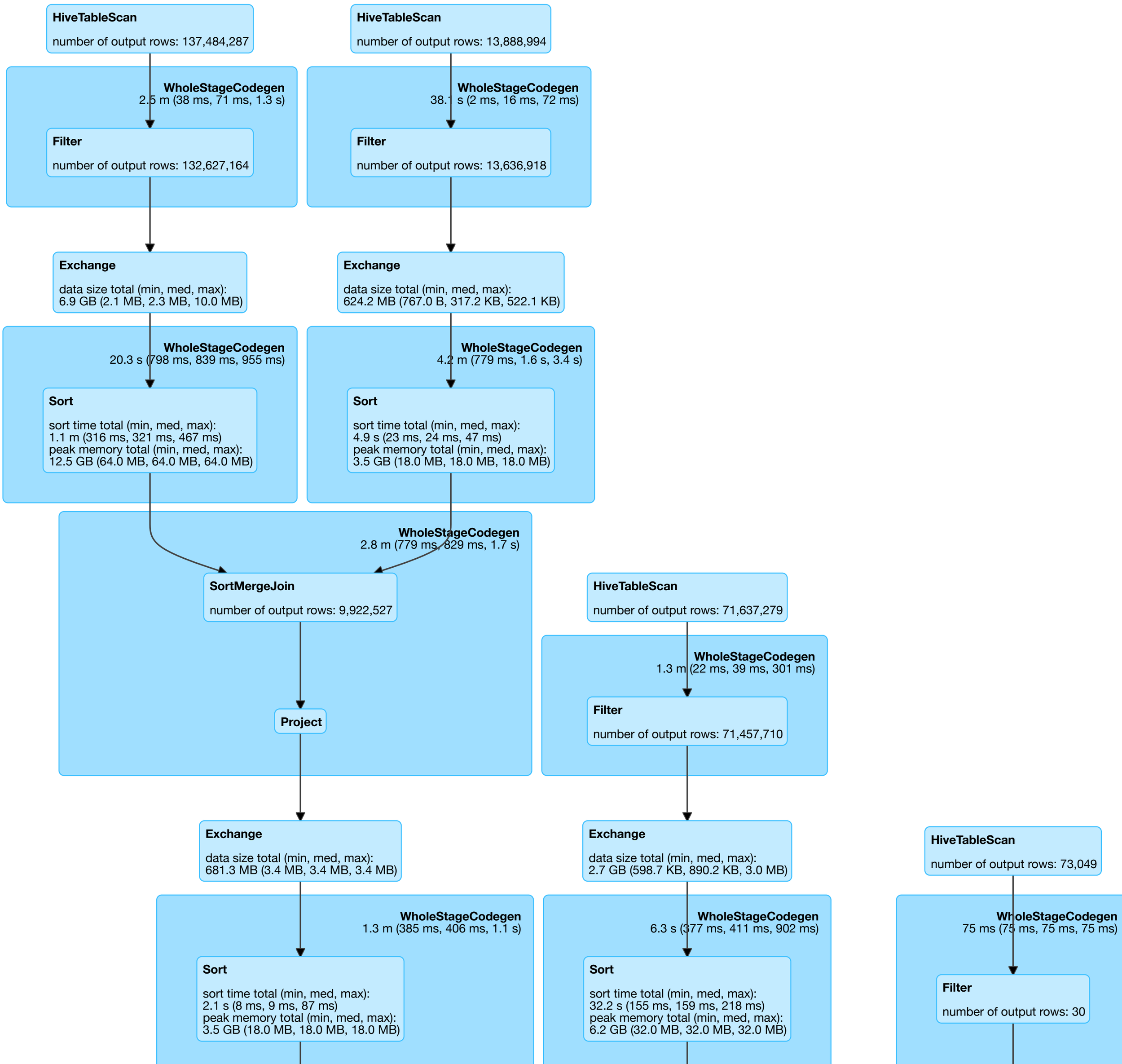
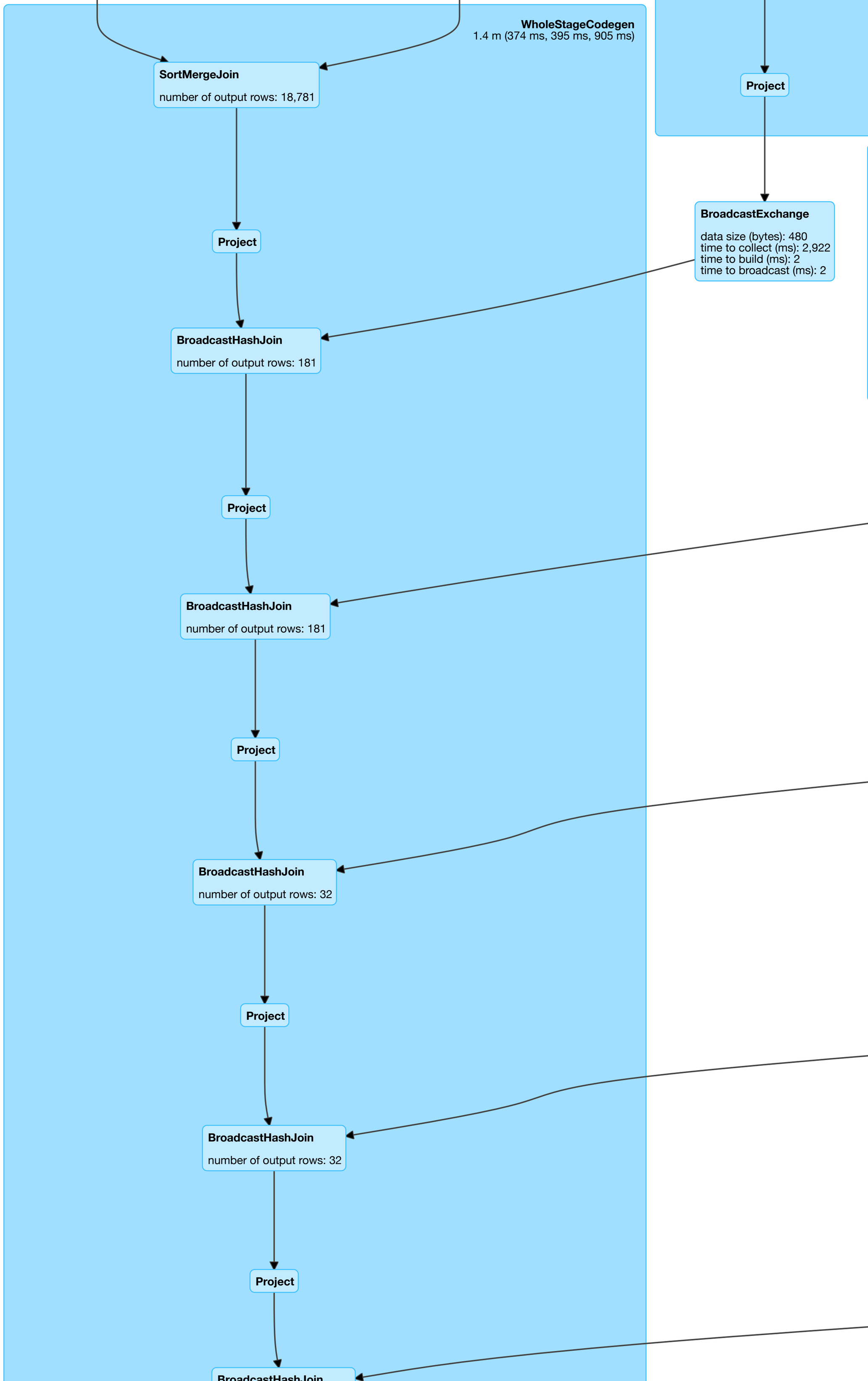
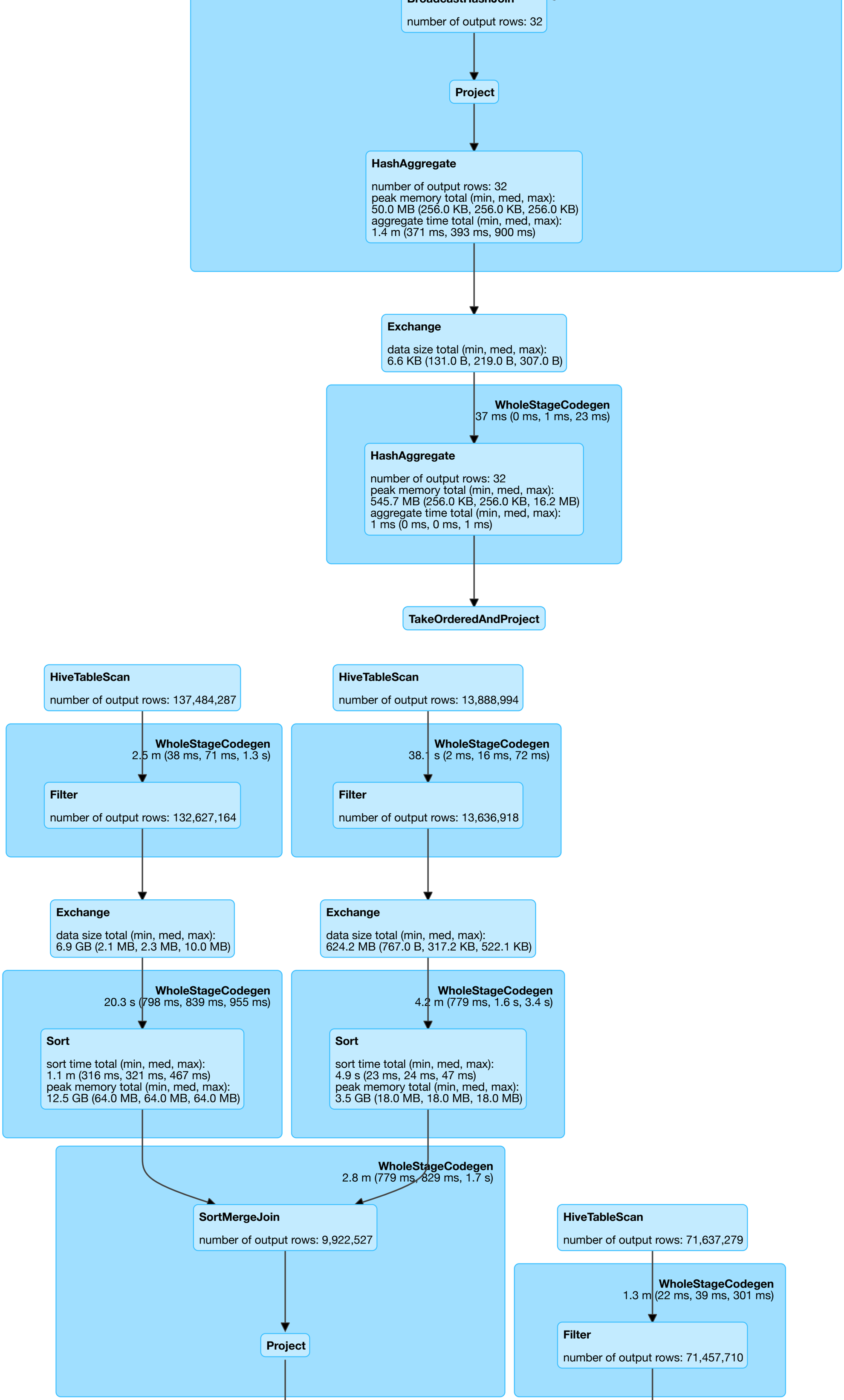
Details for Query 1

