

1. Выполнить запрос с WHERE не использующим ПК. Выполнить запрос с WHERE использующим ПК. Сравнить text_log запросов, предоставить строки лога относящиеся к пробегу основного индекса.
2. Показать тот же индекс через EXPLAIN

```
chl :) select * from movies where rank>1 limit 10

SELECT *
FROM movies
WHERE rank > 1
LIMIT 10

Query id: 0295176c-1981-49ce-bddf-bddf7f960a25

[chi] 2024.07.27 15:31:27.948840 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> executeQuery: (from 192.168.188.132:33772) select * from movies where rank>1 limit 10 (stage: Complete)
[chi] 2024.07.27 15:31:27.956279 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> Planner: Query SELECT __table1.id AS id, __table1.name AS name, __table1.year AS year, __table1.rank AS rank FROM imdb.movies AS __table1 WHERE __table1.rank > 1 LIMIT __CAST(10, 'UInt64') to stage Complete
[chi] 2024.07.27 15:31:27.956541 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> ContextAccess (default): Access granted: SELECT(id, name, year, rank) ON imdb.movies
[chi] 2024.07.27 15:31:27.956962 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> Planner: Query SELECT __table1.id AS id, __table1.name AS name, __table1.year AS year, __table1.rank AS rank FROM imdb.movies AS __table1 WHERE __table1.rank > 1 LIMIT __CAST(10, 'UInt64') from stage FetchColumns to stage Complete
[chi] 2024.07.27 15:31:27.958962 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> QueryPlanOptimizerPrewhere: The min valid primary key position for moving to the tail of PREWHERE is -1
[chi] 2024.07.27 15:31:27.959391 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Key condition: unknown
[chi] 2024.07.27 15:31:27.959602 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Selected 1/1 parts by partition key, 1 parts by primary key, 48/48 marks by primary key, 48 marks to read from 1 ranges
[chi] 2024.07.27 15:31:27.959648 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Spreading mark ranges among streams (default reading)
[chi] 2024.07.27 15:31:27.960604 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> MergeTreeReadPool: min_marks_for_concurrent_read=24
[chi] 2024.07.27 15:31:27.960835 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Reading approx. 388269 rows with 2 streams
[chi] 2024.07.27 15:31:27.962464 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> MergeTreeSelectProcessor: PREWHERE condition was split into 1 steps: "greater(__table1.rank, 1 UInt8)"
[chi] 2024.07.27 15:31:27.963574 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Trace> MergeTreeSelectProcessor: PREWHERE condition was split into 1 steps: "greater(__table1.rank, 1 UInt8)"

+----+-----+-----+-----+
| id | name | year | rank |
+----+-----+-----+-----+
1. 2 $ 1971 6.4
2. 6 $1,000,000 Duck 1971 5
3. 11 $1000 a Touchdown 1939 6.7
4. 15 $30 1999 7.5
5. 18 $40,000 1996 9.6
6. 24 $50,000 Climax Show, The 1975 2.6
7. 31 $pent 2000 4.3
8. 33 $windle 2002 5.4
9. 36 $15' 2002 6.8
10. 38 $38 1987 6.7

[chi] 2024.07.27 15:31:28.020873 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> executeQuery: Read 49152 rows, 1.86 MiB in 0.072346 sec., 679401.7637464408 rows/sec., 25.66 MiB/sec.
[chi] 2024.07.27 15:31:28.027735 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> MemoryTracker: Peak memory usage (for query): 2.48 MiB.
[chi] 2024.07.27 15:31:28.027785 [ 10213 ] [0295176c-1981-49ce-bddf-bddf7f960a25] <Debug> TCPHandler: Processed in 0.082153375 sec.

10 rows in set. Elapsed: 0.075 sec. Processed 49.15 thousand rows, 1.95 MB (654.72 thousand rows/s., 25.93 MB/s.)
Peak memory usage: 2.48 MiB.
