

Cache aware load balancer scale testing

Test with small table

- Cluster with 10 worker nodes
 - Java heap size: 31GB
 - Blockcache: 1.6TB
- Table

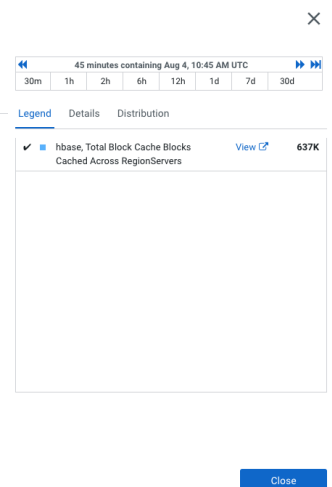
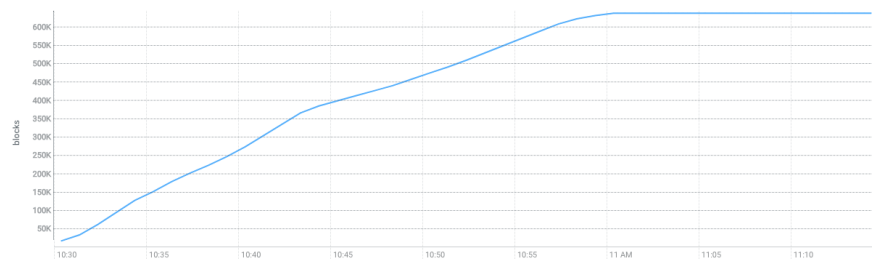
```
hbase:003:0> describe 'TestTable'
Table TestTable is ENABLED
TestTable, {TABLE_ATTRIBUTES => {METADATA => {'hbase.store.file-tracker.impl' => 'FILE'}}}
COLUMN FAMILIES DESCRIPTION
{NAME => 'info0', VERSIONS => '1', KEEP_DELETED_CELLS => 'FALSE',
DATA_BLOCK_ENCODING => 'NONE', TTL => 'FOREVER', MIN_VERSIONS => '0',
REPLICATION_SCOPE => '0', BLOOMFILTER => 'ROW', IN_MEMORY => 'false',
COMPRESSION => 'NONE', BLOCKCACHE => 'true', BLOCKSIZE => '65536',
METADATA => {'IN_MEMORY_COMPACTION' => 'NONE'}}
```

1 row(s)

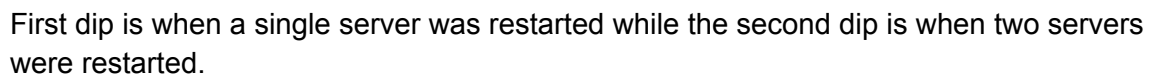
- No. of regions: 10
- No. of rows: 40M
- Cache warmup - cold start

Total Block Cache Blocks Cached Across RegionServers

Query SELECT total_block_cache_blocks_cached_across_regionservers WHERE entityName = 'hbase' AND category = SERVICE
Data Granularity



- Server restart



Restart

✕

Status

🟢 Finished

Context

[hbase](#)

📅 Aug 4, 12:49:09 PM

🕒 59.71s

Successfully restarted service.

✓ Completed 2 of 2 step(s).

☒ Show All Steps

☐ Show Only Failed Steps

☐ Show Only Running Steps

➤ Execute command Stop on service hbase	hbase	Aug 4, 12:49:09 PM	22.56s
➤ Execute command Start on service hbase	hbase	Aug 4, 12:49:32 PM	36.62s