Submitted Time: 2018/02/26 01:02:37
Duration: 9.8 min
Succeeded Jobs: 0 (/history/application_1519504339627_0147/jobs/job?id=0) 1 (/history/application_1519504339627_0147/jobs/job?id=1) 2 (/history/application_1519504339627_0147/jobs/job?id=2) 3 (/history/application_1519504339627_0147/jobs/job?id=3) 4 (/history/application_1519504339627_0147/jobs/job?id=4) 5 (/history/application_1519504339627_0147/jobs/job?id=5)




WholeStageCodegen
1.4 m (374 ms, 395 ms, 905 ms)
SortMergeJoin
number of output rows: 18,781
Project
BroadcastHashJoin
number of output rows: 181
Project
BroadcastHashJoin
number of output rows: 32
Project
BroadcastHashJoin
number of output rows: 32
Project
Project
BroadcastExchange
data size (bytes): 480
time to collect (ms): 2,922
time to build (ms): 2
time to broadcast (ms): 2


number of output rows: 32
Project
HashAggregate
number of output rows: 32
peak memory total (min, med, max):
50.0 MB (256.0 KB, 256.0 KB, 256.0 KB)
aggregate time total (min, med, max):
1.4 m (371 ms, 393 ms, 900 ms)
Exchange
data size total (min, med, max):
6.6 KB (131.0 B, 219.0 B, 307.0 B)
WholeStageCodegen
37 ms (0 ms, 1 ms, 23 ms)
HashAggregate
number of output rows: 32
peak memory total (min, med, max):
545.7 MB (256.0 KB, 256.0 KB, 16.2 MB)
aggregate time total (min, med, max):
1 ms (0 ms, 0 ms, 1 ms)
TakeOrderedAndProject
HiveTableScan
number of output rows: 137,484,287
WholeStageCodegen
2.5 m (38 ms, 71 ms, 1.3 s)
Filter
number of output rows: 132,627,164
HiveTableScan
number of output rows: 13,888,994
WholeStageCodegen
38.1 s (2 ms, 16 ms, 72 ms)
Filter
number of output rows: 13,636,918
Exchange
data size total (min, med, max):
6.9 GB (2.1 MB, 2.3 MB, 10.0 MB)
Exchange
data size total (min, med, max):
624.2 MB (767.0 B, 317.2 KB, 522.1 KB)
WholeStageCodegen
20.3 s (798 ms, 839 ms, 955 ms)
Sort
sort time total (min, med, max):
1.1 m (316 ms, 321 ms, 467 ms)
peak memory total (min, med, max):
12.5 GB (64.0 MB, 64.0 MB, 64.0 MB)
WholeStageCodegen
4.2 m (779 ms, 1.6 s, 3.4 s)
Sort
sort time total (min, med, max):
4.9 s (23 ms, 24 ms, 47 ms)
peak memory total (min, med, max):
3.5 GB (18.0 MB, 18.0 MB, 18.0 MB)
WholeStageCodegen
2.8 m (779 ms, 829 ms, 1.7 s)
SortMergeJoin
number of output rows: 9,922,527
Project
HiveTableScan
number of output rows: 71,637,279
WholeStageCodegen
1.3 m (22 ms, 39 ms, 301 ms)
Filter
number of output rows: 71,457,710

Exchange

data size total (min, med, max):
681.3 MB (3.4 MB, 3.4 MB, 3.4 MB)

