

TAJO-1499

jihoonson

2015-04-01

Contents

Chapter 1

Root issue TAJO-1499

1.1 Summary

Check the bind status when `EvalNode::eval()` is called

1.2 Description

The `bind()` function must be called before `eval()`. So, we should add a routine to check the binding state.

Please refer to the discussion at <https://github.com/apache/tajo/pull/456>.

1.3 Attachments

1. [TAJO-1499_2.patch](#)
2. [TAJO-1499_3.patch](#)
3. [TAJO-1499.patch](#)

1.4 Commits

1. Commit **72948b6** by **Jihoon Son** (2015-04-06): TAJO-1499: Check the bind status when `EvalNode::eval()` is called.

Closes #500

1.5 Comments

1. **tajoqa:** {color:red}***-1** overall.*{color} Here are the results of testing the latest attachment http://issues.apache.org/jira/secure/attachment/12709478/TAJO-1499_2.patch against master revision `release-0.9.0-rc0-239-g696d2aa`.

{color:green}+1 @author.{color} The patch does not contain any @author tags.

{color:green}+1 tests included.{color} The patch appears to include 2 new or modified test files.

{color:green}+1 javac.{color} The applied patch does not increase the total number of javac

compiler warnings.

{color:green}+1 javadoc.{color} The applied patch does not increase the total number of javadoc warnings.

{color:green}+1 checkstyle.{color} The patch generated 0 code style errors.

{color:red}-1 findbugs.{color} The patch appears to introduce 2 new Findbugs (version 2.0.3) warnings.

{color:green}+1 release audit.{color} The applied patch does not increase the total number of release audit warnings.

{color:green}+1 core tests.{color} The patch passed unit tests in tajo-core tajo-plan.

Test results: <https://builds.apache.org/job/PreCommit-TAJO-Build/708//testReport/>
Findbugs warnings: <https://builds.apache.org/job/PreCommit-TAJO-Build/708//artifact/incubator-tajo/patchprocess/newPatchFindbugsWarningstajo-core.html>
Console output: <https://builds.apache.org/job/PreCommit-TAJO-Build/708//console>

This message is automatically generated.

2. **jihoonson:** Fixed findbugs warnings.

3. **tajoqa:** {color:red}* -1 overall.*{color} Here are the results of testing the latest attachment http://issues.apache.org/jira/secure/attachment/12723284/TAJO-1499_3.patch against master revision release-0.9.0-rc0-241-g4eb8713.

{color:green}+1 @author.{color} The patch does not contain any @author tags.

{color:green}+1 tests included.{color} The patch appears to include 2 new or modified test files.

{color:green}+1 javac.{color} The applied patch does not increase the total number of javac compiler warnings.

{color:green}+1 javadoc.{color} The applied patch does not increase the total number of javadoc warnings.

{color:green}+1 checkstyle.{color} The patch generated 0 code style errors.

{color:red}-1 findbugs.{color} The patch appears to introduce 17 new Findbugs (version 2.0.3) warnings.

{color:green}+1 release audit.{color} The applied patch does not increase the total number of release audit warnings.

{color:green}+1 core tests.{color} The patch passed unit tests in tajo-core tajo-plan.

Test results: <https://builds.apache.org/job/PreCommit-TAJO-Build/711//testReport/>
Findbugs warnings: <https://builds.apache.org/job/PreCommit-TAJO-Build/711//artifact/incubator-tajo/patchprocess/newPatchFindbugsWarningstajo-core.html>
Console output: <https://builds.apache.org/job/PreCommit-TAJO-Build/711//console>

This message is automatically generated.