Close

Table Regions

Region distribution immediately after restart

Table Regions

Base Stats Localities Compactions

Name(10)	Region Server	ReadRequests (0)	WriteRequests (0)	StorefileSize (39.31 GB)	Num.Storefiles (10)	MemSize (0 MB)	Start Key	End Key	Region State
TestTable,1686646685233.4d4f4cb98a797cf135ca273173a091a6.	cod-5uylyzo024i-worker8.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB		00000000000000000000 4000000	OPEN
TestTable,0000000000000000000004000000,1686646685233.4ac931d5f31ed70897e9c622abdf4919.	cod-5uylyzo024i-worker6.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000 4000000	00000000000000000000 8000000	OPEN
TestTable,000000000000000000000080000000,1686646685233.86e1aa5a3a904002b3de9fb024caed09.	cod-5uylyzo024i-worker5.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000 8000000	00000000000000000000001 2000000	OPEN
TestTable,000000000000000000000120000000,1686646685233.c9369dacf841b929b7b90dcf8411148a.	cod-5uylyzo024i-worker7.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	000000000000000000001 2000000	00000000000000000000001 6000000	OPEN
TestTable,000000000000000000000160000000,1686646685233.1f276065069bdb43d85053535e5040d.	cod-5uylyzo024i-worker8.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	000000000000000000001 6000000	00000000000000000000002 0000000	OPEN
TestTable,000000000000000000000200000000,1686646685233.171f04c9fd78d219a8cc0ec323bb7681.	cod-5uylyzo024i-worker9.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000002 0000000	00000000000000000000002 4000000	OPEN
TestTable,000000000000000000000240000000,1686646685233.3bece4c5d25c91d1cd07d3cfs131ec7f.	cod-5uylyzo024i-worker7.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000002 4000000	00000000000000000000002 8000000	OPEN
TestTable,000000000000000000000280000000,1686646685233.1863d122c3a191f8d159adcf9e0cc4f.	cod-5uylyzo024i-worker6.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000002 8000000	000000000000000000000003 2000000	OPEN
TestTable,000000000000000000000320000000,1686646685233.334d94128025ed18260e309d900cc957.	cod-5uylyzo024i-worker0.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000003 2000000	00000000000000000000003 6000000	OPEN
TestTable,000000000000000000000360000000,1686646685233.655a39661c7f1d7e8532bceae81e8ddf5.	cod-5uylyzo024i-worker0.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000003 6000000		OPEN

Region distribution after balancer run

Table Regions

Base Stats Localities Compactions

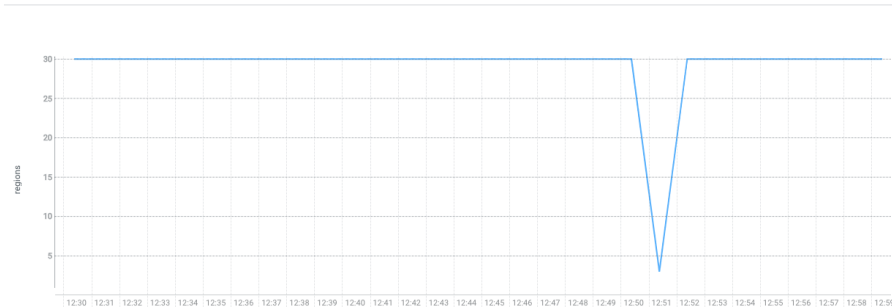
Name(10)	Region Server	ReadRequests (0)	WriteRequests (0)	StorefileSize (39.31 GB)	Num.Storefiles (10)	MemSize (0 MB)	Start Key	End Key	Region State
TestTable,1686646685233.4d4f4cb98a797cf135ca273173a091a6.	cod-5uylyzo024i-worker5.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB		00000000000000000000 4000000	OPEN
TestTable,0000000000000000000004000000,1686646685233.4ac931d5f31ed70897e9c622abdf4919.	cod-5uylyzo024i-worker6.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000 4000000	00000000000000000000000 8000000	OPEN
TestTable,000000000000000000000080000000,1686646685233.86e1aa5a3a904002b3de9fb024caed09.	cod-5uylyzo024i-worker6.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000 8000000	00000000000000000000001 2000000	OPEN
TestTable,000000000000000000000120000000,1686646685233.c9369dacf841b929b7b90dcf8411148a.	cod-5uylyzo024i-worker7.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000001 2000000	00000000000000000000001 6000000	OPEN
TestTable,000000000000000000000160000000,1686646685233.1f276065069bdb43d85053535e5040d.	cod-5uylyzo024i-worker7.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000001 6000000	00000000000000000000002 0000000	OPEN
TestTable,000000000000000000000200000000,1686646685233.171f04c9fd78d219a8cc0ec323bb7681.	cod-5uylyzo024i-worker8.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000002 0000000	00000000000000000000002 4000000	OPEN
TestTable,000000000000000000000240000000,1686646685233.3bece4c5d25c91d1cd07d3cfs131ec7f.	cod-5uylyzo024i-worker9.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000002 4000000	00000000000000000000002 8000000	OPEN
TestTable,000000000000000000000280000000,1686646685233.1863d122c3a191f8d159adcf9e0cc4f.	cod-5uylyzo024i-worker0.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000002 8000000	00000000000000000000003 2000000	OPEN
TestTable,000000000000000000000320000000,1686646685233.334d94128025ed18260e309d900cc957.	cod-5uylyzo024i-worker1.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000003 2000000	00000000000000000000003 6000000	OPEN
TestTable,000000000000000000000360000000,1686646685233.655a39661c7f1d7e8532bceae81e8ddf5.	cod-5uylyzo024i-worker2.cod-7216.xcu2-8y8x. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	0000000000000000000003 6000000		OPEN