Exchange

data size total (min, med, max):
2.7 GB (598.7 KB, 890.2 KB, 3.0 MB)

HiveTableScan

number of output rows: 73,049

WholeStageCodegen
1.3 m (385 ms, 406 ms, 1.1 s)

Sort

sort time total (min, med, max):
2.1 s (8 ms, 9 ms, 87 ms)
peak memory total (min, med, max):
3.5 GB (18.0 MB, 18.0 MB, 18.0 MB)

WholeStageCodegen
6.3 s (377 ms, 411 ms, 902 ms)

Sort

sort time total (min, med, max):
32.2 s (155 ms, 159 ms, 218 ms)
peak memory total (min, med, max):
6.2 GB (32.0 MB, 32.0 MB, 32.0 MB)

WholeStageCodegen
75 ms (75 ms, 75 ms, 75 ms)

Filter

number of output rows: 30

WholeStageCodegen
1.4 m (374 ms, 395 ms, 905 ms)

SortMergeJoin

number of output rows: 18,781

Project

BroadcastExchange

data size (bytes): 480
time to collect (ms): 2,922
time to build (ms): 2
time to broadcast (ms): 2

Project

BroadcastHashJoin

number of output rows: 181

Project

BroadcastHashJoin

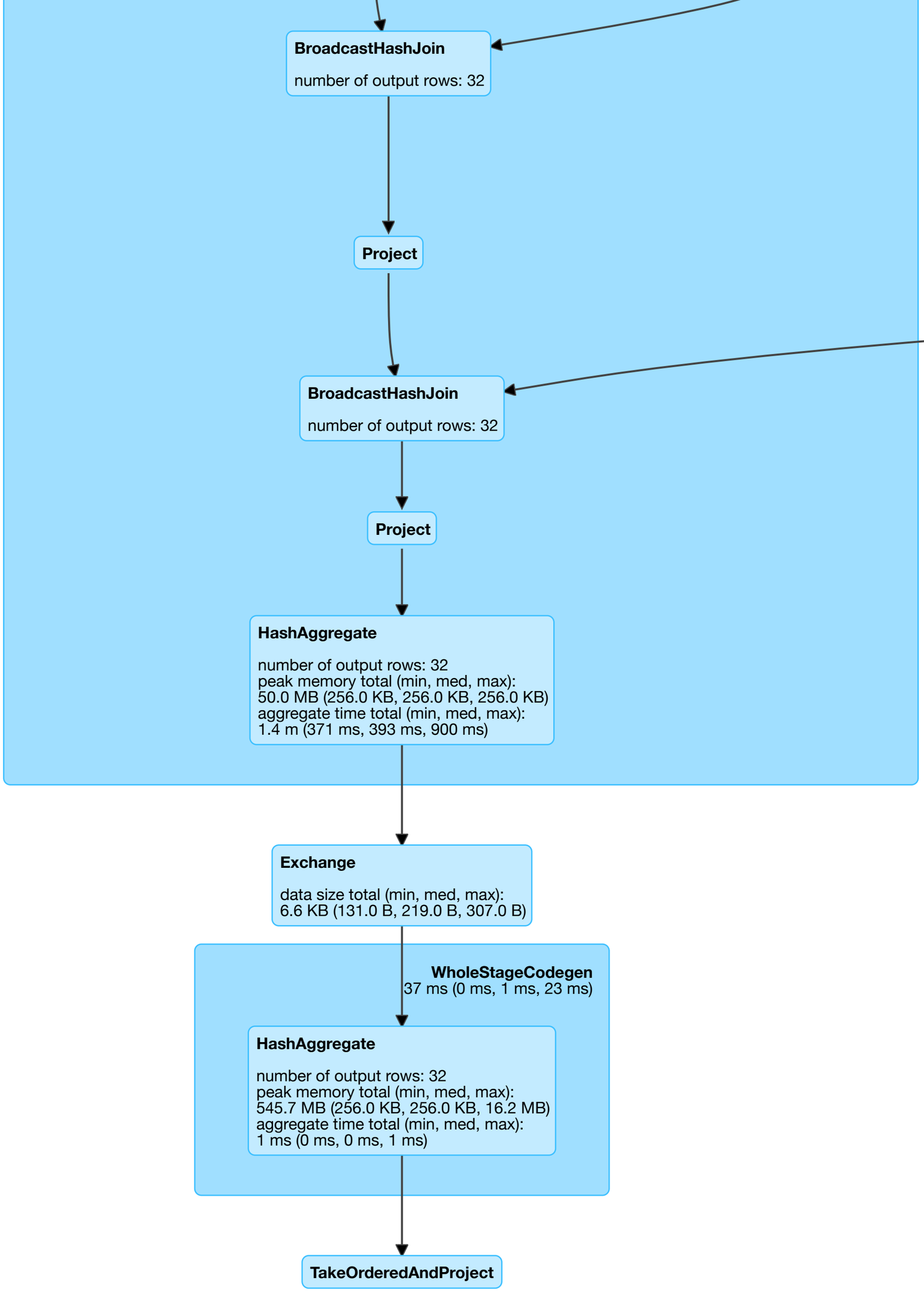
number of output rows: 181

Project

BroadcastHashJoin

number of output rows: 32

Project



Details

```
== Parsed Logical Plan ==
GlobalLimit 21
+- LocalLimit 21
   +- GlobalLimit 100
      +- LocalLimit 100
         +- Project [i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172, store_sales_profit#3, store_returns_loss#4,
catalog_sales_profit#5]
            +- Sort [i_item_id#197 ASC NULLS FIRST, i_item_desc#200 ASC NULLS FIRST, s_store_id#168 ASC NULLS FIRST, s_store_name#172 ASC NULLS FIRST],
true
               +- Aggregate [i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172], [i_item_id#197, i_item_desc#200, s_store_id#168,
s_store_name#172, sum(cast(ss_net_profit#27 as double)) AS store_sales_profit#3, sum(cast(sr_net_loss#47 as double)) AS store_returns_loss#4,
sum(cast(cs_net_profit#81 as double)) AS catalog_sales_profit#5]
                  +- Filter (((((d_moy#91 = 4) && (d_year#89 = 1998)) && ((d_date_sk#83 = ss_sold_date_sk#28) && (i_item_sk#196 = ss_item_sk#7))) &&
(((s_store_sk#167 = ss_store_sk#12) && (ss_customer_sk#8 = sr_customer_sk#31)) && ((ss_item_sk#7 = sr_item_sk#30) && (ss_ticket_number#14L =
sr_ticket_number#37L)))) && ((((sr_returned_date_sk#48 = d_date_sk#111) && ((d_moy#119 >= 4) && (d_moy#119 <= 10))) && ((d_year#117 = 1998) &&
(sr_customer_sk#31 = cs_bill_customer_sk#51))) && (((sr_item_sk#30 = cs_item_sk#63) && (cs_sold_date_sk#82 = d_date_sk#139)) && (((d_moy#147 >= 4) &&
(d_moy#147 <= 10)) && (d_year#145 = 1998)))))
                     +- Join Inner
                        :- Join Inner
                        :  :- Join Inner
                        :  :  :- Join Inner
                        :  :  :  :- Join Inner
                        :  :  :  :  :- Join Inner
                        :  :  :  :  :  :- SubqueryAlias store_sales
```

```
                        :  :  :  :  :  :  :  +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_sales`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[ss_sold_time_sk#6, ss_item_sk#7, ss_customer_sk#8, ss_cdemo_sk#9, ss_hdemo_sk#10, ss_addr_sk#11, ss_store_sk#12, ss_promo_sk#13, ss_ticket_number#14L,
ss_quantity#15, ss_wholesale_cost#16, ss_list_price#17, ss_sales_price#18, ss_ext_discount_amt#19, ss_ext_sales_price#20, ss_ext_wholesale_cost#21,
ss_ext_list_price#22, ss_ext_tax#23, ss_coupon_amt#24, ss_net_paid#25, ss_net_paid_inc_tax#26, ss_net_profit#27], [ss_sold_date_sk#28]
                        :  :  :  :  :  :  +- SubqueryAlias store_returns
                        :  :  :  :  :  :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_returns`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [sr_return_time_sk#29, sr_item_sk#30, sr_customer_sk#31, sr_cdemo_sk#32, sr_hdemo_sk#33, sr_addr_sk#34,
sr_store_sk#35, sr_reason_sk#36, sr_ticket_number#37L, sr_return_quantity#38, sr_return_amt#39, sr_return_tax#40, sr_return_amt_inc_tax#41, sr_fee#42,
sr_return_ship_cost#43, sr_refunded_cash#44, sr_reversed_charge#45, sr_store_credit#46, sr_net_loss#47], [sr_returned_date_sk#48]
                        :  :  :  :  :  +- SubqueryAlias catalog_sales
                        :  :  :  :  :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`catalog_sales`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[cs_sold_time_sk#49, cs_ship_date_sk#50, cs_bill_customer_sk#51, cs_bill_cdemo_sk#52, cs_bill_hdemo_sk#53, cs_bill_addr_sk#54, cs_ship_customer_sk#55,
cs_ship_cdemo_sk#56, cs_ship_hdemo_sk#57, cs_ship_addr_sk#58, cs_call_center_sk#59, cs_catalog_page_sk#60, cs_ship_mode_sk#61, cs_warehouse_sk#62,
cs_item_sk#63, cs_promo_sk#64, cs_order_number#65L, cs_quantity#66, cs_wholesale_cost#67, cs_list_price#68, cs_sales_price#69, cs_ext_discount_amt#70,
cs_ext_sales_price#71, cs_ext_wholesale_cost#72, ... 9 more fields], [cs_sold_date_sk#82]
                        :  :  :  :  +- SubqueryAlias d1
                        :  :  :  :     +- SubqueryAlias date_dim
                        :  :  :  :        +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#83, d_date_id#84, d_date#85, d_month_seq#86, d_week_seq#87, d_quarter_seq#88, d_year#89, d_dow#90, d_moy#91, d_dom#92, d_qoy#93,
d_fy_year#94, d_fy_quarter_seq#95, d_fy_week_seq#96, d_day_name#97, d_quarter_name#98, d_holiday#99, d_weekend#100, d_following_holiday#101,
d_first_dom#102, d_last_dom#103, d_same_day_ly#104, d_same_day_lq#105, d_current_day#106, ... 4 more fields]
                        :  :  :  +- SubqueryAlias d2
                        :  :  :     +- SubqueryAlias date_dim
                        :  :  :        +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#111, d_date_id#112, d_date#113, d_month_seq#114, d_week_seq#115, d_quarter_seq#116, d_year#117, d_dow#118, d_moy#119, d_dom#120, d_qoy#121,
d_fy_year#122, d_fy_quarter_seq#123, d_fy_week_seq#124, d_day_name#125, d_quarter_name#126, d_holiday#127, d_weekend#128, d_following_holiday#129,
d_first_dom#130, d_last_dom#131, d_same_day_ly#132, d_same_day_lq#133, d_current_day#134, ... 4 more fields]
                        :  :  +- SubqueryAlias d3
                        :  :     +- SubqueryAlias date_dim
                        :  :        +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#139, d_date_id#140, d_date#141, d_month_seq#142, d_week_seq#143, d_quarter_seq#144, d_year#145, d_dow#146, d_moy#147, d_dom#148, d_qoy#149,
d_fy_year#150, d_fy_quarter_seq#151, d_fy_week_seq#152, d_day_name#153, d_quarter_name#154, d_holiday#155, d_weekend#156, d_following_holiday#157,
