weeek1 opt]# vi hbase-1.1.2/conf/hbase-site.xml
[root@weeek1 opt]# tail -10 hbase-1.1.2/conf/hbase-site.xml
<configuration>
  <property>
    <name>hbase.rootdir</name>
    <value>file:///home/hadoop/hbase</value>
  </property>
  <property>
    <name>hbase.zookeeper.property.dataDir</name>
    <value>/home/hadoop/zookeeper</value>
  </property>
</configuration>
```

[illegible]

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options that it went ahead and ignored.

```
[root@week1 ~]# su - hadoop
Last login: Mon Jan 25 16:12:25 MST 2016 on pts/0
[hadoop@week1 ~]$ ~/hbase-1.1.2/bin/start-hbase.sh
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: /usr/bin/java/bin/java: Not a directory
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: exec: /usr/bin/java/bin/java: cannot execute: Not a directory
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: /usr/bin/java/bin/java: Not a directory
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: exec: /usr/bin/java/bin/java: cannot execute: Not a directory
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-master-week1.out
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: /usr/bin/java/bin/java: Not a directory
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: exec: /usr/bin/java/bin/java: cannot execute: Not a directory
starting regionserver, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-1-regionserver-week1.out
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: /usr/bin/java/bin/java: Not a directory
/home/hadoop/hbase-1.1.2/bin/hbase: line 408: exec: /usr/bin/java/bin/java: cannot execute: Not a directory
[hadoop@week1 ~]$ vi hbase-1.1.2/conf/hbase-env.sh
[hadoop@week1 ~]$ ~/hbase-1.1.2/bin/start-hbase.sh
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-master-week1.out
Java HotSpot(TM) 64-Bit Server VM warning: ignoring option PermSize=128m; support was removed in 8.0
Java HotSpot(TM) 64-Bit Server VM warning: ignoring option MaxPermSize=128m; support was removed in 8.0
[hadoop@week1 ~]$ jps
5602 HMaster
3867 Jps
[hadoop@week1 ~]$
```

I was successfully able to run the hbase shell and interact with it. I started with creating a table and placing data into it. Then I followed through on their examples of retrieving the data and finally dropping the table.

```
[hbase(main):018:0] create 'test', 'cf'
0 row(s) in 1.2540 seconds

=> Hbase:Table - test
[hbase(main):019:0] list 'test'
TABLE
test
1 row(s) in 0.0220 seconds

=> ["test"]
[hbase(main):020:0] put 'test', 'row1', 'cf:a', 'value1'
0 row(s) in 0.0400 seconds

[hbase(main):021:0] put 'test', 'row2', 'cf:b', 'value2'
0 row(s) in 0.0120 seconds

[hbase(main):022:0] put 'test', 'row3', 'cf:c', 'value3'
0 row(s) in 0.0120 seconds

[hbase(main):023:0] scan 'test'
ROW                                COLUMN+CELL
row1                               column=cf:a, timestamp=1453775981985, value=value1
row2                               column=cf:b, timestamp=1453775987189, value=value2
row3                               column=cf:c, timestamp=1453775992045, value=value3
3 row(s) in 0.0310 seconds

[hbase(main):024:0] get 'test', 'row1'
COLUMN                                CELL
cf:a                                 timestamp=1453775981985, value=value1
1 row(s) in 0.0210 seconds
```

```
=> ["test"]
[hbase(main):004:0] enable 'test'
0 row(s) in 1.2710 seconds

[hbase(main):005:0] disable 'test'
0 row(s) in 2.3150 seconds

[hbase(main):006:0] drop 'test'
0 row(s) in 1.3430 seconds

[hbase(main):007:0] quit
[hadoop@week1 ~]$
```

Finally I stopped hbase and confirmed it was no longer running using jps.

```
[hbase(main):007:0] quit
[hadoop@week1 ~]$ ~/hbase-1.1.2/bin/stop-hbase.sh
stopping hbase.....
[hadoop@week1 ~]$ jps
5570 Jps
[hadoop@week1 ~]$
```

## Section 2.3

To start this portion of the assignment I edited the `hbase-site.xml` file to add the clustering option and change the previous root directory for Section 2.2 from local to HDFS. I then started up HDFS.

