Item 6

git_comments:

1. Fix overlapping sstables from CASSANDRA-4321/4411

git_commits:

1. **summary:** Automatic fixing of overlapping leveled sstables
   message: Automatic fixing of overlapping leveled sstables patch by jbellis; reviewed by slebresne for CASSANDRA-4644

github_issues:

github_issues_comments:

github_pulls:

github_pulls_comments:

github_pulls_reviews:

jira_issues:

1. **summary:** Compaction error with Cassandra 1.1.4 and LCS
   description: In our 1.1.4 testcluster of 3 nodes with RF=3, KS=1, and CF=5, we are getting an asserting error when running 'nodetool compact highscores leaderboard'. This stops compactions on the 'leaderboard' CF summing up to 11835 pending compactions. This error is seen only one one node. The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. Next, we changed to LCS and did again repair, cleanup, compact with success. Then we started to use this LCS-based testcluster intensively and created lots of data and also large keys with millions of columns. The assertion error in system.log : INFO [CompactionExecutor:8] 2012-09-11 14:20:45,043 CompactionController.java (line 172) Compacting large row highscores/leaderboard:4c422d64626331353166372d363464612d343235342d396130322d653536163653433373735532332d676c6f6f62616c2d30 (72589650 bytes) incrementally ERROR [CompactionExecutor:8] 2012-09-11 14:20:50,336 AbstractCassandraDaemon.java (line 135) Exception in thread Thread[CompactionExecutor:8,1,RMI Runtime] java.lang.AssertionError at org.apache.cassandra.db.compaction.LeveledManifest.promote(LeveledManifest.java:214) at org.apache.cassandra.db.compaction.LeveledCompactionStrategy.handleNotification(LeveledCompactionStrategy.java:158) at org.apache.cassandra.db.DataTracker.notifySSTablesChanged(DataTracker.java:531) at org.apache.cassandra.db.DataTracker.replaceCompactedSSTables(DataTracker.java:254) at org.apache.cassandra.db.ColumnFamilyStore.replaceCompactedSSTables(ColumnFamilyStore.java:992) at org.apache.cassandra.db.compaction.CompactionTask.execute(CompactionTask.java:200) at org.apache.cassandra.db.compaction.LeveledCompactionTask.execute(LeveledCompactionTask.java:50) at org.apache.cassandra.db.compaction.CompactionManager$6.runMayThrow(CompactionManager.java:288) at org.apache.cassandra.utils.WrappedRunnable.run(WrappedRunnable.java:30) at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:441) at java.util.concurrent.FutureTask$Sync.innerRun(FutureTask.java:303) at java.util.concurrent.FutureTask.run(FutureTask.java:138) at java.util.concurrent.ThreadPoolExecutor$Worker.runTask(ThreadPoolExecutor.java:886) at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:908) at java.lang.Thread.run(Thread.java:662)