d_first_dom#158, d_last_dom#159, d_same_day_ly#160, d_same_day_lq#161, d_current_day#162, ... 4 more fields]
                        :  +- SubqueryAlias store
                        :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [s_store_sk#167,
s_store_id#168, s_rec_start_date#169, s_rec_end_date#170, s_closed_date_sk#171, s_store_name#172, s_number_employees#173, s_floor_space#174,
s_hours#175, s_manager#176, s_market_id#177, s_geography_class#178, s_market_desc#179, s_market_manager#180, s_division_id#181, s_division_name#182,
s_company_id#183, s_company_name#184, s_street_number#185, s_street_name#186, s_street_type#187, s_suite_number#188, s_city#189, s_county#190, ... 5
more fields]
                        +- SubqueryAlias item
                           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`item`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [i_item_sk#196,
i_item_id#197, i_rec_start_date#198, i_rec_end_date#199, i_item_desc#200, i_current_price#201, i_wholesale_cost#202, i_brand_id#203, i_brand#204,
i_class_id#205, i_class#206, i_category_id#207, i_category#208, i_manufact_id#209, i_manufact#210, i_size#211, i_formulation#212, i_color#213,
i_units#214, i_container#215, i_manager_id#216, i_product_name#217]

== Analyzed Logical Plan ==
i_item_id: string, i_item_desc: string, s_store_id: string, s_store_name: string, store_sales_profit: double, store_returns_loss: double,
catalog_sales_profit: double
GlobalLimit 21
+- LocalLimit 21
   +- GlobalLimit 100
      +- LocalLimit 100
         +- Project [i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172, store_sales_profit#3, store_returns_loss#4,
catalog_sales_profit#5]
            +- Sort [i_item_id#197 ASC NULLS FIRST, i_item_desc#200 ASC NULLS FIRST, s_store_id#168 ASC NULLS FIRST, s_store_name#172 ASC NULLS FIRST],
true
               +- Aggregate [i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172], [i_item_id#197, i_item_desc#200, s_store_id#168,
s_store_name#172, sum(cast(ss_net_profit#27 as double)) AS store_sales_profit#3, sum(cast(sr_net_loss#47 as double)) AS store_returns_loss#4,
sum(cast(cs_net_profit#81 as double)) AS catalog_sales_profit#5]
                  +- Filter (((((d_moy#91 = 4) && (d_year#89 = 1998)) && ((d_date_sk#83 = ss_sold_date_sk#28) && (i_item_sk#196 = ss_item_sk#7))) &&
(((s_store_sk#167 = ss_store_sk#12) && (ss_customer_sk#8 = sr_customer_sk#31)) && ((ss_item_sk#7 = sr_item_sk#30) && (ss_ticket_number#14L =
sr_ticket_number#37L)))) && ((((sr_returned_date_sk#48 = d_date_sk#111) && ((d_moy#119 >= 4) && (d_moy#119 <= 10))) && ((d_year#117 = 1998) &&
(sr_customer_sk#31 = cs_bill_customer_sk#51))) && (((sr_item_sk#30 = cs_item_sk#63) && (cs_sold_date_sk#82 = d_date_sk#139)) && (((d_moy#147 >= 4) &&
(d_moy#147 <= 10)) && (d_year#145 = 1998)))))
                     +- Join Inner
                        :- Join Inner
                        :  :- Join Inner
                        :  :  :- Join Inner
                        :  :  :  :- Join Inner
                        :  :  :  :  :- Join Inner
                        :  :  :  :  :  :- Join Inner
                        :  :  :  :  :  :  :- SubqueryAlias store_sales
                        :  :  :  :  :  :  :  +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_sales`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[ss_sold_time_sk#6, ss_item_sk#7, ss_customer_sk#8, ss_cdemo_sk#9, ss_hdemo_sk#10, ss_addr_sk#11, ss_store_sk#12, ss_promo_sk#13, ss_ticket_number#14L,
ss_quantity#15, ss_wholesale_cost#16, ss_list_price#17, ss_sales_price#18, ss_ext_discount_amt#19, ss_ext_sales_price#20, ss_ext_wholesale_cost#21,
ss_ext_list_price#22, ss_ext_tax#23, ss_coupon_amt#24, ss_net_paid#25, ss_net_paid_inc_tax#26, ss_net_profit#27], [ss_sold_date_sk#28]
                        :  :  :  :  :  :  +- SubqueryAlias store_returns
                        :  :  :  :  :  :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_returns`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [sr_return_time_sk#29, sr_item_sk#30, sr_customer_sk#31, sr_cdemo_sk#32, sr_hdemo_sk#33, sr_addr_sk#34,
sr_store_sk#35, sr_reason_sk#36, sr_ticket_number#37L, sr_return_quantity#38, sr_return_amt#39, sr_return_tax#40, sr_return_amt_inc_tax#41, sr_fee#42,
sr_return_ship_cost#43, sr_refunded_cash#44, sr_reversed_charge#45, sr_store_credit#46, sr_net_loss#47], [sr_returned_date_sk#48]
```

```
                        :  :  :  :  :  +- SubqueryAlias catalog_sales
                        :  :  :  :  :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`catalog_sales`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[cs_sold_time_sk#49, cs_ship_date_sk#50, cs_bill_customer_sk#51, cs_bill_cdemo_sk#52, cs_bill_hdemo_sk#53, cs_bill_addr_sk#54, cs_ship_customer_sk#55,
cs_ship_cdemo_sk#56, cs_ship_hdemo_sk#57, cs_ship_addr_sk#58, cs_call_center_sk#59, cs_catalog_page_sk#60, cs_ship_mode_sk#61, cs_warehouse_sk#62,
cs_item_sk#63, cs_promo_sk#64, cs_order_number#65L, cs_quantity#66, cs_wholesale_cost#67, cs_list_price#68, cs_sales_price#69, cs_ext_discount_amt#70,
cs_ext_sales_price#71, cs_ext_wholesale_cost#72, ... 9 more fields], [cs_sold_date_sk#82]
                        :  :  :  :  +- SubqueryAlias d1
                        :  :  :  :     +- SubqueryAlias date_dim
                        :  :  :  :        +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#83, d_date_id#84, d_date#85, d_month_seq#86, d_week_seq#87, d_quarter_seq#88, d_year#89, d_dow#90, d_moy#91, d_dom#92, d_qoy#93,
d_fy_year#94, d_fy_quarter_seq#95, d_fy_week_seq#96, d_day_name#97, d_quarter_name#98, d_holiday#99, d_weekend#100, d_following_holiday#101,
d_first_dom#102, d_last_dom#103, d_same_day_ly#104, d_same_day_lq#105, d_current_day#106, ... 4 more fields]
                        :  :  :  +- SubqueryAlias d2
                        :  :  :     +- SubqueryAlias date_dim
                        :  :  :        +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#111, d_date_id#112, d_date#113, d_month_seq#114, d_week_seq#115, d_quarter_seq#116, d_year#117, d_dow#118, d_moy#119, d_dom#120, d_qoy#121,
d_fy_year#122, d_fy_quarter_seq#123, d_fy_week_seq#124, d_day_name#125, d_quarter_name#126, d_holiday#127, d_weekend#128, d_following_holiday#129,