```
[hadoop@week1 ~]$ vi ~/hbase-1.1.2/conf/hbase-site.xml
[hadoop@week1 ~]$ tail ~/hbase-1.1.2/conf/hbase-site.xml
</property>
<property>
  <name>hbase.cluster.distributed</name>
  <value>true</value>
</property>
<property>
  <name>hbase.rootdir</name>
  <value>hdfs://localhost:8020/hbase</value>
</property>
</configuration>

[hadoop@week1 ~]$ ~/hadoop/sbin/start-dfs.sh
localhost: starting namenode, logging to /home/hadoop/hadoop/logs/hadoop-hadoop-namenode-week1.out
localhost: starting datanode, logging to /home/hadoop/hadoop/logs/hadoop-hadoop-datanode-week1.out
Starting secondary namenodes [0.0.0.0]
0.0.0.0: starting secondarynamenode, logging to /home/hadoop/hadoop/logs/hadoop-hadoop-secondarynamenode-week1.out
[hadoop@week1 ~]$ ~/hadoop/sbin/start-yarn.sh
starting yarn daemons
starting resourceanagier, logging to /home/hadoop/hadoop/logs/yarn-hadoop-resourceanagier-week1.out
localhost: starting nodemanager, logging to /home/hadoop/hadoop/logs/yarn-hadoop-nodemanager-week1.out
[hadoop@week1 ~]$ jps
5956 DataNode
6465 Jps
5730 NameNode
6022 SecondaryNameNode
6279 NodeManager
6175 ResourceManager
```

I then started hbase and confirmed HRegionServer had started with jps. This looked good but when I did the next check to see if the folder existed in HDFS, I received a "No such file or directory" message. Then looking back on week 1 assignment, it would seem HDFS listens on port 9000 instead of 8020 which is what the documentation asked for. So I made the switch in the conf file and tried starting again, this time I received a message about regionserver already running even though I ran the stop script first. I ran the ps command to try to look for it, but the PID number that came up did not match the error message, instead

I elected to just reboot the machine and start over.

```
hadoop@week1 ~]$ vi ~/hbase-1.1.2/conf/hbase-site.xml
hadoop@week1 ~]$ ~/hbase-1.1.2/bin/start-hbase.sh
localhost: starting zookeeper, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-zookeeper-week1.out
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-master-week1.out
java HotSpot(TM) 64-Bit Server VM warning: ignoring option MaxPermSize=128m; support was removed in 8.0
regionserver running as process 7036. Stop it first.
hadoop@week1 ~]$ hadoop fs -ls
Found 1 items
drwxr-xr-x - hadoop supergroup 0 2016-01-12 20:03 shakespere
hadoop@week1 ~]$ ps -ef |grep 7036
hadoop 10704 9870 0 05:55 pts/0 00:00:00 grep --color=auto 7036
hadoop@week1 ~]$ ps -ef |grep regionserver
hadoop 10706 9870 0 05:55 pts/0 00:00:00 grep --color=auto regionserver
```

After reboot, I again started HDFS and then hbase. This time there was not a complaint about regionserver running and this time running the `hadoop fs -ls /hbase` command actually returned results.

```
[hadoop@week1 ~]$ hadoop fs -ls /hbase
Found 7 items
drwxr-xr-x - hadoop supergroup 0 2016-01-26 21:44 /hbase/.tmp
drwxr-xr-x - hadoop supergroup 0 2016-01-26 21:44 /hbase/MasterProcWALS
drwxr-xr-x - hadoop supergroup 0 2016-01-26 21:44 /hbase/WALS
drwxr-xr-x - hadoop supergroup 0 2016-01-26 21:44 /hbase/data
-rw-r--r-- 1 hadoop supergroup 42 2016-01-26 05:54 /hbase/hbase.id
-rw-r--r-- 1 hadoop supergroup 7 2016-01-26 05:54 /hbase/hbase.version
drwxr-xr-x - hadoop supergroup 0 2016-01-26 21:45 /hbase/oldWALS
[hadoop@week1 ~]$ hadoop fs -ls
```

I could now enter the hbase shell, albeit took a bit longer to return the shell than it did in the Section 2.2 exercise. I then ran through the same shell exercise as in Section 2.2.