Cache chart during restart

Total Regions Across RegionServers

Query SELECT total_regions_across_regionservers WHERE entityName = "hbase" AND category = SERVICE

Data Granularity Auto



30 minutes preceding Aug 4, 12:59 PM UTC

Legend Details Distribution

hbase, Total Regions Across RegionServers View 30

- Rolling restart test
 - Triggered rolling restart:

Rolling Restart

>

Restart HBase Thrift Server (cod-Suylyzo024i-leader0)

🔗

HBase Thrift Server (cod-Suylyzo024i-leader0)

🔗

Aug 4, 12:07:30 PM

23.53s

>

Turn the balancer off from Master (cod-Suylyzo024i-master1).

🔗

Master (cod-Suylyzo024i-master1)

🔗

Aug 4, 12:07:54 PM

19.93s

✓

Number of steps: 10 Completed: 10 Success: 10
Successfully executed command Reload on service hbase

Aug 4, 12:08:13 PM

10.9m

>

Restarting RegionServer on cod-Suylyzo024i-worker0

Aug 4, 12:08:13 PM

63.89s

>

Restarting RegionServer on cod-Suylyzo024i-worker3

Aug 4, 12:09:17 PM

59.43s

>

Restarting RegionServer on cod-Suylyzo024i-worker8

Aug 4, 12:10:17 PM

74.08s

>

Restarting RegionServer on cod-Suylyzo024i-worker9

Aug 4, 12:11:31 PM

65.04s

>

Restarting RegionServer on cod-Suylyzo024i-worker1

Aug 4, 12:12:36 PM

63.4s

>

Restarting RegionServer on cod-Suylyzo024i-worker4

Aug 4, 12:13:39 PM

63.1s

>

Restarting RegionServer on cod-Suylyzo024i-worker7

Aug 4, 12:14:42 PM

68.59s

>

Restarting RegionServer on cod-Suylyzo024i-worker2

Aug 4, 12:15:51 PM

64.45s

>

Restarting RegionServer on cod-Suylyzo024i-worker5

Aug 4, 12:16:55 PM

63.27s

>

Restarting RegionServer on cod-Suylyzo024i-worker6

Aug 4, 12:17:59 PM

70.32s

>

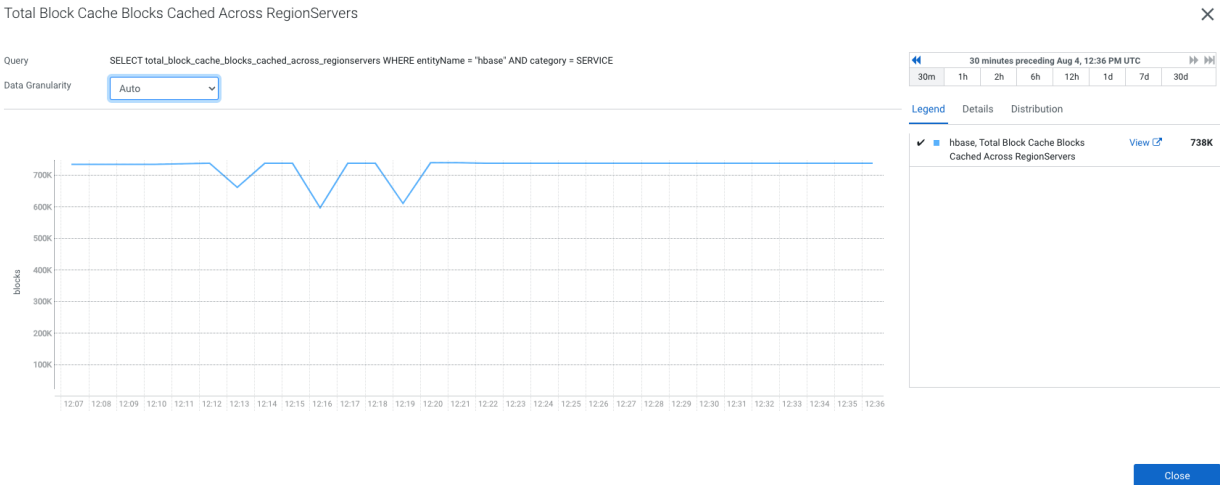
Clean up after rolling restart

Aug 4, 12:19:09 PM

17.29s

Close

Cache chart during rolling upgrade:



- Rolling restart test
 - Region distribution before rolling restart

Table Regions

Base Stats	Localities	Compactions							
Name(10)	Region Server	ReadRequests (0)	WriteRequests (0)	StorefileSize (39.31 GB)	Num.Storefiles (10)	MemSize (0 MB)	Start Key	End Key	Region State
TestTable_168664668523.404f4cb9ea797cf135ca273173A091a6.	cod-Suyjzo024l-worker5.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB		00000000000000000000 4000000	OPEN
TestTable_0000000000000000000000004000000.,168664668523.4ac931cfd5f31ed7d897ec622abd4919.	cod-Suyjzo024l-worker6.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000 4000000	00000000000000000000 8000000	OPEN
TestTable_0000000000000000000000008000000.,168664668523.86e1aa5a3a904002zb3de9fb02f4cacdb9.	cod-Suyjzo024l-worker6.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000 8000000	00000000000000000001 2000000	OPEN
TestTable_0000000000000000000000012000000.,168664668523.c9396daef641b92507b90dc8f411148a.	cod-Suyjzo024l-worker7.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000001 2000000	00000000000000000001 6000000	OPEN
TestTable_000000000000000000000000016000000.,168664668523.1ff27605069bcb43d85053535e504d.	cod-Suyjzo024l-worker7.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000001 6000000	00000000000000000002 0000000	OPEN
TestTable_0000000000000000000000020000000.,168664668523.171f04c9fd78d219a8cc0ce323bb7b81.	cod-Suyjzo024l-worker8.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000002 0000000	00000000000000000002 4000000	OPEN
TestTable_000000000000000000000000024000000.,168664668523.3bec4c5d25c91d1cd7d3cfc5131ec7f.	cod-Suyjzo024l-worker9.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000002 4000000	00000000000000000002 8000000	OPEN
TestTable_000000000000000000000000028000000.,168664668523.1863d122c3a1918d159a8dcfe9e0c4f.	cod-Suyjzo024l-worker0.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000002 8000000	00000000000000000003 2000000	OPEN
TestTable_0000000000000000000000032000000.,168664668523.334994128025ed1826be30d9d900cc957.	cod-Suyjzo024l-worker1.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000003 2000000	00000000000000000003 6000000	OPEN
TestTable_000000000000000000000000036000000.,168664668523.655a39661d7f7e8532bbcba81e8dd5f.	cod-Suyjzo024l-worker2.cod-7216.xcu2-BYxk. dev.cldr.work:16030	0	0	3.93 GB	1	0 MB	00000000000000000003 6000000		OPEN

- Rolling restart triggered

Rolling Restart

Status

Finished

Context

hbase

Aug 4, 1:18:43 PM

13.1m

Finished Rolling Restart successfully.

Completed 7 of 7 step(s).

Show All Steps

Show Only Failed Steps

Show Only Running Steps

Restart Master (cod-Suyiyzo024i-master0)	Master (cod-Suyiyzo024i-master0)	Aug 4, 1:18:43 PM	24.38s
Restart Master (cod-Suyiyzo024i-master1)	Master (cod-Suyiyzo024i-master1)	Aug 4, 1:19:08 PM	23.74s
Restart HBase REST Server (cod-Suyiyzo024i-leader0)	HBase REST Server (cod-Suyiyzo024i-leader0)	Aug 4, 1:19:32 PM	23.1s
Restart HBase Thrift Server (cod-Suyiyzo024i-leader0)	HBase Thrift Server (cod-Suyiyzo024i-leader0)	Aug 4, 1:19:55 PM	23.45s
Turn the balancer off from Master (cod-Suyiyzo024i-master1).	Master (cod-Suyiyzo024i-master1)	Aug 4, 1:20:19 PM	20.83s
Number of steps: 10 Completed: 10 Success: 10		Aug 4, 1:20:40 PM	10.9m
Clean up after rolling restart		Aug 4, 1:31:31 PM	18.72s