d_first_dom#130, d_last_dom#131, d_same_day_ly#132, d_same_day_lq#133, d_current_day#134, ... 4 more fields]
                        :  :  +- SubqueryAlias d3
                        :  :     +- SubqueryAlias date_dim
                        :  :        +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#139, d_date_id#140, d_date#141, d_month_seq#142, d_week_seq#143, d_quarter_seq#144, d_year#145, d_dow#146, d_moy#147, d_dom#148, d_qoy#149,
d_fy_year#150, d_fy_quarter_seq#151, d_fy_week_seq#152, d_day_name#153, d_quarter_name#154, d_holiday#155, d_weekend#156, d_following_holiday#157,
d_first_dom#158, d_last_dom#159, d_same_day_ly#160, d_same_day_lq#161, d_current_day#162, ... 4 more fields]
                        :  +- SubqueryAlias store
                        :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [s_store_sk#167,
s_store_id#168, s_rec_start_date#169, s_rec_end_date#170, s_closed_date_sk#171, s_store_name#172, s_number_employees#173, s_floor_space#174,
s_hours#175, s_manager#176, s_market_id#177, s_geography_class#178, s_market_desc#179, s_market_manager#180, s_division_id#181, s_division_name#182,
s_company_id#183, s_company_name#184, s_street_number#185, s_street_name#186, s_street_type#187, s_suite_number#188, s_city#189, s_county#190, ... 5
more fields]
                           +- SubqueryAlias item
                              +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`item`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [i_item_sk#196,
i_item_id#197, i_rec_start_date#198, i_rec_end_date#199, i_item_desc#200, i_current_price#201, i_wholesale_cost#202, i_brand_id#203, i_brand#204,
i_class_id#205, i_class#206, i_category_id#207, i_category#208, i_manufact_id#209, i_manufact#210, i_size#211, i_formulation#212, i_color#213,
i_units#214, i_container#215, i_manager_id#216, i_product_name#217]

== Optimized Logical Plan ==
GlobalLimit 21
+- LocalLimit 21
   +- Sort [i_item_id#197 ASC NULLS FIRST, i_item_desc#200 ASC NULLS FIRST, s_store_id#168 ASC NULLS FIRST, s_store_name#172 ASC NULLS FIRST], true
      +- Aggregate [i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172], [i_item_id#197, i_item_desc#200, s_store_id#168,
s_store_name#172, sum(cast(ss_net_profit#27 as double)) AS store_sales_profit#3, sum(cast(sr_net_loss#47 as double)) AS store_returns_loss#4,
sum(cast(cs_net_profit#81 as double)) AS catalog_sales_profit#5]
         +- Project [ss_net_profit#27, sr_net_loss#47, cs_net_profit#81, s_store_id#168, s_store_name#172, i_item_id#197, i_item_desc#200]
            +- Join Inner, (i_item_sk#196 = ss_item_sk#7)
               :- Project [ss_item_sk#7, ss_net_profit#27, sr_net_loss#47, cs_net_profit#81, s_store_id#168, s_store_name#172]
               :  +- Join Inner, (s_store_sk#167 = ss_store_sk#12)
               :     :- Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, sr_net_loss#47, cs_net_profit#81]
               :     :  +- Join Inner, (cs_sold_date_sk#82 = d_date_sk#139)
               :     :     :- Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, sr_net_loss#47, cs_net_profit#81, cs_sold_date_sk#82]
               :     :     :  +- Join Inner, (sr_returned_date_sk#48 = d_date_sk#111)
               :     :     :     :- Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, sr_net_loss#47, sr_returned_date_sk#48, cs_net_profit#81,
cs_sold_date_sk#82]
               :     :     :     :  +- Join Inner, (d_date_sk#83 = ss_sold_date_sk#28)
               :     :     :     :     :- Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, ss_sold_date_sk#28, sr_net_loss#47,
sr_returned_date_sk#48, cs_net_profit#81, cs_sold_date_sk#82]
               :     :     :     :     :  +- Join Inner, ((sr_customer_sk#31 = cs_bill_customer_sk#51) && (sr_item_sk#30 = cs_item_sk#63))
               :     :     :     :     :     :- Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, ss_sold_date_sk#28, sr_item_sk#30,
sr_customer_sk#31, sr_net_loss#47, sr_returned_date_sk#48]
               :     :     :     :     :     :  +- Join Inner, (((ss_customer_sk#8 = sr_customer_sk#31) && (ss_item_sk#7 = sr_item_sk#30)) &&
(ss_ticket_number#14L = sr_ticket_number#37L))
               :     :     :     :     :     :     :- Project [ss_item_sk#7, ss_customer_sk#8, ss_store_sk#12, ss_ticket_number#14L, ss_net_profit#27,
ss_sold_date_sk#28]
               :     :     :     :     :     :     :  +- Filter ((((isnotnull(ss_customer_sk#8) && isnotnull(ss_item_sk#7)) &&
isnotnull(ss_ticket_number#14L)) && isnotnull(ss_sold_date_sk#28)) && isnotnull(ss_store_sk#12))
               :     :     :     :     :     :     :     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_sales`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [ss_sold_time_sk#6, ss_item_sk#7, ss_customer_sk#8, ss_cdemo_sk#9, ss_hdemo_sk#10, ss_addr_sk#11,
ss_store_sk#12, ss_promo_sk#13, ss_ticket_number#14L, ss_quantity#15, ss_wholesale_cost#16, ss_list_price#17, ss_sales_price#18, ss_ext_discount_amt#19,
ss_ext_sales_price#20, ss_ext_wholesale_cost#21, ss_ext_list_price#22, ss_ext_tax#23, ss_coupon_amt#24, ss_net_paid#25, ss_net_paid_inc_tax#26,
ss_net_profit#27], [ss_sold_date_sk#28]
               :     :     :     :     :     :     +- Project [sr_item_sk#30, sr_customer_sk#31, sr_ticket_number#37L, sr_net_loss#47,
sr_returned_date_sk#48]
               :     :     :     :     :     :        +- Filter (((isnotnull(sr_customer_sk#31) && isnotnull(sr_ticket_number#37L)) &&
isnotnull(sr_item_sk#30)) && isnotnull(sr_returned_date_sk#48))
               :     :     :     :     :     :           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_returns`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [sr_return_time_sk#29, sr_item_sk#30, sr_customer_sk#31, sr_cdemo_sk#32, sr_hdemo_sk#33, sr_addr_sk#34,
sr_store_sk#35, sr_reason_sk#36, sr_ticket_number#37L, sr_return_quantity#38, sr_return_amt#39, sr_return_tax#40, sr_return_amt_inc_tax#41, sr_fee#42,
sr_return_ship_cost#43, sr_refunded_cash#44, sr_reversed_charge#45, sr_store_credit#46, sr_net_loss#47], [sr_returned_date_sk#48]
               :     :     :     :     :     +- Project [cs_bill_customer_sk#51, cs_item_sk#63, cs_net_profit#81, cs_sold_date_sk#82]
               :     :     :     :     :        +- Filter ((isnotnull(cs_item_sk#63) && isnotnull(cs_bill_customer_sk#51)) &&
isnotnull(cs_sold_date_sk#82))
```

