

# Query Explain Analyze

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## Web Queries

### Home Page Query

```
"Limit (cost=98093.69..98300.24 rows=10 width=60) (actual time=192.455..195.961 rows=10 loops=1)"
"  → Nested Loop (cost=98093.69..2106151.23 rows=97217 width=60) (actual time=192.453..195.959 rows=10 loops=1)"
"    → Gather Merge (cost=98093.13..288281.61 rows=1632989 width=20) (actual time=192.431..195.896 rows=12 loops=1)"
"      Workers Planned: 2"
"      Workers Launched: 2"
"    → Sort (cost=97093.10..98794.13 rows=680412 width=20) (actual time=179.414..179.478 rows=878 loops=3)"
"      Sort Key: tr.numvotes DESC"
"      Sort Method: external merge  Disk: 17776kB"
"      Worker 0: Sort Method: external merge  Disk: 17272kB"
"      Worker 1: Sort Method: external merge  Disk: 16592kB"
"    → Parallel Seq Scan on title_ratings tr (cost=0.00..17220.12 rows=680412 width=20) (actual time=0.198..60.986 rows=544330 loops=3)"
"      → Index Scan using idx_title_basics_tconst on title_basics tb (cost=0.56..1.11 rows=1 width=50) (actual time=0.005..0.005 rows=1 loops=12)"
"        Index Cond: ((tconst)::text = (tr.tconst)::text)"
"        Filter: (titletype = 'movie'::text)"
"        Rows Removed by Filter: 0"
"Planning Time: 0.408 ms"
"Execution Time: 197.113 ms"
```

### Movie Listing Page Query

```
"Limit (cost=26331.89..26337.72 rows=50 width=59) (actual time=96.528..98.029 rows=50 loops=1)"
"  → Gather Merge (cost=26331.89..27550.44 rows=10444 width=59) (actual time=96.526..98.026 rows=50 loops=1)"
"    Workers Planned: 2"
"    Workers Launched: 2"
"  → Sort (cost=25331.87..25344.92 rows=5222 width=59) (actual time=90.880..90.881 rows=50 loops=3)"
"    Sort Key: averagerating DESC"
```

```
"      Sort Method: top-N heapsort  Memory: 29kB"
"      Worker 0: Sort Method: top-N heapsort  Memory: 28kB"
"      Worker 1: Sort Method: top-N heapsort  Memory: 29kB"
"      → Parallel Seq Scan on movie_summary  (cost=0.00..25158.39 rows=5222 width=59) (actual time=
16.194..89.887 rows=6396 loops=3)"
"          Filter: (((genres ~* '%Action%':::text) OR (genres IS NULL)) AND ((year = 2010) OR (year IS NUL
L)) AND ((averagerating >= '7':::double precision) OR (averagerating IS NULL)))"
"          Rows Removed by Filter: 231976"
"Planning Time: 0.271 ms"
"Execution Time: 98.054 ms"
```

## Series Listing Page

```
"Limit  (cost=12521.73..12527.56 rows=50 width=63) (actual time=60.449..61.400 rows=50 loops=1)"
"  → Gather Merge  (cost=12521.73..12881.56 rows=3084 width=63) (actual time=60.447..61.395 rows=50 lo
ops=1)"
"    Workers Planned: 2"
"    Workers Launched: 2"
"    → Sort  (cost=11521.71..11525.56 rows=1542 width=63) (actual time=51.408..51.410 rows=39 loops=3)"
"        Sort Key: averagerating DESC"
"        Sort Method: top-N heapsort  Memory: 34kB"
"        Worker 0: Sort Method: top-N heapsort  Memory: 35kB"
"        Worker 1: Sort Method: top-N heapsort  Memory: 35kB"
"        → Parallel Seq Scan on series_summary  (cost=0.00..11470.48 rows=1542 width=63) (actual time=
0.404..50.807 rows=1504 loops=3)"
"            Filter: ((genres ~* '%Drama%':::text) AND (startyear >= 2010) AND (startyear <= 2020) AND (a
veragerating >= '7.5':::double precision))"
"            Rows Removed by Filter: 113036"
"Planning Time: 0.562 ms"
"Execution Time: 61.443 ms"
```

## Movie Summary Page

```
"Index Scan using movie_summary_pkey on movie_summary  (cost=0.42..8.44 rows=1 width=223) (actual tim
e=0.055..0.057 rows=1 loops=1)"
"  Index Cond: (tconst = 'tt3063586':::text)"
"Planning Time: 0.391 ms"
"Execution Time: 0.096 ms"
```

## Series Summary Page

```
"Index Scan using series_summary_pkey on series_summary  (cost=0.42..8.44 rows=1 width=192) (actual tim
e=0.030..0.032 rows=1 loops=1)"
"  Index Cond: (tconst = 'tt0989125':::text)"
"Planning Time: 0.134 ms"
"Execution Time: 0.053 ms"
```