```
hadoop@week1 ~]$ ~/hbase-1.1.2/bin/hbase shell
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/home/hadoop/hbase-1.1.2/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/home/hadoop/hadoop/share/hadoop/common/lib/slf4j-log4j12-1.7.10.jar!/org/slf4j/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]
HBase Shell; enter 'help<RETURN>' for list of supported commands.
Type "exit<RETURN>" to leave the HBase Shell
Version 1.1.2, rcc2b7cf03e3370800601ec5cab1eb43f4fe0fc, Wed Aug 26 20:11:27 PDT 2015

hbase(main):001:0> create 'test', 'cf'
0 row(s) in 1.5120 seconds

=> Hbase::Table - test
hbase(main):002:0> list 'test'
TABLE
test
1 row(s) in 0.0430 seconds

=> ["test"]
hbase(main):003:0> put 'test', 'row1', 'cf:a', 'value1'
0 row(s) in 0.1770 seconds

hbase(main):004:0> put 'test', 'row2', 'cf:b', 'value2'
0 row(s) in 0.0610 seconds

hbase(main):005:0> put 'test', 'row3', 'cf:c', 'value3'
0 row(s) in 0.0440 seconds

hbase(main):006:0> scan 'test'
ROW
row1      COLUMN=cf:a, timestamp=1453871541040, value=value1
row2      COLUMN=cf:b, timestamp=1453871547849, value=value2
row3      COLUMN=cf:c, timestamp=1453871554719, value=value3
3 row(s) in 0.0800 seconds

hbase(main):007:0> get 'test', 'row1'
COLUMN
cf:a      CELL
          timestamp=1453871541040, value=value1
1 row(s) in 0.0470 seconds

hbase(main):008:0> disable 'test'
0 row(s) in 2.3240 seconds

hbase(main):009:0> drop 'test'
0 row(s) in 1.2770 seconds

hbase(main):010:0> quit
hadoop@week1 ~]$
```

Next the section instructions where to start multiple Hmaster instances. I ran the command it gave `$ ./bin/local-master-backup.sh 2 3 5` but received an error about usage. It would seem that the command wanted start or stop as an argument, so I gave it an argument of "start" before the offset numbers. This time it said it was starting the new Hmasters but when I checked the `/tmp` directory, there where no PID files for the new processes, which could also be seen by trying to stop the processes as it made the same complaint.

```
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-master-backup.sh 2 3 5
Usage: hbase-daemon.sh [--config <conf-dir>] (start|stop|restart|autorestart|foreground_start) <hbase-command> <args...>
Usage: hbase-daemon.sh [--config <conf-dir>] (start|stop|restart|autorestart|foreground_start) <hbase-command> <args...>
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-master-backup.sh start 2 3 5
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-2-master-week1.out
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-3-master-week1.out
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-5-master-week1.out
[hadoop@week1 ~]$ ls /tmp
hadoop-hadoop
hadoop-hadoop-datanode.pid
hadoop-hadoop-namenode.pid
hadoop-hadoop-secondarynamenode.pid
hbase-hadoop
hbase-hadoop-1-regionserver.pid
hadoop-hadoop
hbase-hadoop-1-regionserver.znode
hbase-hadoop-5-master.pid
hbase-hadoop-master.pid
hbase-hadoop-master.znode
hbase-hadoop-zookeeper.pid
hsperfdata_hadoop
Jetty_0_0_0_16010_master_6nvknp
Jetty_0_0_0_16030_regionserver_psk4m3
Jetty_0_0_0_50070_hdfs_v2cu08
Jetty_0_0_0_50090_secondary_y6aanv
Jetty_0_0_0_8042_node_19tj0x
Jetty_0_0_0_8088_cluster_u0rgz3
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-master-backup.sh stop 2 3 5
no master to stop because no pid file /tmp/hbase-hadoop-2-master.pid
no master to stop because no pid file /tmp/hbase-hadoop-3-master.pid
no master to stop because no pid file /tmp/hbase-hadoop-5-master.pid
```

Looking at the log `/home/hadoop/hbase-1.1.2/logs/hbase-hadoop-2-master-week1.log`, there is an error of `"java.net.BindException: Address already in use"`. But when I use the `netstat` command (had to install the `net-tools` package) and `grep` for 160, I only see the process using 16000 and 16010 and the instructions say that Hmaster would use 16010, 16020, and 16030.

