

## 练习一

hbase(main):001:0> status 'simple'

```
active master: h1:16000 1532328898625
1 backup masters
  h2:16000 1532328901427
4 live servers
  h2:16020 1532328899893
    requestsPerSecond=0.0, numberOfOnlineRegions=1, usedHeapMB=73, maxHeapMB=30318, numberOfStores=1, number
    ofStorefiles=2, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, re
    adRequestsCount=580, writeRequestsCount=2, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=
    0, totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[MultiRowMutationEndpoi
    nt]
  h4:16020 1532328900024
    requestsPerSecond=0.0, numberOfOnlineRegions=1, usedHeapMB=380, maxHeapMB=30443, numberOfStores=1, numb
    erOfStorefiles=1, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, r
    eadRequestsCount=0, writeRequestsCount=0, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=0
    , totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[]
  h1:16020 1532328899874
    requestsPerSecond=0.0, numberOfOnlineRegions=0, usedHeapMB=59, maxHeapMB=30318, numberOfStores=0, numbe
    rOfStorefiles=0, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, r
    eadRequestsCount=0, writeRequestsCount=0, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=0,
    totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[]
  h3:16020 1532328899889
    requestsPerSecond=0.0, numberOfOnlineRegions=0, usedHeapMB=87, maxHeapMB=30443, numberOfStores=0, numbe
    rOfStorefiles=0, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, r
    eadRequestsCount=0, writeRequestsCount=0, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=0,
    totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[]
0 dead servers
Aggregate load: 0, regions: 2
```

hbase(main):002:0> scan 'hbase:meta'

```
hbase(main):002:0> scan 'hbase:meta'
ROW COLUMN+CELL
hbase:namespace,,1532326922 column=info:regioninfo, timestamp=1532329227215, value={ENCODED => 2b666740cf74583
858.2b666740cf7458325d23602 25d23602b71ef0c53, NAME => 'hbase:namespace,,1532326922858.2b666740cf7458325d23602
b71ef0c53.', STARTKEY => '', ENDKEY => ''}
hbase:namespace,,1532326922 column=info:seqnumDuringOpen, timestamp=1532329227215, value=\x00\x00\x00\x00\x00\
858.2b666740cf7458325d23602 x00\x00\x0E
b71ef0c53.
hbase:namespace,,1532326922 column=info:server, timestamp=1532329227215, value=h4:16020
858.2b666740cf7458325d23602
b71ef0c53.
hbase:namespace,,1532326922 column=info:serverstartcode, timestamp=1532329227215, value=1532328900024
858.2b666740cf7458325d23602
b71ef0c53.
1 row(s) in 0.1570 seconds
```

hbase(main):003:0> create 'tablesplit','cf1','cf2',{SPLITS=>['A','M','Z']}

hbase(main):004:0> status 'simple'

```
hbase(main):004:0> status 'simple'
active master: h1:16000 1532328898625
1 backup masters
  h2:16000 1532328901427
4 live servers
  h2:16020 1532328899893
    requestsPerSecond=0.0, numberOfOnlineRegions=2, usedHeapMB=92, maxHeapMB=30318, numberOfStores=3, numbe
    rOfStorefiles=2, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, re
    adRequestsCount=584, writeRequestsCount=10, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB
    =0, totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[MultiRowMutationEndpo
    int]
  h4:16020 1532328900024
    requestsPerSecond=0.0, numberOfOnlineRegions=2, usedHeapMB=416, maxHeapMB=30443, numberOfStores=3, numb
    erOfStorefiles=1, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, r
    eadRequestsCount=0, writeRequestsCount=0, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=0
    , totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[]
  h1:16020 1532328899874
    requestsPerSecond=0.0, numberOfOnlineRegions=1, usedHeapMB=127, maxHeapMB=30318, numberOfStores=2, numb
    erOfStorefiles=0, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, r
    eadRequestsCount=0, writeRequestsCount=0, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=0
    , totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[]
  h3:16020 1532328899889
    requestsPerSecond=0.0, numberOfOnlineRegions=1, usedHeapMB=156, maxHeapMB=30443, numberOfStores=2, numb
    erOfStorefiles=0, storefileUncompressedSizeMB=0, storefileSizeMB=0, memstoreSizeMB=0, storefileIndexSizeMB=0, r
    eadRequestsCount=0, writeRequestsCount=0, rootIndexSizeKB=0, totalStaticIndexSizeKB=0, totalStaticBloomSizeKB=0
    , totalCompactingKVs=0, currentCompactedKVs=0, compactionProgressPct=NaN, coprocessors=[]
0 dead servers
Aggregate load: 0, regions: 6
```