## Filtering for adult content query

```
"Seq Scan on title_basics  (cost=0.00..289410.03 rows=11311166 width=46) (actual time=0.059..1226.645 row
s=11286653 loops=1)"
"  Filter: (NOT isadult)"
"  Rows Removed by Filter: 377550"
```

```
"Planning Time: 0.100 ms"
"Execution Time: 1459.914 ms"
```

## Search Engine Query

```
"Limit (cost=24669.33..24671.66 rows=20 width=55) (actual time=86.624..87.615 rows=20 loops=1)"
"  → Gather Merge (cost=24669.33..24676.33 rows=60 width=55) (actual time=86.622..87.613 rows=20 loops=1)"
"    Workers Planned: 2"
"    Workers Launched: 2"
"    → Sort (cost=23669.30..23669.38 rows=30 width=55) (actual time=79.433..79.434 rows=20 loops=3)"
"      Sort Key: averagerating DESC, numvotes DESC"
"      Sort Method: quicksort Memory: 29kB"
"      Worker 0: Sort Method: quicksort Memory: 28kB"
"      Worker 1: Sort Method: quicksort Memory: 28kB"
"      → Parallel Seq Scan on movie_summary (cost=0.00..23668.57 rows=30 width=55) (actual time=13.381..79.315 rows=33 loops=3)"
"        Filter: (title ~~* '%batman%':text)"
"        Rows Removed by Filter: 238340"
"Planning Time: 0.250 ms"
"Execution Time: 87.667 ms"
```

## Analysis Queries

### Top Director-Actor Pairs

```
"Limit (cost=3031753.72..3031753.74 rows=10 width=68) (actual time=55633.335..56019.719 rows=10 loops=1)"
"  → Sort (cost=3031753.72..3033189.18 rows=574185 width=68) (actual time=55633.331..56019.714 rows=10 loops=1)"
"    Sort Key: (round(avg(r.averagerating), 2)) DESC"
"    Sort Method: top-N heapsort Memory: 26kB"
"    → Finalize GroupAggregate (cost=2790497.22..3019345.78 rows=574185 width=68) (actual time=51685.737..55955.902 rows=448299 loops=1)"
"      Group Key: d.primaryname, a.primaryname"
"      Filter: (count(*) >= 3)"
"      Rows Removed by Filter: 4312424"
"      → Gather Merge (cost=2790497.22..2974128.68 rows=1435464 width=68) (actual time=51685.677..53795.666 rows=4770839 loops=1)"
"        Workers Planned: 2"
"        Workers Launched: 2"
"        → Partial GroupAggregate (cost=2789497.20..2807440.50 rows=717732 width=68) (actual time=51645.421..52732.942 rows=1590280 loops=3)"
"          Group Key: d.primaryname, a.primaryname"
"          → Sort (cost=2789497.20..2791291.53 rows=717732 width=34) (actual time=51645.355..52025.127 rows=2684627 loops=3)"
"            Sort Key: d.primaryname, a.primaryname"
"            Sort Method: external merge Disk: 120752kB"
"            Worker 0: Sort Method: external merge Disk: 120032kB"
"            Worker 1: Sort Method: external merge Disk: 120848kB"
"            → Parallel Hash Join (cost=1052890.78..2700058.68 rows=717732 width=34) (actual time=48492.392..49826.350 rows=2684627 loops=3)"
```

```

"          Hash Cond: ((p.nconst)::text = (a.nconst)::text)"
"          → Parallel Hash Join (cost=729494.59..2329768.45 rows=717732 width=30) (actual
time=40732.413..42299.113 rows=2684627 loops=3)"
"          Hash Cond: ((p.tconst)::text = (b.tconst)::text)"
"          → Parallel Seq Scan on title_principals p (cost=0.00..1344895.00 rows=16179815
width=20) (actual time=0.934..19946.822 rows=12836517 loops=3)"
"          Filter: (category = ANY ('{actor,actress}'::text[]))"
"          Rows Removed by Filter: 18026267"
"          → Parallel Hash (cost=724693.69..724693.69 rows=215592 width=50) (actual ti
me=18800.897..18800.933 rows=376583 loops=3)"
"          Buckets: 131072 (originally 131072) Batches: 16 (originally 8) Memory Usage:
7168kB"
"          → Parallel Hash Join (cost=435054.23..724693.69 rows=215592 width=50)
(actual time=17996.042..18619.275 rows=376583 loops=3)"
"          Hash Cond: ((b.tconst)::text = (c.tconst)::text)"
"          → Parallel Seq Scan on title_basics b (cost=0.00..221368.85 rows=48600
85 width=10) (actual time=0.592..3507.580 rows=3888068 loops=3)"
"          → Parallel Hash (cost=430674.32..430674.32 rows=215593 width=40) (a
ctual time=13972.992..13973.018 rows=376583 loops=3)"
"          Buckets: 131072 (originally 131072) Batches: 16 (originally 8) Memory
Usage: 6432kB"
"          → Nested Loop (cost=29048.84..430674.32 rows=215593 width=40)
(actual time=2174.785..13715.150 rows=376583 loops=3)"
"          → Parallel Hash Join (cost=29048.27..209093.16 rows=383004 wi
dth=39) (actual time=2172.736..2931.835 rows=449828 loops=3)"
"          Hash Cond: ((c.tconst)::text = (r.tconst)::text)"
"          → Parallel Seq Scan on title_crew c (cost=0.00..137480.60 rows
=2735728 width=23) (actual time=1.854..1384.271 rows=2197448 loops=3)"
"          Filter: (directors IS NOT NULL)"
"          Rows Removed by Filter: 1690600"
"          → Parallel Hash (cost=17220.12..17220.12 rows=680412 width=1
6) (actual time=308.796..308.798 rows=544330 loops=3)"
"          Buckets: 262144 Batches: 16 Memory Usage: 7616kB"
"          → Parallel Seq Scan on title_ratings r (cost=0.00..17220.12 r
ows=680412 width=16) (actual time=0.967..180.646 rows=544330 loops=3)"
"          → Memoize (cost=0.57..5.79 rows=1 width=24) (actual time=0.02
4..0.024 rows=1 loops=1349484)"
"          Cache Key: c.directors"
"          Cache Mode: logical"
"          Hits: 253894 Misses: 195107 Evictions: 126766 Overflows: 0
Memory Usage: 8194kB"
"          Worker 0: Hits: 255749 Misses: 195318 Evictions: 126998 Ove
rflows: 0 Memory Usage: 8194kB"
"          Worker 1: Hits: 255102 Misses: 194314 Evictions: 125933 Over
flows: 0 Memory Usage: 8194kB"
"          → Index Scan using idx_name_basics_nconst on name_basics d
(cost=0.56..5.78 rows=1 width=24) (actual time=0.053..0.053 rows=1 loops=584739)"
"          Index Cond: ((nconst)::text = c.directors)"
"          → Parallel Hash (cost=213115.64..213115.64 rows=6006764 width=24) (actual time=
5394.325..5394.327 rows=4805411 loops=3)"
"          Buckets: 131072 Batches: 128 Memory Usage: 7744kB"
"          → Parallel Seq Scan on name_basics a (cost=0.00..213115.64 rows=6006764 wid
th=24) (actual time=0.104..3920.864 rows=4805411 loops=3)"