```
[hadoop@week1 ~]$ tail -20 /home/hadoop/hbase-1.1.2/logs/hbase-hadoop-5-master-week1.log | grep -i "caused by"
Caused by: java.net.BindException: Address already in use
[hadoop@week1 ~]$ netstat -nlp|grep 160
(Not all processes could be identified, non-owned process info
will not be shown, you would have to be root to see it all.)
tcp6      0      0 :::16010          :::*               LISTEN      2699/java
tcp6      0      0 0.0.0.0:16000     :::*               LISTEN      2699/java
[hadoop@week1 ~]$ ps -ef|grep -i hmaster
hadoop  2699  2695  0 Jan26 ?        00:00:36 /opt/java/bin/java -Dproc_master -XX:OnOutOfMemoryError=kill -9 %p -XX:+UseConcMarkSweepGC -XX:R
base.log.dir=/home/hadoop/hbase-1.1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-master-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1.2/bin/..
logger=INFO,RFA -Djava.library.path=/home/hadoop/hadoop/lib/native: /home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFA5 org.apach
hadoop  7740  7637  0 02:44 pts/0    00:00:00 grep --color=auto -i hmaster
[hadoop@week1 ~]$
```

Running a Google search of `"hbase hmaster local-master-backup.sh"`, surprisingly the very first hit was about not starting Hmaster correctly and an effected version was 1.1.2, whereas version 1.2.0 is fixed. The fix from the JIRA ticket was to add a line to the `local-master-backup.sh` script:

```
-D hbase.master.port='expr 16000 + \${DN}' \
```

This makes perfect sense because I found mine running on 16000. I added the line and tried to start it again, this time it did start and then I was able to run the stop command as well.

```
[hadoop@week1 ~]$ vi ./hbase-1.1.2/bin/local-master-backup.sh
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-master-backup.sh start 2 3 5
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-2-master-week1.out
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-3-master-week1.out
starting master, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-5-master-week1.out
[hadoop@week1 ~]$ ls /tmp/
hadoop-hadoop
hadoop-hadoop-datanode.pid
hadoop-hadoop-namenode.pid
hadoop-hadoop-secondarynamenode.pid
hbase-hadoop
hbase-hadoop-1-regionserver.pid
hadoop-hadoop
hbase-hadoop-2-master.pid
hbase-hadoop-3-master.pid
hbase-hadoop-5-master.pid
hbase-hadoop-master.pid
hbase-hadoop-master.znode
hbase-hadoop-zookeeper.pid
hsperfdata_hadoop
Jetty_0_0_0_16010_master_6nvknp
Jetty_0_0_0_16012_master_4xi08d
Jetty_0_0_0_16030_regionserver_psk4m3
Jetty_0_0_0_50070_hdfs_v2cu08
Jetty_0_0_0_50090_secondary_y6aanv
Jetty_0_0_0_8042_node_19tj0x
Jetty_0_0_0_8088_cluster_u0rgz3
[hadoop@week1 ~]$ ps -ef|grep -i hmaster
hadoop  2699  2695  0 Jan26 ?        00:00:37 /opt/java/bin/java -Dproc_master -XX:OnOutOfMemoryError=kill -9 %p -XX:+UseConcMarkSweepGC
base.log.dir=/home/hadoop/hbase-1.1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-master-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1.
logger=INFO,RFA -Djava.library.path=/home/hadoop/hadoop/lib/native: /home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFA5 org.apach
hadoop  7878  7864  27 02:53 pts/0    00:00:04 /opt/java/bin/java -Dproc_master -XX:OnOutOfMemoryError=kill -9 %p -XX:+UseConcMarkSweepGC
in/./logs -Dhbase.log.file=hbase-hadoop-2-master-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1.2/bin/.. -Dhbase.id.str=hadoop-2 -Dhba
~/home/hadoop/hadoop/lib/native: /home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFA5 org.apache.hadoop.hbase.master.HMaster
info.port=16012 -D hbase.regionserver.port=16022 -D hbase.regionserver.info.port=16032 --backup start
hadoop  7981  7967  31 02:53 pts/0    00:00:04 /opt/java/bin/java -Dproc_master -XX:OnOutOfMemoryError=kill -9 %p -XX:+UseConcMarkSweepGC
in/./logs -Dhbase.log.file=hbase-hadoop-3-master-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1.2/bin/.. -Dhbase.id.str=hadoop-3 -Dhba
~/home/hadoop/hadoop/lib/native: /home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFA5 org.apache.hadoop.hbase.master.HMaster
info.port=16013 -D hbase.regionserver.port=16023 -D hbase.regionserver.info.port=16033 --backup start
hadoop  8090  8067  34 02:53 pts/0    00:00:04 /opt/java/bin/java -Dproc_master -XX:OnOutOfMemoryError=kill -9 %p -XX:+UseConcMarkSweepGC
in/./logs -Dhbase.log.file=hbase-hadoop-5-master-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1.2/bin/.. -Dhbase.id.str=hadoop-5 -Dhba
~/home/hadoop/hadoop/lib/native: /home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFA5 org.apache.hadoop.hbase.master.HMaster
info.port=16015 -D hbase.regionserver.port=16025 -D hbase.regionserver.info.port=16035 --backup start
hadoop  8391  7837  0 02:53 pts/0    00:00:00 grep --color=auto -i hmaster
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-master-backup.sh stop 2 3 5
stopping master.
stopping master.
stopping master.
```

Finally, I finished out the section running the command to start and then stop additional regionservers and then stopped Hbase.

