Nested Query Optimization

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Goals

75% (Done) -> Support nested queries in optimizer

- Transform 4 basic types of nesting into joins with transformation rules

100% (Partially) -> Support nested predicates in execution engine

- COMPARE_IN operation - LogicalSemiJoin operator
- COMAPARE_EQUAL operation
- (❌) COMPARE_NOT_IN operation, requires AntiJoin

125% (Todo) -> Rewrite views into nested queries

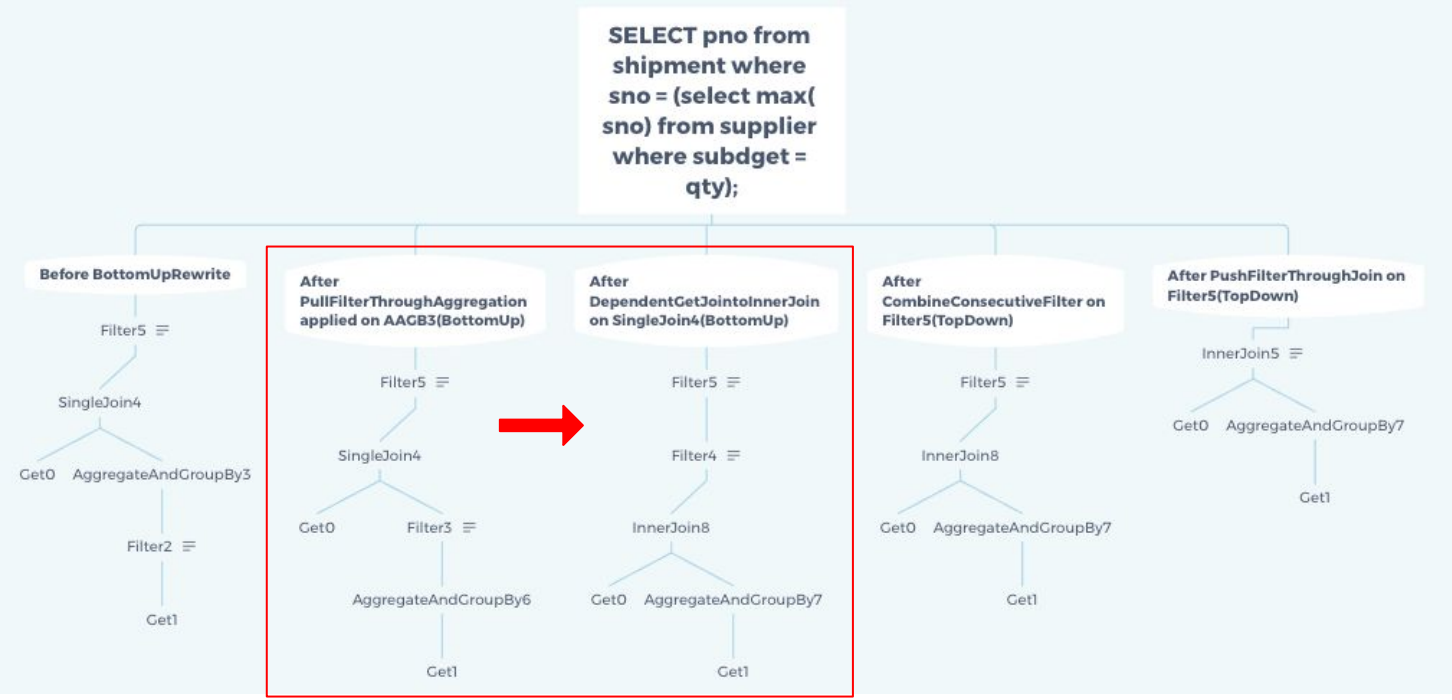
- Store view in system catalog
- Replace view nodes with operator trees