Close

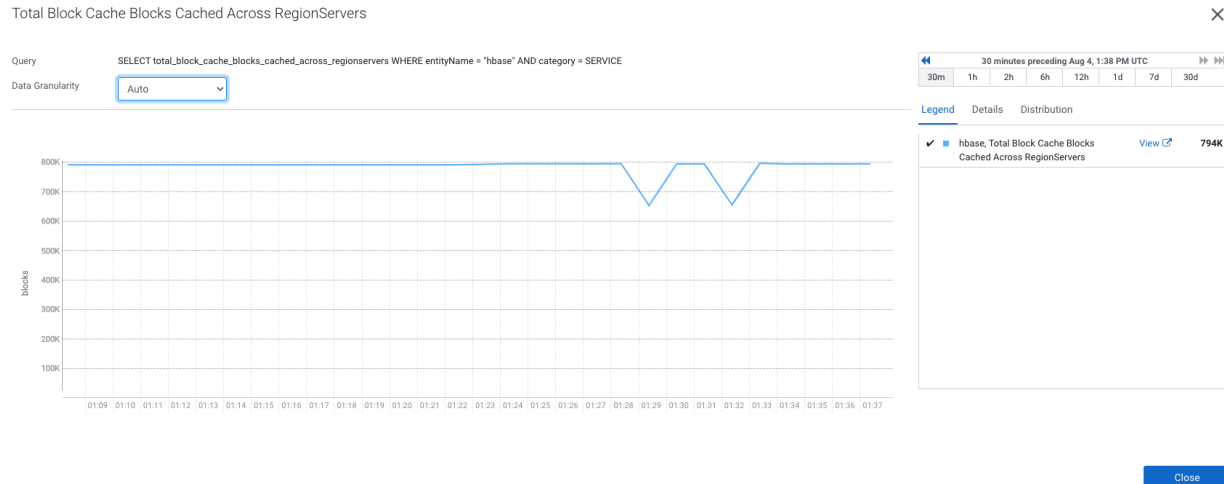
- Region distribution after rolling restart

Table Regions

Base StatsLocalitiesCompactions

Name(10)	Region Server	ReadRequests (0)	WriteRequests (0)	StoreFileSize (39.31 GB)	Num.StoreFiles (10)	MemSize (0 MB)	Start Key	End Key	Region State
TestTable_1686646685233.4d4f4cb98a797cf135ca2731713a091ae.	cod--\$uyjzo2q4l-worker5.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	40000000
TestTable_0000000000000000000000000000000000,1686646685233.4ac591df5f31ed7d897e8c822aabdf4919.	cod--\$uyjzo2q4l-worker6.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	40000000
TestTable_0000000000000000000000000000000000,1686646685233.85e1aa5a3a904002b3cd9fb024caeab9.	cod--\$uyjzo2q4l-worker6.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	20000000
TestTable_0000000000000000000000000000000000,1686646685233.c9369dcacf841b925b7b90cdf8411148a.	cod--\$uyjzo2q4l-worker7.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	60000000
TestTable_0000000000000000000000000000000000,1686646685233.1ff2760e5069db43d85053555a504d.	cod--\$uyjzo2q4l-worker7.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	60000000
TestTable_0000000000000000000000000000000000,1686646685233.171104c9fd78ad219a8ecDec323bb67881.	cod--\$uyjzo2q4l-worker8.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	40000000
TestTable_0000000000000000000000000000000000,1686646685233.3bec4c5d25c91g1cd07d73cf5131ec7L	cod--\$uyjzo2q4l-worker9.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	80000000
TestTable_0000000000000000000000000000000000,1686646685233.1863d122c3a1918bd159adb5cfe90cc4f.	cod--\$uyjzo2q4l-worker0.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	20000000
TestTable_0000000000000000000000000000000000,1686646685233.334d9a128025de1826de30d9900cc957.	cod--\$uyjzo2q4l-worker1.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	60000000
TestTable_0000000000000000000000000000000000,1686646685233.655a39661cd7d7e853zbbcba81e8cdf5.	cod--\$uyjzo2q4l-worker2.cod-7216.xcu2-\$yBx.dev.cldr:work:16030	0	0	3.93 GB	1	0 MB	00000000000000000000000000000000	OPEN	60000000