```
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-regionserver.sh start 2 3 4 5
starting regionserver, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-2-regionserver-week1.out
starting regionserver, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-3-regionserver-week1.out
starting regionserver, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-4-regionserver-week1.out
starting regionserver, logging to /home/hadoop/hbase-1.1.2/bin/../logs/hbase-hadoop-5-regionserver-week1.out
[hadoop@week1 ~]$ ls /tmp/
hadoop-hadoop-3-regionserver.pid      hbase-hadoop-4-regionserver.pid      Jetty_0_0_0_16012_master_4xio8k
hadoop-hadoop-datanode.pid            hbase-hadoop-5-regionserver.pid      Jetty_0_0_0_16013_master_osc8t
hadoop-hadoop-namenode.pid            hbase-hadoop-master.pid             Jetty_0_0_0_16015_master_d6xzt
hadoop-hadoop-secondarynamenode.pid  hbase-hadoop-master.znode           Jetty_0_0_0_16301_regionserver
hbase-hadoop-1-regionserver.pid       hbase-hadoop-zookeeper.pid          Jetty_0_0_0_16302_regionserver
hbase-hadoop-1-regionserver.znode     hbase-hadoop-2-regionserver.pid      Jetty_0_0_0_16010_master_6nvknp
hbase-hadoop-2-regionserver.pid       Jetty_0_0_0_16010_master_19tj9x