可以看到 region 增加了 4 个，store 增加了 8 个（3+3+2+2-1-1-0-0）。因为创建表时，建了 2 个 column family，一个 cf 对应一个 store，所以一个 region 含两个 store

hbase(main):005:0> scan 'hbase:meta'

```
hbase(main):005:0> scan 'hbase:meta'
ROW COLUMN+CELL
hbase:namespace,,1532326922 column=info:regioninfo, timestamp=1532329227215, value={ENCODED => 2b666740cf74583
858.2b666740cf7458325d23602 25d23602b71ef0c53, NAME => 'hbase:namespace,,1532326922858.2b666740cf7458325d23602
b71ef0c53.', STARTKEY => '', ENDKEY => ''}
hbase:namespace,,1532326922 column=info:seqnumDuringOpen, timestamp=1532329227215, value=\x00\x00\x00\x00\x00\
858.2b666740cf7458325d23602 x00\x00\x0E
b71ef0c53.
hbase:namespace,,1532326922 column=info:server, timestamp=1532329227215, value=h4:16020
858.2b666740cf7458325d23602
b71ef0c53.
hbase:namespace,,1532326922 column=info:serverstartcode, timestamp=1532329227215, value=1532328900024
858.2b666740cf7458325d23602
b71ef0c53.
tablesplrit,,1532502494788.2 column=info:regioninfo, timestamp=1532502496567, value={ENCODED => 25db71d04b2c5e3
5db71d04b2c5e36bd73e85b3019 6bd73e85b30195f5c, NAME => 'tablesplrit,,1532502494788.25db71d04b2c5e36bd73e85b3019
5f5c.', STARTKEY => '', ENDKEY => 'A'}
tablesplrit,,1532502494788.2 column=info:seqnumDuringOpen, timestamp=1532502496567, value=\x00\x00\x00\x00\x00\
5db71d04b2c5e36bd73e85b3019 x00\x00\x02
5f5c.
tablesplrit,,1532502494788.2 column=info:server, timestamp=1532502496567, value=h3:16020
5db71d04b2c5e36bd73e85b3019
5f5c.
tablesplrit,,1532502494788.2 column=info:serverstartcode, timestamp=1532502496567, value=1532328899989
5db71d04b2c5e36bd73e85b3019
5f5c.
tablesplrit,A,1532502494788. column=info:regioninfo, timestamp=1532502496194, value={ENCODED => eb2fa65405774e1
eb2fa65405774e112743fab154d 12743fab154de6f87, NAME => 'tablesplrit,A,1532502494788.eb2fa65405774e112743fab154d
e6f87.', STARTKEY => 'A', ENDKEY => 'M'}
tablesplrit,A,1532502494788. column=info:seqnumDuringOpen, timestamp=1532502496194, value=\x00\x00\x00\x00\x00\
eb2fa65405774e112743fab154d x00\x00\x02
e6f87.
tablesplrit,A,1532502494788. column=info:server, timestamp=1532502496194, value=h2:16020
eb2fa65405774e112743fab154d
e6f87.
```

```
tablesplrit,M,1532502494788. column=info:regioninfo, timestamp=1532502496215, value={ENCODED => 6cc1e72a8e8568a
6cc1e72a8e8568a2c8b19128964 2c8b191289646348d, NAME => 'tablesplrit,M,1532502494788.6cc1e72a8e8568a2c8b19128964
6348d.', STARTKEY => 'M', ENDKEY => 'Z'}
tablesplrit,M,1532502494788. column=info:seqnumDuringOpen, timestamp=1532502496215, value=\x00\x00\x00\x00\x00\
6cc1e72a8e8568a2c8b19128964 x00\x00\x02
6348d.
tablesplrit,M,1532502494788. column=info:server, timestamp=1532502496215, value=h4:16020
6cc1e72a8e8568a2c8b19128964
6348d.
tablesplrit,M,1532502494788. column=info:serverstartcode, timestamp=1532502496215, value=1532328900024
6cc1e72a8e8568a2c8b19128964
6348d.
tablesplrit,Z,1532502494788. column=info:regioninfo, timestamp=1532502496548, value={ENCODED => 63121ed95924a5a
63121ed95924a5acca9c4de3b58 cca9c4de3b58fa8bc, NAME => 'tablesplrit,Z,1532502494788.63121ed95924a5acca9c4de3b58
fa8bc.', STARTKEY => 'Z', ENDKEY => ''}
tablesplrit,Z,1532502494788. column=info:seqnumDuringOpen, timestamp=1532502496548, value=\x00\x00\x00\x00\x00\
63121ed95924a5acca9c4de3b58 x00\x00\x02
fa8bc.
tablesplrit,Z,1532502494788. column=info:server, timestamp=1532502496548, value=h1:16020
63121ed95924a5acca9c4de3b58
fa8bc.
tablesplrit,Z,1532502494788. column=info:serverstartcode, timestamp=1532502496548, value=1532328899874
63121ed95924a5acca9c4de3b58
fa8bc.
```

