

Item 136

#### git\_comments:

#### git\_commits:

- summary:** [SPARK-33582][SQL] Hive Metastore support filter by not-equals  
**message:** [SPARK-33582][SQL] Hive Metastore support filter by not-equals ### What changes were proposed in this pull request? This pr make partition predicate pushdown into Hive metastore support not-equals operator. Hive related changes:  
<https://github.com/apache/hive/blob/b8bd4594bef718b1eeac9fceb437d7df7b480ed1/itests/hive-unit/src/test/java/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java#L2194-L2207>  
<https://issues.apache.org/jira/browse/HIVE-2702> ### Why are the changes needed? Improve query performance. ### Does this PR introduce \_any\_ user-facing change? No. ### How was this patch tested? Unit test. Closes #30534 from wangyum/SPARK-33582. Authored-by: Yuming Wang <yumwang@ebay.com> Signed-off-by: HyukjinKwon <gurwls223@apache.org>

#### github\_issues:

#### github\_issues\_comments:

#### github\_pulls:

- title:** [SPARK-33582][SQL] Hive Metastore support filter by not-equals  
**body:** ### What changes were proposed in this pull request? This pr make partition predicate pushdown into Hive metastore support not-equals operator. Hive related changes:  
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<https://issues.apache.org/jira/browse/HIVE-2702> ### Why are the changes needed? Improve query performance. ### Does this PR introduce \_any\_ user-facing change? No. ### How was this patch tested? Unit test.

#### github\_pulls\_comments:

- \*\*[Test build #131920 has finished]  
(<https://amplab.cs.berkeley.edu/jenkins/job/SparkPullRequestBuilder/131920/testReport>)\*\* for PR 30534 at commit [`22e149d``]  
(<https://github.com/apache/spark/commit/22e149d43729bb6efcc15391dba2ac1c9b9f223e>). \* This patch passes all tests. \* This patch merges cleanly. \* This patch adds the following public classes  
\_(experimental)\_:  
\* `case class UnixTimestamp`  
2. Merged to master.

#### github\_pulls\_reviews:

- Could you add null and empty string as partition values into your test cases? It should include both data values and predicate values.
- For your reference, <https://github.com/apache/spark/pull/30893> is the related PR

#### jira\_issues:

- summary:** Enhance listPartitionsByFilter to add support for integral types both for equality and non-equality  
**description:** listPartitionsByFilter supports only non-string partitions. This is because its explicitly specified in generateJDOFilterOverPartitions in ExpressionTree.java. //Can only support partitions whose types are string if( ! table.getPartitionKeys().get(partitionColumnIndex).getType().equals(org.apache.hadoop.hive.serde.Constants.STRING\_TYPE\_NAME) ) { throw new MetaException ("Filtering is supported only on partition keys of type string"); }