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   description: In our 1.1.4 testcluster of 3 nodes with RF=3, KS=1, and CF=5, we are getting an asserting error when running 'nodetool compact highscores leaderboard'. This stops compactions on the 'leaderboard' CF summing up to 11835 pending compactions. This error is seen only one one node. The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. Next, we changed to LCS and did again repair, cleanup, compact with success. Then we started to use this LCS-based testcluster intensively and created lots of data and also large keys with millions of columns. The assertion error in system.log : INFO [CompactionExecutor:8] 2012-09-11 14:20:45,043 CompactionController.java (line 172) Compacting large row highscores/leaderboard:4c422d64626331353166372d363464612d343235342d396130322d653536163653433373735532332d676c6f6f62616c2d30 (72589650 bytes) incrementally ERROR [CompactionExecutor:8] 2012-09-11 14:20:50,336 AbstractCassandraDaemon.java (line 135) Exception in thread Thread[CompactionExecutor:8,1,RMI Runtime] java.lang.AssertionError at org.apache.cassandra.db.compaction.LeveledManifest.promote(LeveledManifest.java:214) at org.apache.cassandra.db.compaction.LeveledCompactionStrategy.handleNotification(LeveledCompactionStrategy.java:158) at org.apache.cassandra.db.DataTracker.notifySSTablesChanged(DataTracker.java:531) at org.apache.cassandra.db.DataTracker.replaceCompactedSSTables(DataTracker.java:254) at org.apache.cassandra.db.ColumnFamilyStore.replaceCompactedSSTables(ColumnFamilyStore.java:992) at org.apache.cassandra.db.compaction.CompactionTask.execute(CompactionTask.java:200) at org.apache.cassandra.db.compaction.LeveledCompactionTask.execute(LeveledCompactionTask.java:50) at org.apache.cassandra.db.compaction.CompactionManager$6.runMayThrow(CompactionManager.java:288) at org.apache.cassandra.utils.WrappedRunnable.run(WrappedRunnable.java:30) at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:441) at java.util.concurrent.FutureTask$Sync.innerRun(FutureTask.java:303) at java.util.concurrent.FutureTask.run(FutureTask.java:138) at java.util.concurrent.ThreadPoolExecutor$Worker.runTask(ThreadPoolExecutor.java:886) at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:908) at java.lang.Thread.run(Thread.java:662)

3. **summary:** Compaction error with Cassandra 1.1.4 and LCS
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5. **summary:** Compaction error with Cassandra 1.1.4 and LCS
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label: code-design

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description: In our 1.1.4 testcluster of 3 nodes with RF=3, KS=1, and CF=5, we are getting an asserting error when running 'nodetool compact highscores leaderboard'. This stops compactions on the 'leaderboard' CF summing up to 11835 pending compactions. This error is seen only one one node. The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. Next, we changed to LCS and did again repair, cleanup, compact with success. Then we started to use this LCS-based testcluster intensively and created lots of data and also large keys with millions of columns. The assertion error in system.log : INFO [CompactionExecutor:8] 2012-09-11 14:20:45,043 CompactionController.java (line 172) Compacting large row highscores/leaderboard:4c422d64626331353166372d363464612d343235342d396130322d653536163653433373735332332d676c6f62616c6c2d30 (72589650 bytes) incrementally ERROR [CompactionExecutor:8] 2012-09-11 14:20:50,336 AbstractCassandraDaemon.java (line 135) Exception in thread Thread[CompactionExecutor:8,1,RMI Runtime] java.lang.AssertionError at
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9. **summary:** Compaction error with Cassandra 1.1.4 and LCS

   description: In our 1.1.4 testcluster of 3 nodes with RF=3, KS=1, and CF=5, we are getting an asserting error when running 'nodetool compact highscores leaderboard'. This stops compactions on the 'leaderboard' CF summing up to 11835 pending compactions. This error is seen only one one node. The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. Next, we changed to LCS and did again repair, cleanup, compact with success. Then we started to use this LCS-based testcluster intensively and created lots of data and also large keys with millions of columns. The assertion error in system.log : INFO [CompactionExecutor:8] 2012-09-11 14:20:45,043 CompactionController.java (line 172) Compacting large row highscores/leaderboard:4c422d64626331353166372d363464612d343235342d396130322d653536163653433373735532332d676c6f62616c2d30 (72589650 bytes) incrementally ERROR [CompactionExecutor:8] 2012-09-11 14:20:50,336 AbstractCassandraDaemon.java (line 135) Exception in thread Thread[CompactionExecutor:8,1,RMI Runtime] java.lang.AssertionError at org.apache.cassandra.db.compaction.LeveledManifest.promote(LeveledManifest.java:214) at org.apache.cassandra.db.compaction.LeveledCompactionStrategy.handleNotification(LeveledCompactionStrategy.java:158) at org.apache.cassandra.db.DataTracker.notifySSTablesChanged(DataTracker.java:531) at org.apache.cassandra.db.DataTracker.replaceCompactedSSTables(DataTracker.java:254) at org.apache.cassandra.db.ColumnFamilyStore.replaceCompactedSSTables(ColumnFamilyStore.java:992) at org.apache.cassandra.db.compaction.CompactionTask.execute(CompactionTask.java:200) at org.apache.cassandra.db.compaction.LeveledCompactionTask.execute(LeveledCompactionTask.java:50) at org.apache.cassandra.db.compaction.CompactionManager$6.runMayThrow(CompactionManager.java:288) at org.apache.cassandra.utils.WrappedRunnable.run(WrappedRunnable.java:30) at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:441) at java.util.concurrent.FutureTask$Sync.innerRun(FutureTask.java:303) at java.util.concurrent.FutureTask.run(FutureTask.java:138) at java.util.concurrent.ThreadPoolExecutor$Worker.runTask(ThreadPoolExecutor.java:886) at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:908) at java.lang.Thread.run(Thread.java:662)