```

```
chl :) select * from movies where id>100 limit 10

SELECT *
FROM movies
WHERE id > 100
LIMIT 10

Query id: af169c90-61ff-4b22-b485-50a0a6c63ca

[chi] 2024.07.27 15:30:58.572259 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> executeQuery: (from 192.168.188.132:33772) select * from movies where id>100 limit 10 (stage: Complete)
[chi] 2024.07.27 15:30:58.583399 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> Planner: Query SELECT __table1.id AS id, __table1.name AS name, __table1.year AS year, __table1.rank AS rank FROM imdb.movies AS __table1 WHERE __table1.id > 100 LIMIT __CAST(10, 'UInt64') to stage Complete
[chi] 2024.07.27 15:30:58.584324 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> ContextAccess (default): Access granted: SELECT(id, name, year, rank) ON imdb.movies
[chi] 2024.07.27 15:30:58.586749 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> Planner: Query SELECT __table1.id AS id, __table1.name AS name, __table1.year AS year, __table1.rank AS rank FROM imdb.movies AS __table1 WHERE __table1.id > 100 LIMIT __CAST(10, 'UInt64') from stage FetchColumns to stage Complete
[chi] 2024.07.27 15:30:58.592892 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> QueryPlanOptimizerPrewhere: The min valid primary key position for moving to the tail of PREWHERE is 0
[chi] 2024.07.27 15:30:58.593935 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Key condition: (column 0 in [101, +Inf))
[chi] 2024.07.27 15:30:58.594173 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Running binary search on index range for part all_1_1_0 (40 marks)
[chi] 2024.07.27 15:30:58.594312 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Found (LEFT) boundary mark: 0
[chi] 2024.07.27 15:30:58.594407 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Found (RIGHT) boundary mark: 49
[chi] 2024.07.27 15:30:58.594600 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Found continuous range in 11 steps
[chi] 2024.07.27 15:30:58.594682 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Selected 1/1 parts by partition key, 1 parts by primary key, 48/48 marks by primary key, 48 marks to read from 1 ranges
[chi] 2024.07.27 15:30:58.594932 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Spreading mark ranges among streams (default reading)
[chi] 2024.07.27 15:30:58.596448 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> MergeTreeReadPool: min_marks_for_concurrent_read=24
[chi] 2024.07.27 15:30:58.596495 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Reading approx. 388269 rows with 2 streams
[chi] 2024.07.27 15:30:58.596546 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> MergeTreeSelectProcessor: PREWHERE condition was split into 1 steps: "greater(__table1.id, 100 UInt8)"
[chi] 2024.07.27 15:30:58.596580 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Trace> MergeTreeSelectProcessor: PREWHERE condition was split into 1 steps: "greater(__table1.id, 100 UInt8)"

+----+-----+-----+-----+
| id | name | year | rank |
+----+-----+-----+-----+
1. 210654 Mein Weg zu Dir 2003 0
2. 210655 Mein Weg zu dir heit Liebe 2004 0
3. 210656 Mein Wille ist Gesetz 1919 0
4. 210657 Meine 16 Shne 1956 0
5. 210658 Meine 99 Brute 1958 0
6. 210659 Meine beste Feindin 1999 0
7. 210660 Meine Cousine aus Warschau 1931 0
8. 210662 Meine Eltern 2004 0
9. 210663 Meine Frau 1929 0
10. 210664 Meine Frau erfahrt kein Wort 1969 0

[chi] 2024.07.27 15:30:58.652424 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> executeQuery: Read 49152 rows, 1.86 MiB in 0.081440 sec., 603469.6558582672 rows/sec., 22.80 MiB/sec.
[chi] 2024.07.27 15:30:58.653462 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> MemoryTracker: Peak memory usage (for query): 3.34 MiB.
[chi] 2024.07.27 15:30:58.653681 [ 10213 ] [af169c90-61ff-4b22-b485-50a0a6c63ca] <Debug> TCPHandler: Processed in 0.084786375 sec.

10 rows in set. Elapsed: 0.084 sec. Processed 49.15 thousand rows, 1.95 MB (587.51 thousand rows/s., 23.27 MB/s.)
Peak memory usage: 3.34 MiB.

chl :) |
```

```
ch1 :) explain indexes=1 select * from movies where id>100 limit 10

EXPLAIN indexes = 1
SELECT *
FROM movies
WHERE id > 100
LIMIT 10

Query id: c89830ed-d929-4467-bed3-52ff778b53cf6

[ch1] 2024.07.27 15:33:09.839833 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Debug> executeQuery: ((from 152.169.108.132:33772) explain indexes=1 select * from movies where id>100 limit 10 (stage: Complete))
[ch1] 2024.07.27 15:33:09.833129 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> Planner: Query SELECT __table1.id AS id, __table1.name AS name, __table1.year AS year, __table1.rank AS rank FROM imdb.movies AS __table1 WHERE __table1.id > 100 LIMIT CAST(10, 'UInt64') to stage Complete
[ch1] 2024.07.27 15:33:09.833388 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> ContextAccess (default): Access granted: SELECT(id, name, year, rank) ON imdb.movies
[ch1] 2024.07.27 15:33:09.833398 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> Planner: Query SELECT __table1.id AS id, __table1.name AS name, __table1.year AS year, __table1.rank AS rank FROM imdb.movies AS __table1 WHERE __table1.id > 100 LIMIT CAST(10, 'UInt64') from stage FetchColumns to stage Complete
[ch1] 2024.07.27 15:33:09.834893 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> QueryPlanOptimizePrewhere: The min valid primary key position for moving to the tail of PREWHERE is 0
[ch1] 2024.07.27 15:33:09.835612 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Debug> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Key condition: (column 0 in [101, +Inf))
[ch1] 2024.07.27 15:33:09.836469 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Running binary search on index range for part all_1_1_0 (49 marks)
[ch1] 2024.07.27 15:33:09.836851 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Found (LEFT) boundary mark: 0
[ch1] 2024.07.27 15:33:09.836935 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Found (RIGHT) boundary mark: 49
[ch1] 2024.07.27 15:33:09.836959 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Trace> imdb.movies (29c257b3-49c3-4f77-bec5-f789f20aee41) (SelectExecutor): Found continuous range in 11 steps

  explain
  Expression ((Project names + Projection))
  1. Limit (preliminary LIMIT (without OFFSET))
  2. Expression
  3. ReadFromMergeTree (imdb.movies)
  4. Indexes:
  5. PrimaryKey
  6. Keys:
  7. id
  8. Condition (id in [101, +Inf))
  9. Parts: 1/1
  10. Granules: 48/48
  11.

[ch1] 2024.07.27 15:33:09.839946 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Debug> executeQuery: Read 11 rows, 382.00 B in 0.009272 sec., 1186.3675582398619 rows/sec., 40.23 KiB/sec.
[ch1] 2024.07.27 15:33:09.840050 [ 10213 ] [c89830ed-d929-4467-bed3-52ff778b53cf6] <Debug> TCPHandler: Processed in 0.010884667 sec.

11 rows in set. Elapsed: 0.011 sec.
```