- Cache chart after rolling restart



Test with large table

- Table:
hbase:005:0> describe 'LargeTable'
Table LargeTable is ENABLED
LargeTable, {TABLE_ATTRIBUTES => {METADATA => {'hbase.store.file-tracker.impl' => 'FILE'}}}
COLUMN FAMILIES DESCRIPTION
{NAME => 'info0', VERSIONS => '1', KEEP_DELETED_CELLS => 'FALSE',
DATA_BLOCK_ENCODING => 'NONE', TTL => 'FOREVER', MIN_VERSIONS => '0',
REPLICATION_SCOPE => '0', BLOOMFILTER => 'ROW', IN_MEMORY => 'false',
COMPRESSION => 'NONE', BLOCKCACHE => 'true', BLOCKSIZE => '65536',
METADATA => {'IN_MEMORY_COMPACTION' => 'NONE'}}

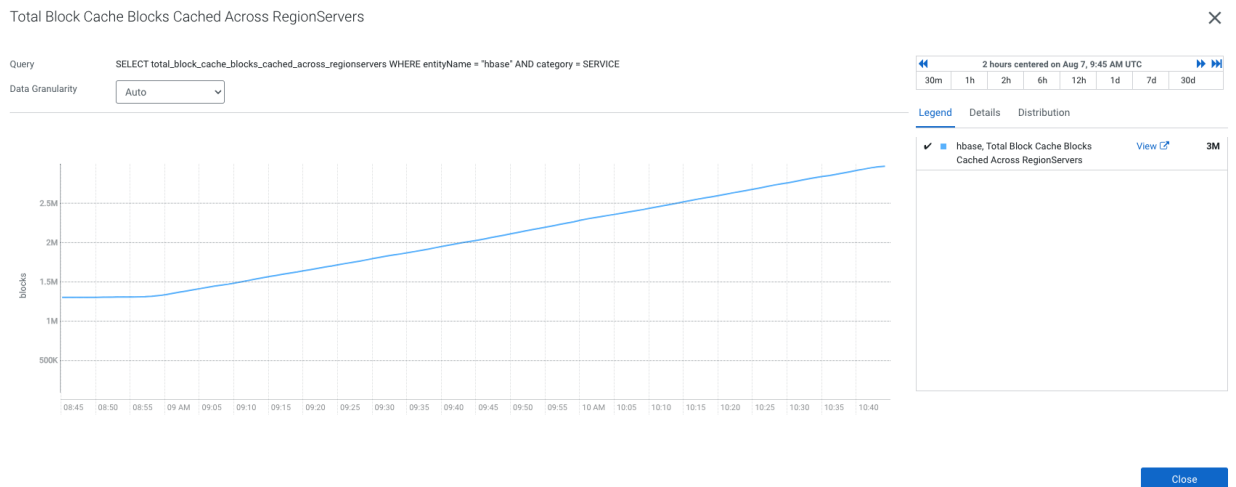
{NAME => 'info1', VERSIONS => '1', KEEP_DELETED_CELLS => 'FALSE',
DATA_BLOCK_ENCODING => 'NONE', TTL => 'FOREVER', MIN_VERSIONS => '0',
REPLICATION_SCOPE => '0', BLOOMFILTER => 'ROW', IN_MEMORY => 'false',
COMPRESSION => 'NONE', BLOCKCACHE => 'true', BLOCKSIZE => '65536',
METADATA => {'IN_MEMORY_COMPACTION' => 'NONE'}}

{NAME => 'info2', VERSIONS => '1', KEEP_DELETED_CELLS => 'FALSE',
DATA_BLOCK_ENCODING => 'NONE', TTL => 'FOREVER', MIN_VERSIONS => '0',
REPLICATION_SCOPE => '0', BLOOMFILTER => 'ROW', IN_MEMORY => 'false',
COMPRESSION => 'NONE', BLOCKCACHE => 'true', BLOCKSIZE => '65536',
METADATA => {'IN_MEMORY_COMPACTION' => 'NONE'}}