[hadoop@week1 ~]$ ps -ef|grep -i regionserver
hadoop 2814      1  0 Jan26 ?        00:00:00 bash /home/hadoop/hbase-1.1.2/bin/hbase-daemon.sh --config /home
e.regionserver.port=16201 -D hbase.regionserver.info.port=16301
hadoop 2828 2814  0 Jan26 ?        00:00:39 /opt/java/bin/java -Dproc_regionserver -XX:OnOutOfMemoryError=kill
-1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-1-regionserver-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1
library.path=/home/hadoop/hadoop/lib/native:/home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFAS
er.port=16201 -D hbase.regionserver.info.port=16301 start
hadoop 8576      1  0 02:59 pts/0    00:00:00 bash /home/hadoop/hbase-1.1.2/bin/hbase-daemon.sh --config /home
e.regionserver.port=16202 -D hbase.regionserver.info.port=16302
hadoop 8598 8576 21 02:59 pts/0    00:00:04 /opt/java/bin/java -Dproc_regionserver -XX:OnOutOfMemoryError=kill
-1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-2-regionserver-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1
library.path=/home/hadoop/hadoop/lib/native:/home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFAS
er.port=16202 -D hbase.regionserver.info.port=16302 start
hadoop 8669      1  0 02:59 pts/0    00:00:00 bash /home/hadoop/hbase-1.1.2/bin/hbase-daemon.sh --config /home
e.regionserver.port=16203 -D hbase.regionserver.info.port=16303
hadoop 8685 8669 24 02:59 pts/0    00:00:05 /opt/java/bin/java -Dproc_regionserver -XX:OnOutOfMemoryError=kill
-1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-3-regionserver-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1
library.path=/home/hadoop/hadoop/lib/native:/home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFAS
er.port=16203 -D hbase.regionserver.info.port=16303 start
hadoop 8753      1  0 02:59 pts/0    00:00:00 bash /home/hadoop/hbase-1.1.2/bin/hbase-daemon.sh --config /home
e.regionserver.port=16204 -D hbase.regionserver.info.port=16304
hadoop 8779 8753 28 02:59 pts/0    00:00:05 /opt/java/bin/java -Dproc_regionserver -XX:OnOutOfMemoryError=kill
-1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-4-regionserver-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1
library.path=/home/hadoop/hadoop/lib/native:/home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFAS
er.port=16204 -D hbase.regionserver.info.port=16304 start
hadoop 8843      1  0 02:59 pts/0    00:00:06 bash /home/hadoop/hbase-1.1.2/bin/hbase-daemon.sh --config /home
e.regionserver.port=16205 -D hbase.regionserver.info.port=16305
hadoop 8865 8843 29 02:59 pts/0    00:00:05 /opt/java/bin/java -Dproc_regionserver -XX:OnOutOfMemoryError=kill
-1.2/bin/../logs -Dhbase.log.file=hbase-hadoop-5-regionserver-week1.log -Dhbase.home.dir=/home/hadoop/hbase-1.1
library.path=/home/hadoop/hadoop/lib/native:/home/hadoop/hadoop/lib/native: -Dhbase.security.logger=INFO,RFAS
er.port=16205 -D hbase.regionserver.info.port=16305 start
hadoop 9355 7657  0 02:59 pts/0    00:00:00 grep --color=auto -i regionserver
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/local-regionserver.sh stop 2 3 4 5
stopping regionserver.....
stopping regionserver.....
stopping regionserver.....
stopping regionserver.....
[hadoop@week1 ~]$ ./hbase-1.1.2/bin/stop-hbase.sh
stopping hbase.....
localhost: stopping zookeeper...
```

## Section 2.4

With this section, I would need to reinstall hbase onto my cluster of VMs created in week 2, but good news is I would be able to skip the steps about ssh key sharing as this was already done last week, though I did still have to copy the keys for node-b (hslave1) to the other nodes since it is the Hmaster backup. In this case I did go ahead and install it into /opt onto 3 of the nodes (I have 4 machines in the cluster but the example was only with three) since that was where hadoop was installed and changed the permissions to the hadoop user.

```
hbase-1.1.2/lib/hbase-1.1.2-tests.jar
hbase-1.1.2/lib/hbase-annotations-1.1.2-tests.jar
[hadoop@hslave1 opt]$ ls -l
total 306032
-rwxr-xr-x. 1 hadoop hadoop 17 Jan 19 02:32 hadoop -> /opt/hadoop-2.7.1
-rw-r--r--. 1 root root 4096 Jan 18 23:13 hadoop-2.7.1
-rw-r--r--. 1 root root 210606087 Jul 4 2015 hadoop-2.7.1.tar.gz
-rwxr-xr-x. 7 root root 4096 Jan 27 22:14 hbase-1.1.2
-rw-r--r--. 1 root root 102754526 Aug 26 21:57 hbase-1.1.2-bin.tar.gz
-rwxr-xr-x. 1 root root 16 Jan 18 22:04 java -> /opt/jdk1.8.0_65
-rwxr-xr-x. 0 10 143 4096 Jan 18 22:03 jdk1.8.0_65
[hadoop@hslave1 opt]$ sudo chown -R hadoop.hadoop hbase-1.1.2
[hadoop@hslave1 opt]$ exit
logout
Connection to hslave1 closed.
[hadoop@hmaster ~]$ ssh hslave2
Last login: Fri Jan 22 11:13:57 2016 from hmaster
[hadoop@hslave2 ~]$ cd /opt/
[hadoop@hslave2 ~]$ sudo wget http://apache.claz.org/hbase/1.1.2/hbase-1.1.2-bin.tar.gz
[sudo] password for hadoop:
Sorry, try again.
[sudo] password for hadoop:
--2016-01-27 22:15:24-- http://apache.claz.org/hbase/1.1.2/hbase-1.1.2-bin.tar.gz
Resolving apache.claz.org (apache.claz.org)... 74.62.227.45
Connecting to apache.claz.org (apache.claz.org):74.62.227.45|80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 102754526 (98M) [application/x-gzip]
Saving to: 'hbase-1.1.2-bin.tar.gz'