hbase(main):013:0> flush 'table2'

[ian@h1 ~]\$ hbase hfile --printkv --file hdfs://h1:9000/hbase/data/default/table2/c95f3087391c44bf13d9d638549aef55/info/9d548378d7414fe6b151f09b4614532d

```
[ian@h1 ~]$ hbase hfile --printkv --file hdfs://h1:9000/hbase/data/default/table2/c95f3087391c44bf13d9d638549aef55/info/9d548378d7414fe6b151f09b4614532d
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/home/ian/installed/hbase/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticLoggerBinder.class]
SLF4J: Found binding in [jar:file:/home/ian/installed/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]
2018-07-25 15:39:05,795 INFO [main] hfile.CacheConfig: Created cacheConfig: CacheConfig:disabled
K: rk001/info:name/1532504076816/Put/vlen=8/seqid=4 V: zhangsan
K: rk002/info:name/1532504088934/Put/vlen=9/seqid=5 V: zhangsan2
K: rk003/info:name/1532504096930/Put/vlen=9/seqid=6 V: zhangsan3
Scanned kv count -> 3
```

hbase(main):014:0> put 'table2','rk004','info:name','zhangsan4'

hbase(main):015:0> flush 'table2'

[ian@h1 ~]\$ hdfs dfs -ls /hbase/data/default/table2/c95f3087391c44bf13d9d638549aef55/info

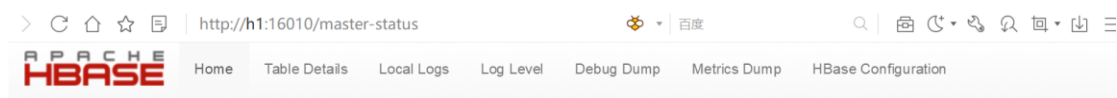
```
[ian@h1 ~]$ hdfs dfs -ls /hbase/data/default/table2/c95f3087391c44bf13d9d638549aef55/info
Found 2 items
-rw-r--r--  1 ian supergroup          4926 2018-07-25 15:41 /hbase/data/default/table2/c95f3087391c44bf13d9d63854
9aef55/info/63a2bcaea4854202a75981f53cc6ba0f
-rw-r--r--  1 ian supergroup          5017 2018-07-25 15:37 /hbase/data/default/table2/c95f3087391c44bf13d9d63854
9aef55/info/9d548378d7414fe6b151f09b4614532d

[ian@h1 ~]$ hbase hfile --printkv --file hdfs://h1:9000/hbase/data/default/table2/c95f3087391c44bf13d9d638549aef55/info/63a2bcae
a4854202a75981f53cc6ba0f

[ian@h1 ~]$ hbase hfile --printkv --file hdfs://h1:9000/hbase/data/default/table2/c95f3087391c44bf13d9d638549aef55/info/63a2bcae
a4854202a75981f53cc6ba0f
SLF4J: Class path contains multiple SLF4J bindings.
SLF4J: Found binding in [jar:file:/home/ian/installed/hbase/lib/slf4j-log4j12-1.7.5.jar!/org/slf4j/impl/StaticL
oggerBinder.class]
SLF4J: Found binding in [jar:file:/home/ian/installed/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]
2018-07-25 15:42:38,602 INFO  [main] hfile.CacheConfig: Created cacheConfig: CacheConfig:disabled
K: rk004/info:name/1532504468927/Put/vlen=9/seqid=11 V: zhangsan4
Scanned kv count -> 1
```