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               :     :     :     :     :           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`catalog_sales`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [cs_sold_time_sk#49, cs_ship_date_sk#50, cs_bill_customer_sk#51, cs_bill_cdemo_sk#52, cs_bill_hdemo_sk#53,
cs_bill_addr_sk#54, cs_ship_customer_sk#55, cs_ship_cdemo_sk#56, cs_ship_hdemo_sk#57, cs_ship_addr_sk#58, cs_call_center_sk#59, cs_catalog_page_sk#60,
cs_ship_mode_sk#61, cs_warehouse_sk#62, cs_item_sk#63, cs_promo_sk#64, cs_order_number#65L, cs_quantity#66, cs_wholesale_cost#67, cs_list_price#68,
cs_sales_price#69, cs_ext_discount_amt#70, cs_ext_sales_price#71, cs_ext_wholesale_cost#72, ... 9 more fields], [cs_sold_date_sk#82]
               :     :     :     :     +- Project [d_date_sk#83]
               :     :     :     :        +- Filter ((((isnotnull(d_moy#91) && isnotnull(d_year#89)) && (d_moy#91 = 4)) && (d_year#89 = 1998)) &&
isnotnull(d_date_sk#83))
               :     :     :     :           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#83, d_date_id#84, d_date#85, d_month_seq#86, d_week_seq#87, d_quarter_seq#88, d_year#89, d_dow#90, d_moy#91, d_dom#92, d_qoy#93,
d_fy_year#94, d_fy_quarter_seq#95, d_fy_week_seq#96, d_day_name#97, d_quarter_name#98, d_holiday#99, d_weekend#100, d_following_holiday#101,
d_first_dom#102, d_last_dom#103, d_same_day_ly#104, d_same_day_lq#105, d_current_day#106, ... 4 more fields]
               :     :     :     +- Project [d_date_sk#111]
               :     :     :        +- Filter (((((isnotnull(d_year#117) && isnotnull(d_moy#119)) && (d_moy#119 >= 4)) && (d_moy#119 <= 10)) &&
(d_year#117 = 1998)) && isnotnull(d_date_sk#111))
               :     :     :           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#111, d_date_id#112, d_date#113, d_month_seq#114, d_week_seq#115, d_quarter_seq#116, d_year#117, d_dow#118, d_moy#119, d_dom#120, d_qoy#121,
d_fy_year#122, d_fy_quarter_seq#123, d_fy_week_seq#124, d_day_name#125, d_quarter_name#126, d_holiday#127, d_weekend#128, d_following_holiday#129,
d_first_dom#130, d_last_dom#131, d_same_day_ly#132, d_same_day_lq#133, d_current_day#134, ... 4 more fields]
               :     :     +- Project [d_date_sk#139]
               :     :        +- Filter (((((isnotnull(d_moy#147) && isnotnull(d_year#145)) && (d_moy#147 >= 4)) && (d_moy#147 <= 10)) && (d_year#145 =
1998)) && isnotnull(d_date_sk#139))
               :     :           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[d_date_sk#139, d_date_id#140, d_date#141, d_month_seq#142, d_week_seq#143, d_quarter_seq#144, d_year#145, d_dow#146, d_moy#147, d_dom#148, d_qoy#149,
d_fy_year#150, d_fy_quarter_seq#151, d_fy_week_seq#152, d_day_name#153, d_quarter_name#154, d_holiday#155, d_weekend#156, d_following_holiday#157,
d_first_dom#158, d_last_dom#159, d_same_day_ly#160, d_same_day_lq#161, d_current_day#162, ... 4 more fields]
               :     +- Project [s_store_sk#167, s_store_id#168, s_store_name#172]
               :        +- Filter isnotnull(s_store_sk#167)
               :           +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`store`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [s_store_sk#167,
s_store_id#168, s_rec_start_date#169, s_rec_end_date#170, s_closed_date_sk#171, s_store_name#172, s_number_employees#173, s_floor_space#174,
s_hours#175, s_manager#176, s_market_id#177, s_geography_class#178, s_market_desc#179, s_market_manager#180, s_division_id#181, s_division_name#182,
s_company_id#183, s_company_name#184, s_street_number#185, s_street_name#186, s_street_type#187, s_suite_number#188, s_city#189, s_county#190, ... 5
more fields]
               +- Project [i_item_sk#196, i_item_id#197, i_item_desc#200]
                  +- Filter isnotnull(i_item_sk#196)
                     +- CatalogRelation `tpcds_bin_partitioned_orc_50`.`item`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [i_item_sk#196, i_item_id#197,
i_rec_start_date#198, i_rec_end_date#199, i_item_desc#200, i_current_price#201, i_wholesale_cost#202, i_brand_id#203, i_brand#204, i_class_id#205,
i_class#206, i_category_id#207, i_category#208, i_manufact_id#209, i_manufact#210, i_size#211, i_formulation#212, i_color#213, i_units#214,
i_container#215, i_manager_id#216, i_product_name#217]