4. **jihoonson:** Thanks [~blrunner] for the review.
Committed to the master branch.
5. **hudson:** FAILURE: Integrated in Tajo-master-CODEGEN-build #293 (See [https://builds.apache.org/job/Tajo-master-CODEGEN-build/293/])
TAJO-1499: Check the bind status when EvalNode::eval() is called. (jihoonson: rev 72948b63a79cd8902381c3443699)
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/IsNullEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/SignedEval.java
 - * tajo-core/src/main/java/org/apache/tajo/master/exec/QueryExecutor.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/utils/TupleUtil.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/UnaryEval.java
 - * CHANGES
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/GeneralFunctionEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/NotEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/RowConstantEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FieldEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CastEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FunctionEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/InEval.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTree.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AggregationFunctionCallEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/WindowFunctionEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CaseWhenEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BinaryEval.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTreeUtil.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/ComparableVector.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/ConstEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BetweenPredicateEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/LogicalPlanner.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/PatternMatchPredicateEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AlgebraicUtil.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/EvalNode.java
6. **hudson:** SUCCESS: Integrated in Tajo-master-build #655 (See [https://builds.apache.org/job/Tajo-master-build/655/])
TAJO-1499: Check the bind status when EvalNode::eval() is called. (jihoonson: rev 72948b63a79cd8902381c3443699)
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTreeUtil.java
 - * tajo-core/src/main/java/org/apache/tajo/master/exec/QueryExecutor.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/ComparableVector.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/IsNullEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BinaryEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CaseWhenEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/InEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FieldEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BetweenPredicateEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/LogicalPlanner.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/WindowFunctionEval.java
 - * CHANGES
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/EvalNode.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/utils/TupleUtil.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/GeneralFunctionEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FunctionEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/UnaryEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/RowConstantEval.java

- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AggregationFunctionCallEval.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/PatternMatchPredicateEval.java
- * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTree.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/ConstEval.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AlgebraicUtil.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/SignedEval.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CastEval.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/NotEval.java

1.6 Pull requests

1.6.1 Pull request 500

Title: TAJO-1499: Check the bind status when EvalNode::eval() is called

Author: jihoonson

Date: 2015-04-02

Status: closed

Comments:

1. **blrunner** (2015-04-05): Thanks for your contribution.

I would like it more valuable if you add more unit test case for verifying the message for IllegalStateException. And could you trigger this for Travis CI build or could you add the patch to JIRA?

2. **jihoonson** (2015-04-05): Thanks. I added an unit test.

3. **blrunner** (2015-04-06): +1

Ship it. :)

Chapter 2

Connected issue TAJO-1436

2.1 Summary

Add Bind method to EvalNode

2.2 Description

EvalNode just has eval() method to evaluate some tuples. It does not have any method to prepare actual execution.

For example, FieldEval should know an actual field index of an input tuple. This process is also performed in eval() method.

It has some problems:

- * eval() method should involve two works, and it does different behavior with some flag or null check.
- * 'if condition' in eval() method for different behaviors involves unnecessary branches, causing performance degradation.

So, we should add {{bind(Schema)}} method to EvalNode and then move some preparation code from eval() to bind(Schema) method.

Also, we should refactor the signature {{eval(Schema, Tuple)}} to {{eval(Tuple)}}.

2.3 Attachments

No attachments

2.4 Commits

1. Commit **f4c9e54** by **navis.ryu** (2015-04-02): TAJO-1436: Add Bind method to EvalNode.

Closes #456

Signed-off-by: Jihoon Son <jihoonson@apache.org>

2.5 Comments

1. **hudson:** FAILURE: Integrated in Tajo-master-CODEGEN-build #285 (See [<https://builds.apache.org/job/Tajo-master-CODEGEN-build/285/>])
TAJO-1436: Add Bind method to EvalNode. (jihoonson: rev f4c9e54c88fb9e69023da2b0a74ead76ad2a6f8d)
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/NLJoinExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/InEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FieldEval.java
 - * tajo-core/src/main/java/org/apache/tajo/master/exec/QueryExecutor.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CastEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/codegen/CaseWhenEmitter.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BetweenPredicateEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/CommonJoinExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/EvalTreeUtil.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbyHashAggregationExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbyFirstAggregationExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/RowConstantEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashAggregateExec.java
 - * tajo-common/src/main/java/org/apache/tajo/conf/TajoConf.java
 - * CHANGES
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/NotEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/SignedEval.java
 - * tajo-core/src/main/java/org/apache/tajo/master/exec/NonForwardQueryResultSystemScanner.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/LogicalPlanner.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbyThirdAggregationExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/NLLeftOuterJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/EvalExprExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/MergeFullOuterJoinExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CaseWhenEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/RightOuterMergeJoinExec.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/ExprTestBase.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTree.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/codegen/EvalCodeGenContext.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/PartialBinaryExpr.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/codegen/EvalCodeGenerator.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/AggregationExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/UnaryEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AlgebraicUtil.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/Projector.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FunctionEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/ConstEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashLeftAntiJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/SortAggregateExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/IsNullEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbySecondAggregationExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/BNLJoinExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/WindowFunctionEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HavingExec.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTreeUtil.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/SeqScanExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/WindowAggExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BinaryEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/rewrite/rules/PartitionedTableRewriter.java

- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/SelectionExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/EvalNode.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/BSTIndexScanExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/PatternMatchPredicateEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashLeftOuterJoinExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AggregationFunctionCallEval.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/exprrewrite/rules/ConstantFolding.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/GeneralFunctionEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/MergeJoinExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashFullOuterJoinExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/utils/TupleUtil.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashLeftSemiJoinExec.java

2. **hudson:** SUCCESS: Integrated in Tajo-master-build #647 (See [<https://builds.apache.org/job/Tajo-master-build/647/>])
- TAJO-1436: Add Bind method to EvalNode. (jihoonson: rev f4c9e54c88fb9e69023da2b0a74ead76ad2a6f8d)
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashLeftAntiJoinExec.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTreeUtil.java
 - * CHANGES
 - * tajo-plan/src/main/java/org/apache/tajo/plan/exprrewrite/rules/ConstantFolding.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/SeqScanExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/NLJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/utils/TupleUtil.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/InEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/SelectionExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/IsNullEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CastEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FieldEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/LogicalPlanner.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/codegen/EvalCodeGenContext.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/NLLeftOuterJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/RightOuterMergeJoinExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/SignedEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashFullOuterJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/codegen/EvalCodeGenerator.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/EvalExprExec.java
 - * tajo-common/src/main/java/org/apache/tajo/conf/TajoConf.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AggregationFunctionCallEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/EvalTreeUtil.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/PatternMatchPredicateEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/WindowAggExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/FunctionEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/Projector.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/GeneralFunctionEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/AggregationExec.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/ConstEval.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/PartialBinaryExpr.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/NotEval.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/BNLJoinExec.java
 - * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/BSTIndexScanExec.java
 - * tajo-core/src/test/java/org/apache/tajo/engine/eval/TestEvalTree.java
 - * tajo-plan/src/main/java/org/apache/tajo/plan/expr/AlgebraicUtil.java

- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashLeftOuterJoinExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BinaryEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HavingExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashAggregateExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbyThirdAggregationExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbySecondAggregationExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/WindowFunctionEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/codegen/CaseWhenEmitter.java
- * tajo-core/src/test/java/org/apache/tajo/engine/eval/ExprTestBase.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/MergeFullOuterJoinExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbyHashAggregationExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/rewrite/rules/PartitionedTableRewriter.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/BetweenPredicateEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/SortAggregateExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/EvalNode.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/CaseWhenEval.java
- * tajo-core/src/main/java/org/apache/tajo/master/exec/QueryExecutor.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/RowConstantEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/CommonJoinExec.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/MergeJoinExec.java
- * tajo-plan/src/main/java/org/apache/tajo/plan/expr/UnaryEval.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/DistinctGroupbyFirstAggregationExec.java
- * tajo-core/src/main/java/org/apache/tajo/master/exec/NonForwardQueryResultSystemScanner.java
- * tajo-core/src/main/java/org/apache/tajo/engine/planner/physical/HashLeftSemiJoinExec.java

3. **jihoonson**: Committed to the master branch.

2.6 Pull requests

2.6.1 Pull request 456

Title: TAJO-1436 Add Bind method to EvalNode

Author: navis

Date: 2015-03-23

Status: closed

Comments:

1. **jihoonson** (2015-03-30): Thanks @navis. The patch looks good.
I have some additional comments as follows.
 - Changes on NettyClientBase look for <https://issues.apache.org/jira/browse/TAJO-1424>. If so, it would be better to resolve in that issue. Please remove them.
 - The bind() function must be called before eval(). So, it would be much greater if you add a routine to check the binding state.

2. **navis** (2015-04-01): I've also thought about that (bind check), but thinking that the intention of this issue was for removing any non-working code from eval, I decided to remove it. Opinion?

I'll fix TAJO-1424, which seemed abandoned for a long time.

3. **jihoonson** (2015-04-01): Ok. I created another issue for bind check. <https://issues.apache.org/jira/browse/TAJO-1499>

4. **jihoonson** (2015-04-02): Would you please rebase?
5. **jihoonson** (2015-04-02): Oh, you have already rebased. Sorry. I'll review ASAP.
6. **jihoonson** (2015-04-02): +1
LGTM!