10. **summary:** Compaction error with Cassandra 1.1.4 and LCS

description: In our 1.1.4 testcluster of 3 nodes with RF=3, KS=1, and CF=5, we are getting an asserting error when running 'nodetool compact highscores leaderboard'. This stops compactions on the 'leaderboard' CF summing up to 11835 pending compactions. This error is seen only one one node. The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. Next, we changed to LCS and did again repair, cleanup, compact with success. Then we started to use this LCS-based testcluster intensively and created lots of data and also large keys with millions of columns. The assertion error in system.log : INFO [CompactionExecutor:8] 2012-09-11 14:20:45,043 CompactionController.java (line 172) Compacting large row highscores/leaderboard:4c422d64626331353166372d363464612d343235342d396130322d6535361636534337373532332d676c6f62616c2d30 (72589650 bytes) incrementally ERROR [CompactionExecutor:8] 2012-09-11 14:20:50,336 AbstractCassandraDaemon.java (line 135) Exception in thread Thread[CompactionExecutor:8,1,RMI Runtime] java.lang.AssertionError at org.apache.cassandra.db.compaction.LeveledManifest.promote(LeveledManifest.java:214) at org.apache.cassandra.db.compaction.LeveledCompactionStrategy.handleNotification(LeveledCompactionStrategy.java:158) at org.apache.cassandra.db.DataTracker.notifySSTablesChanged(DataTracker.java:531) at org.apache.cassandra.db.DataTracker.replaceCompactedSSTables(DataTracker.java:254) at org.apache.cassandra.db.ColumnFamilyStore.replaceCompactedSSTables(ColumnFamilyStore.java:992) at org.apache.cassandra.db.compaction.CompactionTask.execute(CompactionTask.java:200) at org.apache.cassandra.db.compaction.LeveledCompactionTask.execute(LeveledCompactionTask.java:50) at org.apache.cassandra.db.compaction.CompactionManager$6.runMayThrow(CompactionManager.java:288) at org.apache.cassandra.utils.WrappedRunnable.run(WrappedRunnable.java:30) at java.util.concurrent.Executors$RunnableAdapter.call(Executors.java:441) at java.util.concurrent.FutureTask$Sync.innerRun(FutureTask.java:303) at java.util.concurrent.FutureTask.run(FutureTask.java:138) at java.util.concurrent.ThreadPoolExecutor$Worker.runTask(ThreadPoolExecutor.java:886) at java.util.concurrent.ThreadPoolExecutor$Worker.run(ThreadPoolExecutor.java:908) at java.lang.Thread.run(Thread.java:662)

11. **summary:** Compaction error with Cassandra 1.1.4 and LCS
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jira_issues_comments:

1. {quote} The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. _Next, we changed to LCS_ and did again repair, cleanup, compact with success. {quote} Just to double-check, as you mentioned in the mailing list, you upgraded to 1.1.4 before changing to LCS, right?
2. Sorry, I forgot to mention the 1.1.4 upgrade step. It should read: (1) The SSTables have originally been created on a 1.1.2 cluster with STCS and then copied to the testcluster also with 1.1.2. Repair, cleanup, compact were OK with STCS. (2) Upgrade to 1.1.4 (3) We changed to LCS and did again repair, cleanup, compact, also with success.