#### jira\_issues\_comments:

1. aniket486 requested code review of "HIVE-2702 [jira] listPartitionsByFilter only supports non-string partitions". Reviewers: JIRA <https://issues.apache.org/jira/browse/HIVE-2702> Added support for integer partitions in listPartitionByFilter method listPartitionsByFilter supports only non-string partitions. This is because its explicitly specified in generateJDOFilterOverPartitions in ExpressionTree.java. //Can only support partitions whose types are string if( ! table.getPartitionKeys().get(partitionColumnIndex).getType().equals(org.apache.hadoop.hive.serde.Constants.STRING\_TYPE\_NAME) ) { throw new MetaException ("Filtering is supported only on partition keys of type string"); } TEST PLAN EMPTY REVISION DETAIL <https://reviews.facebook.net/D2043> AFFECTED FILES  
metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java MANAGE HERALD DIFFERENTIAL RULES <https://reviews.facebook.net/herald/view/differential/> WHY DID I GET THIS EMAIL? <https://reviews.facebook.net/herald/transcript/4395/> Tip: use the X-Herald-Rules header to filter Herald messages in your client.
2. @Aniket, This is by design. Partition values are stored as strings in backend db (mysql) so pushing filters into db where partition column is of numeric types won't work, since then comparison will happen lexicographically. You should be able to catch this with rigorous tests. e.g., with your patch on, create table with partition key of int type, add partitions 1-11 and then do filter p < 2 and you will get partitions 1,10,11 instead of 1. Though, you can still push equality predicate. Enabling this feature requires mysql table schema updates which can retain type information for partition keys.
3. I agree on your comment, I didn't catch it earlier. I wonder if there is an elegant workaround for this.
4. This is very limiting for HCat as it means HCat clients cannot access non-string partitions from Pig or MR, whereas they are available via Hive directly. The JDOQL that's used in generateJDOFilter() to generate the query is not powerful enough to support stripping out the value, casting it to a number, and then sorting it thusly. The best solution is probably to re-write ObjectStore.listPartitionNamesByFilter() to not use the Partitions table (which stores the values as "PARTITION=FOO" but rather take advantage of PARTITION\_KEY\_VALS, which stores the partition values by themselves. Any objections to this approach?
5. Drop partition get org.apache.hadoop.hive.ql.parse.SemanticException because of this design. Drop partition is a base function, why this design exist if a base function can not work!
6. There hasn't been activity for a while, I will take over if you don't mind
7. Preliminary patch. No tests so far, in case something is wrong in the approach, this is my first hive patch. Existing tests pass. Patch summary: for filter pushdown, \* add support for equals for integral partition types; \* add support for not-equals for both; \* allow the client to push down other compare ops for string partitions - server already supports that; \* change Filter.g integral type handling to use Long instead of Integer, to support bigger numbers; \* refactor generateJDOFilterOverPartitions a bit. Adding other compare operators for integral types is next. I added a TODO in the patch where it should be done. The approach will need to be considered more carefully and may involve some refactoring.
8. sershe requested code review of "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions". Reviewers: JIRA initial changes and tests, this time posting to Phabricator; compared to previous patch in the JIRA, added testing, as well as support for negative numbers. I will run some perf tests, locally on derby it seems to work well. listPartitionsByFilter supports only non-string partitions. This is because its explicitly specified in generateJDOFilterOverPartitions in ExpressionTree.java. TEST PLAN EMPTY REVISION DETAIL <https://reviews.facebook.net/D11715> AFFECTED FILES  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g  
metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java  
ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java  
ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java MANAGE HERALD RULES <https://reviews.facebook.net/herald/view/differential/> WHY DID I GET THIS EMAIL? <https://reviews.facebook.net/herald/transcript/27771/> To: JIRA, sershe
9. gt/lt/etc. hit HIVE-2609 unfortunately; I simplified valString to avoid nested substrings but that didn't help either, and Collection get method is not supported on DN 2.0. Making blocked on DN upgrade
10. Well, this is also blocked (kind of) by the hack where during query parsing we set the types of all partitioning columns to string. This causes the constant type to be changed to double thru a complex chain of events, unless it's explicitly set to bigint. This causes the validation to fail and filter to not be pushed down. I am not sure why HIVE-3059 reverted it, there are no details...
11. Actually, as a quick workaround I can change the part of HIVE-2249 that changes the legitimately derived integer type to double if the other column is string. I don't think it makes sense... I feel like an archeologist by now