== Physical Plan ==
TakeOrderedAndProject(limit=21, orderBy=[i_item_id#197 ASC NULLS FIRST,i_item_desc#200 ASC NULLS FIRST,s_store_id#168 ASC NULLS FIRST,s_store_name#172
ASC NULLS FIRST], output=
[i_item_id#197,i_item_desc#200,s_store_id#168,s_store_name#172,store_sales_profit#3,store_returns_loss#4,catalog_sales_profit#5])
+- *HashAggregate(keys=[i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172], functions=[sum(cast(ss_net_profit#27 as double)),
sum(cast(sr_net_loss#47 as double)), sum(cast(cs_net_profit#81 as double))], output=[i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172,
store_sales_profit#3, store_returns_loss#4, catalog_sales_profit#5])
   +- Exchange hashpartitioning(i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172, 200)
      +- *HashAggregate(keys=[i_item_id#197, i_item_desc#200, s_store_id#168, s_store_name#172], functions=[partial_sum(cast(ss_net_profit#27 as
double)), partial_sum(cast(sr_net_loss#47 as double)), partial_sum(cast(cs_net_profit#81 as double))], output=[i_item_id#197, i_item_desc#200,
s_store_id#168, s_store_name#172, sum#245, sum#246, sum#247])
         +- *Project [ss_net_profit#27, sr_net_loss#47, cs_net_profit#81, s_store_id#168, s_store_name#172, i_item_id#197, i_item_desc#200]
            +- *BroadcastHashJoin [ss_item_sk#7], [i_item_sk#196], Inner, BuildRight
               :- *Project [ss_item_sk#7, ss_net_profit#27, sr_net_loss#47, cs_net_profit#81, s_store_id#168, s_store_name#172]
               :  +- *BroadcastHashJoin [ss_store_sk#12], [s_store_sk#167], Inner, BuildRight
               :     :- *Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, sr_net_loss#47, cs_net_profit#81]
               :     :  +- *BroadcastHashJoin [cs_sold_date_sk#82], [d_date_sk#139], Inner, BuildRight
               :     :     :- *Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, sr_net_loss#47, cs_net_profit#81, cs_sold_date_sk#82]
               :     :     :  +- *BroadcastHashJoin [sr_returned_date_sk#48], [d_date_sk#111], Inner, BuildRight
               :     :     :     :- *Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, sr_net_loss#47, sr_returned_date_sk#48, cs_net_profit#81,
cs_sold_date_sk#82]
               :     :     :     :  +- *BroadcastHashJoin [ss_sold_date_sk#28], [d_date_sk#83], Inner, BuildRight
               :     :     :     :     :- *Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, ss_sold_date_sk#28, sr_net_loss#47,
sr_returned_date_sk#48, cs_net_profit#81, cs_sold_date_sk#82]
               :     :     :     :     :  +- *SortMergeJoin [sr_customer_sk#31, sr_item_sk#30], [cs_bill_customer_sk#51, cs_item_sk#63], Inner
               :     :     :     :     :     :- *Sort [sr_customer_sk#31 ASC NULLS FIRST, sr_item_sk#30 ASC NULLS FIRST], false, 0
               :     :     :     :     :     :  +- Exchange hashpartitioning(sr_customer_sk#31, sr_item_sk#30, 200)
               :     :     :     :     :     :     +- *Project [ss_item_sk#7, ss_store_sk#12, ss_net_profit#27, ss_sold_date_sk#28, sr_item_sk#30,
sr_customer_sk#31, sr_net_loss#47, sr_returned_date_sk#48]
               :     :     :     :     :     :        +- *SortMergeJoin [ss_customer_sk#8, ss_item_sk#7, ss_ticket_number#14L], [sr_customer_sk#31,
sr_item_sk#30, sr_ticket_number#37L], Inner
               :     :     :     :     :     :           :- *Sort [ss_customer_sk#8 ASC NULLS FIRST, ss_item_sk#7 ASC NULLS FIRST, ss_ticket_number#14L
ASC NULLS FIRST], false, 0
               :     :     :     :     :     :           :  +- Exchange hashpartitioning(ss_customer_sk#8, ss_item_sk#7, ss_ticket_number#14L, 200)
               :     :     :     :     :     :           :     +- *Filter (((isnotnull(ss_customer_sk#8) && isnotnull(ss_item_sk#7)) &&
isnotnull(ss_ticket_number#14L)) && isnotnull(ss_store_sk#12))
               :     :     :     :     :     :           :        +- HiveTableScan [ss_item_sk#7, ss_customer_sk#8, ss_store_sk#12,
ss_ticket_number#14L, ss_net_profit#27, ss_sold_date_sk#28], CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_sales`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [ss_sold_time_sk#6, ss_item_sk#7, ss_customer_sk#8, ss_cdemo_sk#9, ss_hdemo_sk#10, ss_addr_sk#11,
ss_store_sk#12, ss_promo_sk#13, ss_ticket_number#14L, ss_quantity#15, ss_wholesale_cost#16, ss_list_price#17, ss_sales_price#18, ss_ext_discount_amt#19,
ss_ext_sales_price#20, ss_ext_wholesale_cost#21, ss_ext_list_price#22, ss_ext_tax#23, ss_coupon_amt#24, ss_net_paid#25, ss_net_paid_inc_tax#26,
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ss_net_profit#27], [ss_sold_date_sk#28], [isnotnull(ss_sold_date_sk#28)]
               :     :     :     :     :     :           +- *Sort [sr_customer_sk#31 ASC NULLS FIRST, sr_item_sk#30 ASC NULLS FIRST,
sr_ticket_number#37L ASC NULLS FIRST], false, 0
               :     :     :     :     :     :              +- Exchange hashpartitioning(sr_customer_sk#31, sr_item_sk#30, sr_ticket_number#37L, 200)
               :     :     :     :     :     :                 +- *Filter ((isnotnull(sr_customer_sk#31) && isnotnull(sr_ticket_number#37L)) &&
isnotnull(sr_item_sk#30))
               :     :     :     :     :     :                    +- HiveTableScan [sr_item_sk#30, sr_customer_sk#31, sr_ticket_number#37L,
sr_net_loss#47, sr_returned_date_sk#48], CatalogRelation `tpcds_bin_partitioned_orc_50`.`store_returns`, org.apache.hadoop.hive.ql.io.orc.OrcSerde,
[sr_return_time_sk#29, sr_item_sk#30, sr_customer_sk#31, sr_cdemo_sk#32, sr_hdemo_sk#33, sr_addr_sk#34, sr_store_sk#35, sr_reason_sk#36,
sr_ticket_number#37L, sr_return_quantity#38, sr_return_amt#39, sr_return_tax#40, sr_return_amt_inc_tax#41, sr_fee#42, sr_return_ship_cost#43,