100%[=====] 102754526 (6.91 MB/s) - 'hbase-1.1.2-bin.tar.gz' saved [102754526/102754526]

2016-01-27 22:15:30 (6.91 MB/s) - 'hbase-1.1.2-bin.tar.gz' saved [102754526/102754526]
```

Since this was not the machine I used for the Section 2.3 exercise I needed to add the HDFS config to the conf/hbase-site.xml file. The next step says to change anywhere in the configs "localhost" exists to the name of the node-a but the only place I had it was in the hdfs config pointing to port 9000. It is unclear if in the hadoop cluster if there is only one entry point into the system, but I went ahead and changed it to hmaster and then copied the config to hslave1 and 2.



```

[hadoop@hmaster opt]$ vi hbase/conf/hbase-site.xml
[hadoop@hmaster opt]$ cd hbase/conf/
[hadoop@hmaster conf]$ grep localhost *
hbase-site.xml: <value>hdfs://localhost:9000/hbase</value>
[hadoop@hmaster conf]$ vi hbase-site.xml
[hadoop@hmaster conf]$ grep localhost *
[hadoop@hmaster conf]$ cd ../
[hadoop@hmaster hbase]$ scp conf/ hslave1:/opt/hbase-1.1.2/conf/
conf: not a regular file
[hadoop@hmaster hbase]$ scp -r conf/ hslave1:/opt/hbase-1.1.2/
hadoop-metrics2-hbase.properties
hbase-env.cmd
hbase-env.sh
hbase-policy.xml
log4j.properties
regionserver
backup-masters
[hadoop@hmaster hbase]$ scp -r conf/ hslave2:/opt/hbase-1.1.2/
hadoop-metrics2-hbase.properties
hbase-env.cmd
hbase-env.sh
hbase-policy.xml
log4j.properties
regionserver
backup-masters
hbase-site.xml

```

Before starting Hbase, I first started up HDFS. I then checked that none of the nodes was running any Hbase processes and that HDFS was running with the one-line command:

```
for line in $(cat /opt/hadoop/etc/hadoop/slaves);do echo "Host: $line";ssh $line jps;echo " "; done;
```

Now I tried starting Hbase with it's start script but received errors about directories not existing on hslave1 or 2:

```
hslave1: bash: line 0: cd: /opt/hbase/bin/..: No such file or directory
```

I realized it was because I had not made a symbolic link on my other 2 nodes. So after correcting the links, I tried starting again this time with success. I now had HMaster running on node-a and node-b, HRegionServer running on node-b and node-c, and HQuorumPeer running on all three. After looking at this, I thought it probably would have made sense to make hslave1 node-a in order to spread out the processes running on the 4 machines. I also made a check to the HDFS to make sure the hbase folder had been created.