12. sershe updated the revision "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions". Some minor fixes to the patch, remove client support for most compare ops since it cannot easily be supported due to DN bugs/missing features in 2.0, fix the number type scrambling that was causing pushdown to not work for integers. Reviewers: JIRA, ashutoshc REVISION DETAIL <https://reviews.facebook.net/D11715> CHANGE SINCE LAST DIFF <https://reviews.facebook.net/D11715?vs=35793&id=35919#toc> AFFECTED FILES  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g  
metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java  
ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java  
ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java  
ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java  
ql/src/java/org/apache/hadoop/hive/ql/parse/TypeCheckProcFactory.java To: JIRA, ashutoshc, sershe
13. ran some perf tests, filter pushdown can cut about 300ms for getting partitions on 16k-partition table on my machine, with standalone metastore on the same machine (for equivalent queries e.g. n=0 vs "n=0 and n>=0")
14. ashutoshc has requested changes to the revision "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions". Some comments. INLINE COMMENTS  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java:161 Its better to say numeric type here, since we can also support byte and short (both of which are valid hive types) as well.  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java:262 As stated earlier, lets rename this method and variable as doesOpSupportNumeric()  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java:272 Why are you checking value instanceof Long here ? This parsing is not done via grammar described in Filter.g  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java:299 I presume this depends on DN upgrade, lets postpone it till then.  
ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java:7699 HIVE-3059, I assume you want to say. REVISION DETAIL <https://reviews.facebook.net/D11715> BRANCH HIVE-2702 ARCANIST PROJECT hive To: JIRA, ashutoshc, sershe
15. attaching patch for hiveqa.
16. sershe updated the revision "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions". CR feedback. Hive QA appears to be sleeping, I will run the tests overnight. Reviewers: ashutoshc, JIRA REVISION DETAIL <https://reviews.facebook.net/D11715> CHANGE SINCE LAST DIFF <https://reviews.facebook.net/D11715?vs=35919&id=35991#toc> AFFECTED FILES  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g  
metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java  
ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java  
ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java  
ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java  
ql/src/java/org/apache/hadoop/hive/ql/parse/TypeCheckProcFactory.java To: JIRA, ashutoshc, sershe
17. ashutoshc has accepted the revision "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions". +1. Sergey, How did the tests go? REVISION DETAIL <https://reviews.facebook.net/D11715> BRANCH HIVE-2702 ARCANIST PROJECT hive To: JIRA, ashutoshc, sershe
18. Large number of tests failed due to removal of the conversion of everything to double. I will fix them and update.
19. sershe requested code review of "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions for equals". Reviewers: JIRA Rebase on top of HIVE-4929. It should still compile/pass server tests, but won't work properly before HIVE-4929 listPartitionsByFilter supports only non-string partitions. This is because its explicitly specified in generateJDOFilterOverPartitions in ExpressionTree.java. //Can only support partitions whose types are string if( ! table.getPartitionKeys().get(partitionColumnIndex).getType().equals(org.apache.hadoop.hive.serde.Constants.STRING\_TYPE\_NAME) ) { throw new MetaException ("Filtering is supported only on partition keys of type string"); } TEST PLAN EMPTY REVISION DETAIL <https://reviews.facebook.net/D11847> AFFECTED FILES  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g  
metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java  
ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java  
ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java

- ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java MANAGE HERALD RULES  
<https://reviews.facebook.net/herald/view/differential/> WHY DID I GET THIS EMAIL?  
<https://reviews.facebook.net/herald/transcript/28167/> To: JIRA, sershe
20. Do you want to improve the description of ticket ... something like Enhance listPartitionsByFilter to add support for integral types both for equality and non-equality
21. ashutoshc has accepted the revision "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions for equals". +1 Looks good. Few minor nits. INLINE COMMENTS  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g:160 Do u want to name this as IntegralLiteral now ?  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java:312 Do you instead want to say in this TODO that this will be dealt in HIVE-4888  
ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java:2188 Do you want to say for 2nd TODO that this will be dealt in HIVE-4888 REVISION DETAIL <https://reviews.facebook.net/D11847> BRANCH HIVE-2702-2 ARCANIST PROJECT hive To: JIRA, ashutoshc, sershe
22. I ran the tests on current patch on latest trunk. All tests passed except alter\_partition\_coltype.q for which you just need to update .q.out file. Can you also include that update in your next refresh of the patch?
23. sershe updated the revision "HIVE-2702 [jira] listPartitionsByFilter only supports string partitions for equals". Adding the query change. Fetching partition "dt=100x" for query dt = 100 seems incorrect  
Reviewers: ashutoshc, JIRA REVISION DETAIL <https://reviews.facebook.net/D11847> CHANGE SINCE LAST DIFF <https://reviews.facebook.net/D11847?vs=36303&id=36483#toc> BRANCH HIVE-2702-2 ARCANIST PROJECT hive AFFECTED FILES  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java  
metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g  
metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java  
ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java  
ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java  
ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java  
ql/src/test/results/clientpositive/alter\_partition\_coltype.q.out To: JIRA, ashutoshc, sershe
24. Committed to trunk. Thanks, Sergey!
25. FAILURE: Integrated in Hive-trunk-hadoop2-ptest #37 (See [<https://builds.apache.org/job/Hive-trunk-hadoop2-ptest/37/>]) HIVE-2702 : Enhance listPartitionsByFilter to add support for integral types both for equality and non-equality (Sergey Shelukhin via Ashutosh Chauhan) (hashutosh:  
<http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1508539>) \*  
/hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java \*  
/hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g \*  
/hive/trunk/metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java \*  
/hive/trunk/ql/src/test/results/clientpositive/alter\_partition\_coltype.q.out
26. SUCCESS: Integrated in Hive-trunk-hadoop1-ptest #109 (See [<https://builds.apache.org/job/Hive-trunk-hadoop1-ptest/109/>]) HIVE-2702 : Enhance listPartitionsByFilter to add support for integral types both for equality and non-equality (Sergey Shelukhin via Ashutosh Chauhan) (hashutosh:  
<http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1508539>) \*  
/hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java \*  
/hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g \*  
/hive/trunk/metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java \*  
/hive/trunk/ql/src/test/results/clientpositive/alter\_partition\_coltype.q.out
27. FAILURE: Integrated in Hive-trunk-h0.21 #2234 (See [<https://builds.apache.org/job/Hive-trunk-h0.21/2234/>]) HIVE-2702 : Enhance listPartitionsByFilter to add support for integral types both for equality and non-equality (Sergey Shelukhin via Ashutosh Chauhan) (hashutosh:  
<http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1508539>) \*  
/hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java \*  
/hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g \*  
/hive/trunk/metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java \*  
/hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java \*

- /hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java \*
  - /hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java \*
  - /hive/trunk/ql/src/test/results/clientpositive/alter\_partition\_coltype.q.out
28. ABORTED: Integrated in Hive-trunk-hadoop2 #319 (See [<https://builds.apache.org/job/Hive-trunk-hadoop2/319/>]) HIVE-2702 : Enhance listPartitionsByFilter to add support for integral types both for equality and non-equality (Sergey Shelukhin via Ashutosh Chauhan) (hashutosh: <http://svn.apache.org/viewcvcs.cgi/?root=Apache-SVN&view=rev&rev=1508539>) \*
- /hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/ExpressionTree.java \*
  - /hive/trunk/metastore/src/java/org/apache/hadoop/hive/metastore/parser/Filter.g \*
  - /hive/trunk/metastore/src/test/org/apache/hadoop/hive/metastore/TestHiveMetaStore.java \*
  - /hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/exec/Utilities.java \*
  - /hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/optimizer/ppr/PartitionPruner.java \*
  - /hive/trunk/ql/src/java/org/apache/hadoop/hive/ql/parse/SemanticAnalyzer.java \*
  - /hive/trunk/ql/src/test/results/clientpositive/alter\_partition\_coltype.q.out
29. This issue has been fixed and released as part of 0.12 release. If you find further issues, please create a new jira and link it to this one.
30. Doc note: See HIVE-7164 comment for information about setting  
\*hive.metastore.integral.jdo.pushdown\*. \* [HIVE-7164 comment |  
[https://issues.apache.org/jira/browse/HIVE-7164?](https://issues.apache.org/jira/browse/HIVE-7164?focusedCommentId=14228468&page=com.atlassian.jira.plugin.system.issuetabpanels:comment-tabpanel#comment-14228468)  
[focusedCommentId=14228468&page=com.atlassian.jira.plugin.system.issuetabpanels:comment-](https://issues.apache.org/jira/browse/HIVE-7164?focusedCommentId=14228468&page=com.atlassian.jira.plugin.system.issuetabpanels:comment-tabpanel#comment-14228468)  
[tabpanel#comment-14228468](https://issues.apache.org/jira/browse/HIVE-7164?focusedCommentId=14228468&page=com.atlassian.jira.plugin.system.issuetabpanels:comment-tabpanel#comment-14228468)]