## 练习二

访问 Hbase web 页面



### Master h1

### Region Servers

Base Stats				
Memory				
Requests				
Storefiles				
Compactions				
ServerName	Start time	Version	Requests Per Second	Num. Regions
<a href="#">h1,16020,1532328899874</a>	Mon Jul 23 14:54:59 CST 2018	1.2.6.1	0	0
<a href="#">h2,16020,1532328899893</a>	Mon Jul 23 14:54:59 CST 2018	1.2.6.1	0	1
<a href="#">h3,16020,1532328899989</a>	Mon Jul 23 14:54:59 CST 2018	1.2.6.1	0	1
<a href="#">h4,16020,1532328900024</a>	Mon Jul 23 14:55:00 CST 2018	1.2.6.1	0	1
Total:4			0	3

访问标签 Table->System Table -> hbase:meta

查看 hbase:meta 的信息，显示哪个 RegionServer 管理 hbase:meta 表，这个表将不会 split 为多个 Region，因为 meta 表永远不会 split

## Table hbase:meta

### Table Regions

Name	Region Server	Start Key	End Key	Locality	Requests
hbase:meta,,1.1588230740	<a href="#">h2:16030</a>			-	-

Actions:

Compact

Region Key (optional):

This action will force a compaction of all regions of the table, or, if a key is supplied, only the region containing the given key.

Split

Region Key (optional):

This action will force a split of all eligible regions of the table, or, if a key is supplied, only the region containing the given key. An eligible region is one that does not contain any references to other regions. Split requests for noneligible regions will be ignored

返回上一页，选择 ‘User Table’

## Tables

User TablesSystem TablesSnapshots

1 table(s) in set. [\[Details\]](#)

Namespace	Table Name	Online Regions	Offline Regions	Failed Regions	Split Regions	Other Regions	Description
default	<a href="#">table2</a>	1	0	0	0	0	'table2', {NAME => 'info'}

在 hbase shell 中重新创建 table split,

```
hbase> create 'tablesplit', 'cf1', 'cf2', {SPLITS => ['A', 'M', 'Z']}
```

在 web 页面中重新选择 tablesplit

观察 Table Region 选项，由于预先 split 了表,表的 region 会在这显示，查看每个 region 的 RegionServer,每个 Region 的 start rowkey 和 stop rowkey

### Table Regions

Name	Region Server	Start Key	End Key	Locality	Requests
tablesplit,,1532505206771.8bda6e3bf5dc1e10bf9bf32489635014.	<a href="#">h2:16030</a>		A	0.0	0
tablesplit,A,1532505206771.8cf154bcf62e82a3c38d06f76a994585.	<a href="#">h4:16030</a>	A	M	0.0	0
tablesplit,M,1532505206771.4d5ca5e4f06e12ba6093fa5b59917cda.	<a href="#">h3:16030</a>	M	Z	0.0	0
tablesplit,Z,1532505206771.ffb441f36b0f2dc9bc36c4f04a132759.	<a href="#">h1:16030</a>	Z		0.0	0

查看 RegionServer 选项，可以查看 RegionServer 管理的 Region

# Regions by Region Server

Region Server	Region Count
<a href="#">h1:16030</a>	1
<a href="#">h2:16030</a>	1
<a href="#">h3:16030</a>	1
<a href="#">h4:16030</a>	1

点击 [RegionServer](#) ,查看 [RegionServer Web](#) 页面

## Regions

Base Info			
<a href="#">Request metrics</a>			
<a href="#">Storefile Metrics</a>			
<a href="#">Memstore Metrics</a>			
<a href="#">Compaction Metrics</a>			
Region Name	Start Key	End Key	ReplicaID
<a href="#">tablesplitt,,1532505206771.8bda6e3bf5dc1e10bf9bf32489635014.</a>		A	0
<a href="#">hbase:meta,,1.1588230740</a>			0