sr_refunded_cash#44, sr_reversed_charge#45, sr_store_credit#46, sr_net_loss#47], [sr_returned_date_sk#48], [isnotnull(sr_returned_date_sk#48)]
               :     :     :     :     :     +- *Sort [cs_bill_customer_sk#51 ASC NULLS FIRST, cs_item_sk#63 ASC NULLS FIRST], false, 0
               :     :     :     :     :        +- Exchange hashpartitioning(cs_bill_customer_sk#51, cs_item_sk#63, 200)
               :     :     :     :     :           +- *Filter (isnotnull(cs_item_sk#63) && isnotnull(cs_bill_customer_sk#51))
               :     :     :     :     :              +- HiveTableScan [cs_bill_customer_sk#51, cs_item_sk#63, cs_net_profit#81, cs_sold_date_sk#82],
CatalogRelation `tpcds_bin_partitioned_orc_50`.`catalog_sales`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [cs_sold_time_sk#49, cs_ship_date_sk#50,
cs_bill_customer_sk#51, cs_bill_cdemo_sk#52, cs_bill_hdemo_sk#53, cs_bill_addr_sk#54, cs_ship_customer_sk#55, cs_ship_cdemo_sk#56, cs_ship_hdemo_sk#57,
cs_ship_addr_sk#58, cs_call_center_sk#59, cs_catalog_page_sk#60, cs_ship_mode_sk#61, cs_warehouse_sk#62, cs_item_sk#63, cs_promo_sk#64,
cs_order_number#65L, cs_quantity#66, cs_wholesale_cost#67, cs_list_price#68, cs_sales_price#69, cs_ext_discount_amt#70, cs_ext_sales_price#71,
cs_ext_wholesale_cost#72, ... 9 more fields], [cs_sold_date_sk#82], [isnotnull(cs_sold_date_sk#82)]
               :     :     :     :     +- BroadcastExchange HashedRelationBroadcastMode(List(cast(input[0, int, true] as bigint)))
               :     :     :     :        +- *Project [d_date_sk#83]
               :     :     :     :           +- *Filter ((((isnotnull(d_moy#91) && isnotnull(d_year#89)) && (d_moy#91 = 4)) && (d_year#89 = 1998)) &&
isnotnull(d_date_sk#83))
               :     :     :     :              +- HiveTableScan [d_date_sk#83, d_moy#91, d_year#89], CatalogRelation
`tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [d_date_sk#83, d_date_id#84, d_date#85, d_month_seq#86,
d_week_seq#87, d_quarter_seq#88, d_year#89, d_dow#90, d_moy#91, d_dom#92, d_qoy#93, d_fy_year#94, d_fy_quarter_seq#95, d_fy_week_seq#96, d_day_name#97,
d_quarter_name#98, d_holiday#99, d_weekend#100, d_following_holiday#101, d_first_dom#102, d_last_dom#103, d_same_day_ly#104, d_same_day_lq#105,
d_current_day#106, ... 4 more fields]
               :     :     :     +- BroadcastExchange HashedRelationBroadcastMode(List(cast(input[0, int, true] as bigint)))
               :     :     :        +- *Project [d_date_sk#111]
               :     :     :           +- *Filter (((((isnotnull(d_year#117) && isnotnull(d_moy#119)) && (d_moy#119 >= 4)) && (d_moy#119 <= 10)) &&
(d_year#117 = 1998)) && isnotnull(d_date_sk#111))
               :     :     :              +- HiveTableScan [d_date_sk#111, d_year#117, d_moy#119], CatalogRelation
`tpcds_bin_partitioned_orc_50`.`date_dim`, org.apache.hadoop.hive.ql.io.orc.OrcSerde, [d_date_sk#111, d_date_id#112, d_date#113, d_month_seq#114,
d_week_seq#115, d_quarter_seq#116, d_year#117, d_dow#118, d_moy#119, d_dom#120, d_qoy#121, d_fy_year#122, d_fy_quarter_seq#123, d_fy_week_seq#124,
d_day_name#125, d_quarter_name#126, d_holiday#127, d_weekend#128, d_following_holiday#129, d_first_dom#130, d_last_dom#131, d_same_day_ly#132,
d_same_day_lq#133, d_current_day#134, ... 4 more fields]
               :     :     +- BroadcastExchange HashedRelationBroadcastMode(List(cast(input[0, int, true] as bigint)))
               :     :        +- *Project [d_date_sk#139]
               :     :           +- *Filter (((((isnotnull(d_moy#147) && isnotnull(d_year#145)) && (d_moy#147 >= 4)) && (d_moy#147 <= 10)) &&
(d_year#145 = 1998)) && isnotnull(d_date_sk#139))
               :     :              +- HiveTableScan [d_date_sk#139, d_moy#147, d_year#145], CatalogRelation `tpcds_bin_partitioned_orc_50`.`date_dim`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [d_date_sk#139, d_date_id#140, d_date#141, d_month_seq#142, d_week_seq#143, d_quarter_seq#144, d_year#145,
d_dow#146, d_moy#147, d_dom#148, d_qoy#149, d_fy_year#150, d_fy_quarter_seq#151, d_fy_week_seq#152, d_day_name#153, d_quarter_name#154, d_holiday#155,
d_weekend#156, d_following_holiday#157, d_first_dom#158, d_last_dom#159, d_same_day_ly#160, d_same_day_lq#161, d_current_day#162, ... 4 more fields]
               :     +- BroadcastExchange HashedRelationBroadcastMode(List(cast(input[0, int, false] as bigint)))
               :        +- *Filter isnotnull(s_store_sk#167)
               :           +- HiveTableScan [s_store_sk#167, s_store_id#168, s_store_name#172], CatalogRelation `tpcds_bin_partitioned_orc_50`.`store`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [s_store_sk#167, s_store_id#168, s_rec_start_date#169, s_rec_end_date#170, s_closed_date_sk#171,
s_store_name#172, s_number_employees#173, s_floor_space#174, s_hours#175, s_manager#176, s_market_id#177, s_geography_class#178, s_market_desc#179,
s_market_manager#180, s_division_id#181, s_division_name#182, s_company_id#183, s_company_name#184, s_street_number#185, s_street_name#186,
s_street_type#187, s_suite_number#188, s_city#189, s_county#190, ... 5 more fields]
               +- BroadcastExchange HashedRelationBroadcastMode(List(cast(input[0, int, false] as bigint)))
                  +- *Filter isnotnull(i_item_sk#196)
                     +- HiveTableScan [i_item_sk#196, i_item_id#197, i_item_desc#200], CatalogRelation `tpcds_bin_partitioned_orc_50`.`item`,
org.apache.hadoop.hive.ql.io.orc.OrcSerde, [i_item_sk#196, i_item_id#197, i_rec_start_date#198, i_rec_end_date#199, i_item_desc#200,
i_current_price#201, i_wholesale_cost#202, i_brand_id#203, i_brand#204, i_class_id#205, i_class#206, i_category_id#207, i_category#208,
i_manufact_id#209, i_manufact#210, i_size#211, i_formulation#212, i_color#213, i_units#214, i_container#215, i_manager_id#216, i_product_name#217]
```