```

[hadoop@hmaster ~]$ /opt/hbase/bin/start-hbase.sh
hslave2: starting zookeeper, logging to /opt/hbase/bin/../logs/hbase-hadoop-zookeeper-hslave2.local.out
hslave1: starting zookeeper, logging to /opt/hbase/bin/../logs/hbase-hadoop-zookeeper-hslave1.local.out
hmaster: starting zookeeper, logging to /opt/hbase/bin/../logs/hbase-hadoop-zookeeper-hmaster.local.out
starting master, logging to /opt/hbase/bin/../logs/hbase-hadoop-master-hmaster.local.out
hslave2: starting regionserver, logging to /opt/hbase/bin/../logs/hbase-hadoop-regionserver-hslave2.local.out
hslave1: starting regionserver, logging to /opt/hbase/bin/../logs/hbase-hadoop-regionserver-hslave1.local.out
hslave2: Java HotSpot(TM) 64-Bit Server VM warning: ignoring option MaxPermSize=128m; support was removed in 8.0
hslave1: Java HotSpot(TM) 64-Bit Server VM warning: ignoring option MaxPermSize=128m; support was removed in 8.0
hslave1: Java HotSpot(TM) 64-Bit Server VM warning: ignoring option MaxPermSize=128m; support was removed in 8.0
hslave1: starting master, logging to /opt/hbase/bin/../logs/hbase-hadoop-master-hslave1.local.out
[hadoop@hmaster ~]$ for line in $(cat /opt/hadoop/etc/hadoop/slaves);do echo "Host: $line";ssh $line jps;echo " "; done;
Host: hmaster
2272 DataNode
4806 HQuorumPeer
4902 HMaster
2136 NameNode
2442 SecondaryNameNode
2738 NodeManager
2619 ResourceManager
5212 Jps

Host: hslave1
1927 HQuorumPeer
2151 HMaster
1435 DataNode
2042 HRegionServer
1564 NodeManager
2428 Jps

Host: hslave2
1472 NodeManager
1920 HRegionServer
1309 HQuorumPeer
1341 DataNode
2143 Jps

Host: hslave3
1394 NodeManager
1508 Jps
1263 DataNode

[hadoop@hmaster ~]$ hadoop fs -ls /hbase
Found 7 items
drwxr-xr-x - hadoop supergroup 0 2016-01-28 21:43 /hbase/.tmp
drwxr-xr-x - hadoop supergroup 0 2016-01-28 21:43 /hbase/MasterProcWALs
drwxr-xr-x - hadoop supergroup 0 2016-01-28 17:16 /hbase/WALs
drwxr-xr-x - hadoop supergroup 0 2016-01-28 21:43 /hbase/data
-rw-r--r- 3 hadoop supergroup 42 2016-01-28 17:15 /hbase/hbase.id
-rw-r--r- 3 hadoop supergroup 7 2016-01-28 17:15 /hbase/hbase.version
drwxr-xr-x - hadoop supergroup 0 2016-01-28 21:44 /hbase/oldWALs

```

Unfortunately similarly to my experience last week, though the cluster looked good at startup, it closes down shortly. I found this out when I tried to follow the next step and go to the http page node-a was supposed to have. When I ran jps again, the only thing left of hbase I had running was HQuorumPeer.

Looking in some of the logs, there were many errors about Zookeeper I just went ahead and elected to stop all services and restart all of the machines and try again. This time I was successful at getting to the website.

The screenshot shows the Apache HBase web interface in a browser window. The address bar shows the URL 192.168.56.102. The page has a navigation bar with links like Home, Table Details, Local Logs, Log Level, Debug Dump, Metrics Dump, and HBase Configuration. The main content area is divided into sections: Region Servers, Backup Masters, and Tables. The Region Servers section has tabs for Base Stats, Memory, Requests, Storefiles, and Compactions. It displays a table with columns: ServerName, Start time, Requests Per Second, and Num. Regions. The Backup Masters section displays a table with columns: ServerName, Port, and Start Time. The Tables section has tabs for User Tables, System Tables, and Snapshots.

### Region Servers

ServerName	Start time	Requests Per Second	Num. Regions
hslave1,16020,1454044966394	Thu Jan 28 22:22:46 MST 2016	0	1
hslave2,16020,1454044965758	Thu Jan 28 22:22:45 MST 2016	0	1
Total:2		0	2

### Backup Masters

ServerName	Port	Start Time
hslave1	16000	Thu Jan 28 22:22:51 MST 2016
Total:1		

### Tables

## References

hbase.apache.org, 2016. Retrieved from <http://hbase.apache.org/book.html#quickstart>  
issues.apache.org, 2016. Retrieved from <https://issues.apache.org/jira/browse/HBASE-15057>