Summary: between the 75% - 100% goal

LIVE DEMO

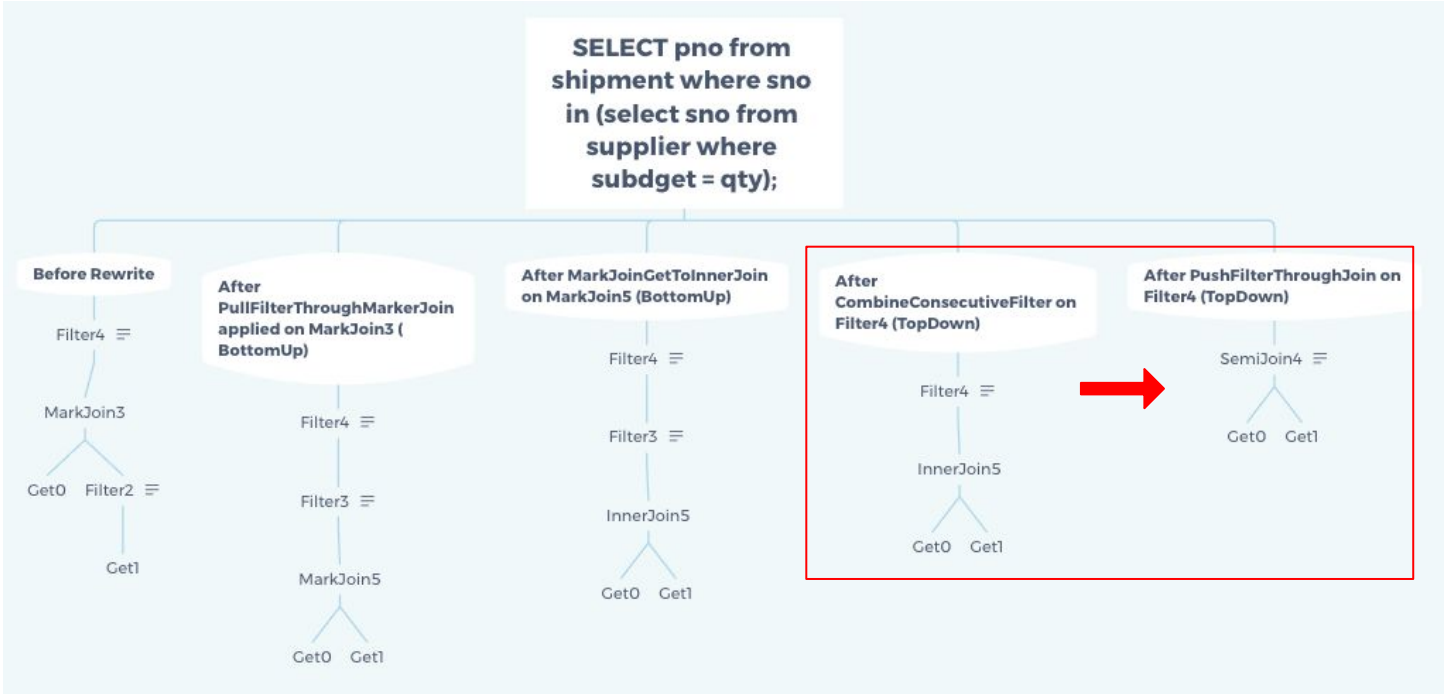
Project Goal Reiteration

Unnesting algorithms in optimizer



Project Goal Reiteration

Support nested predicates in execution engine



Test & Benchmarks

- Correctness is tested with a mix of C++ code and java code

  ○ C++ code is for a specific functionality. e.g. Check if the transformation rules are applied successfully

  ○ Junit test is for an end-to-end test. 10 test cases for each type

Code Quality

- Strong : Well-defined and flexible transformation rules
- Weak: Avoid materialization, should we use CTE nodes in the future?

Future Work

- Support views by rewriting them into nested queries
- Materialization techniques & cost model
- Deal with Type D by supporting set operations in terrier

Thank you!