3. Maybe, the following debug lines help to find the cause: DEBUG 20:59:47,207 Deleted /mnt/cassandra/data/highscores/leaderboard/highscores-leaderboard-he-18148 DEBUG 20:59:47,207 L0 contains 4422 SSTables (62004030662 bytes) in Manifest@451835319 DEBUG 20:59:47,207 L1 contains 14 SSTables (258039196 bytes) in Manifest@451835319 DEBUG 20:59:47,208 L2 contains 33 SSTables (508660830 bytes) in Manifest@451835319 DEBUG 20:59:47,208 L3 contains 360 SSTables (3536343071 bytes) in Manifest@451835319 DEBUG 20:59:47,209 L4 contains 1813 SSTables (32410447712 bytes) in Manifest@451835319 DEBUG 20:59:47,209 Replacing [leaderboard-18148(L1),] DEBUG 20:59:47,209 Adding [leaderboard-21505(L-1),] at L2 ERROR 20:59:47,209 Exception in thread Thread[CompactionExecutor:5,1,RMI Runtime] java.lang.AssertionError

4. You need to run the *offline* scrub ({{bin/sstablescrub}}) to fix the sstable overlapping problem from early 1.1 releases. (Running with -m to just check for overlaps between sstables should be fine, since you already scrubbed online which will catch out-of-order within an sstable.)

5. **body:** Attachment adds sendBackToL0 code to promote, to fix this transparently instead of requiring offline scrub. Not really a huge win since you still need scrub (off-or-online) to catch out-of-order rows within an sstable, but may help with some of the confusion around this.
   label: code-design

6. @Jonathan: compaction strategy was changed to LCS after upgrading to 1.1.4 so it looks like even with CASSANDRA-4321/CASSANDRA-4411 fixes, sstables are wrongly leveled. The patch will temporarily work around the problem though. {quote} since you already scrubbed online which will catch out-of-order within an sstable {quote} Online scrub can't fix out-of-order sstables since they won't be loaded in the first place, unless it has somehow has escaped from IntervalTree's assumption that sstables are sorted. [1] [1] https://issues.apache.org/jira/browse/CASSANDRA-4321?focusedCommentId=13295704&page=com.atlassian.jira.plugin.system.issuetabpanels:comment-tabpanel#comment-13295704

7. bq. Online scrub can't fix out-of-order sstables No, but it fixes rows that are out of order *within* a given sstable. bq. compaction strategy was changed to LCS after upgrading to 1.1.4 so it looks like even with CASSANDRA-4321/CASSANDRA-4411 fixes, sstables are wrongly leveled I see.

8. Following the hint of Johathan I did the following: (1) nodetool scrub (online) ==> (3h:36m) OK (2) sstablescrub -m (offline) ==> (5m) For 5 SSTables there is a message like: Sending SSTableReader(path='XXX-Data.db') back to L0 to fix intra-level overlapping (3) nodetool compact ==> (10h:15m) OK Result: All 11737 SSTables have been successfully compacted to 4357 files. (I did NOT install the patch). It looks like everything is fine now. Thanks for your help!

9. Regarding Jonathan's patch: that's a good idea though the condition in the patch is reversed. It should be: {noformat} if (previous != null && current.first.compareTo(previous.last) <= 0) {noformat} (i.e. we send back if the new start is smaller than that the previous end). Other than that, lgtm.

10. Committed with <= fix. (Marking this issue "can't reproduce" referring to the original report of overlapping sstables caused by 1.1.4.)