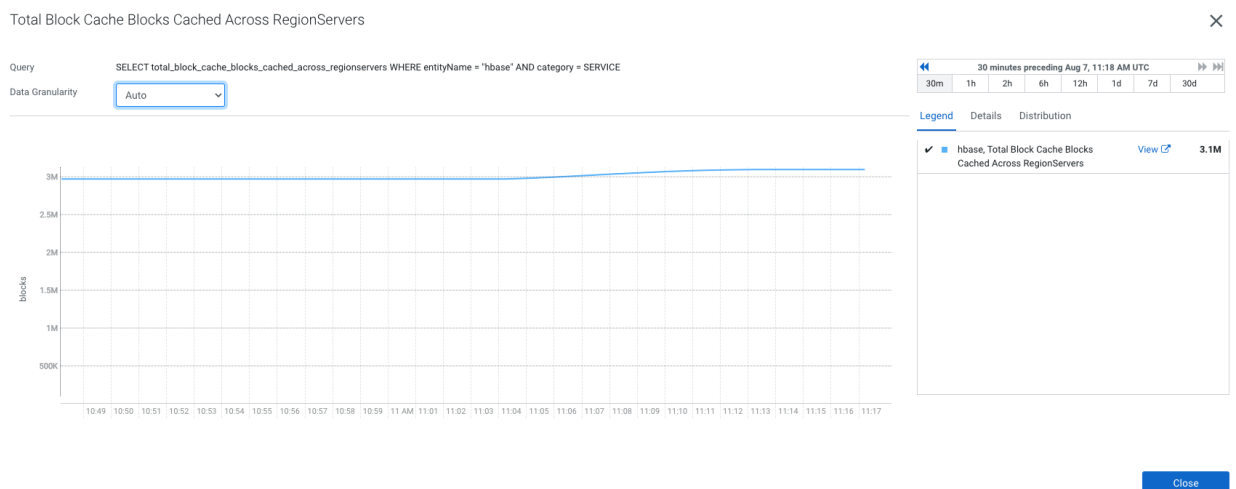
3 row(s)

Quota is disabled
Took 0.3154 seconds

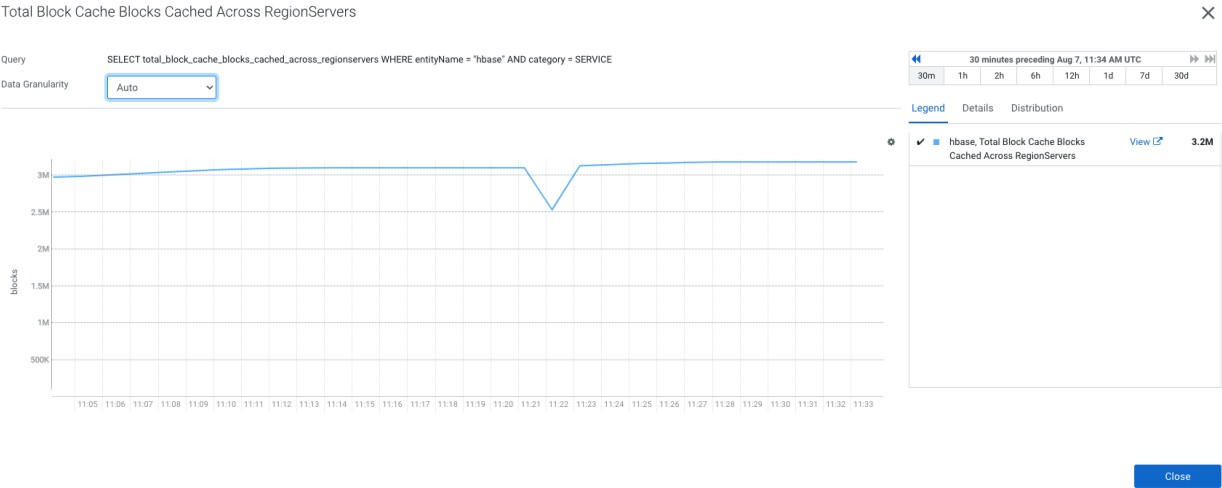
- No. of regions: 5000
- No. of rows: 10M
- Time taken to warm up the cache: 4.5 hrs. Approx
- Cold cache warm up chart:



- Cache after single region server start:



- Cache chart post balancer run after restarting 2 nodes in the cluster:



● Rolling restart:

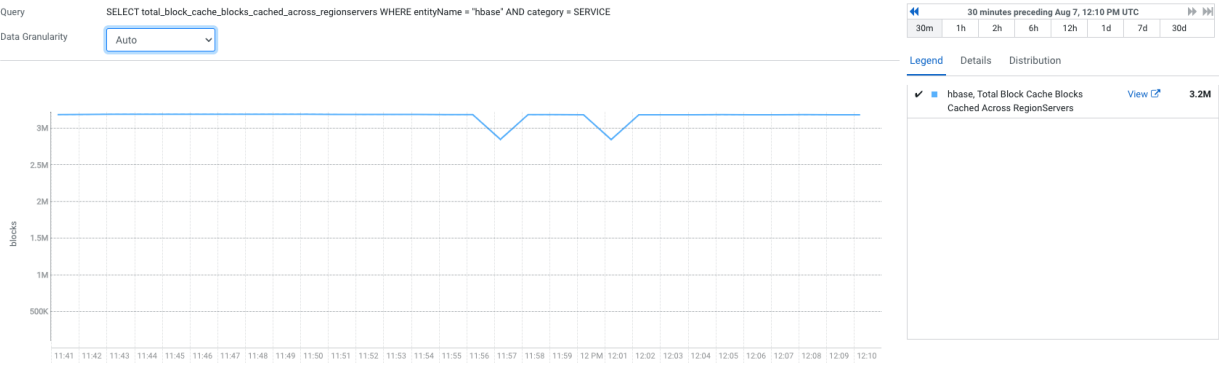
Rolling Restart

> Restart HBase Thrift Server (cod-Suylyzo024i-leader0)	HBase Thrift Server (cod-Suylyzo024i-leader0)	Aug 7, 11:37:16 AM	23.33s
> Turn the balancer off from Master (cod-Suylyzo024i-master1).	Master (cod-Suylyzo024i-master1)	Aug 7, 11:37:39 AM	19.67s
Number of steps: 10 Completed: 10 Success: 10 Successfully executed command Reload on service hbase		Aug 7, 11:37:59 AM	27.4m
> Restarting RegionServer on cod-Suylyzo024i-worker0		Aug 7, 11:37:59 AM	2.7m
> Restarting RegionServer on cod-Suylyzo024i-worker3		Aug 7, 11:40:42 AM	2.8m
> Restarting RegionServer on cod-Suylyzo024i-worker8		Aug 7, 11:43:32 AM	2.6m
> Restarting RegionServer on cod-Suylyzo024i-worker9		Aug 7, 11:46:06 AM	2.7m
> Restarting RegionServer on cod-Suylyzo024i-worker1		Aug 7, 11:48:47 AM	3.1m
> Restarting RegionServer on cod-Suylyzo024i-worker4		Aug 7, 11:51:54 AM	2.6m
> Restarting RegionServer on cod-Suylyzo024i-worker7		Aug 7, 11:54:32 AM	2.6m
> Restarting RegionServer on cod-Suylyzo024i-worker2		Aug 7, 11:57:08 AM	2.7m
> Restarting RegionServer on cod-Suylyzo024i-worker5		Aug 7, 11:59:48 AM	2.7m
> Restarting RegionServer on cod-Suylyzo024i-worker6		Aug 7, 12:02:33 PM	2.8m
> Clean up after rolling restart		Aug 7, 12:05:20 PM	21.08s

Close

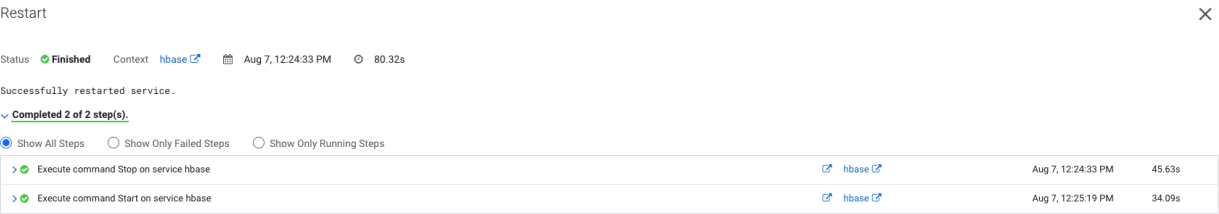
● Cache chart during rolling restart:

Total Block Cache Blocks Cached Across RegionServers



Close

Cluster restart test:



Close

Cache chart after cluster restart:



Close