```

"Planning Time: 26.251 ms"  
"Execution Time: 56042.574 ms"

## Average IMDB Rating per Genre for the top 10 genres Query

```
"Limit (cost=594365.74..594365.77 rows=10 width=72) (actual time=5494.476..5523.851 rows=10 loops=1)"
"  → Sort (cost=594365.74..594365.91 rows=67 width=72) (actual time=5494.476..5523.850 rows=10 loops=1)"
"    Sort Key: (round(avg(r.averagerating), 2)) DESC"
"    Sort Method: top-N heapsort  Memory: 25kB"
"  → Finalize GroupAggregate (cost=594310.46..594364.29 rows=67 width=72) (actual time=5494.422..5523.832 rows=28 loops=1)"
"    Group Key: sub.genre"
"    Filter: (count(*) > 50)"
"  → Gather Merge (cost=594310.46..594357.12 rows=400 width=72) (actual time=5494.414..5523.796 rows=84 loops=1)"
"    Workers Planned: 2"
"    Workers Launched: 2"
"  → Sort (cost=593310.43..593310.93 rows=200 width=72) (actual time=5482.382..5482.464 rows=28 loops=3)"
"    Sort Key: sub.genre"
"    Sort Method: quicksort  Memory: 28kB"
"    Worker 0: Sort Method: quicksort  Memory: 28kB"
"    Worker 1: Sort Method: quicksort  Memory: 28kB"
"  → Partial HashAggregate (cost=593300.29..593302.79 rows=200 width=72) (actual time=5482.345..5482.431 rows=28 loops=3)"
"    Group Key: sub.genre"
"    Batches: 1  Memory Usage: 48kB"
"    Worker 0: Batches: 1  Memory Usage: 48kB"
"    Worker 1: Batches: 1  Memory Usage: 48kB"
"  → Parallel Hash Join (cost=58096.54..588419.01 rows=650837 width=38) (actual time=5090.272..5346.517 rows=1076392 loops=3)"
"    Hash Cond: ((sub.tconst)::text = (r.tconst)::text)"
"  → Subquery Scan on sub (cost=29048.27..424557.22 rows=6508370 width=42) (actual time=3374.284..4725.405 rows=1076392 loops=3)"
"    → ProjectSet (cost=29048.27..359473.52 rows=6508370 width=42) (actual time=3374.283..4666.833 rows=1076392 loops=3)"
"      → Parallel Hash Join (cost=29048.27..320423.30 rows=650837 width=22) (actual time=3374.265..4433.416 rows=536237 loops=3)"
"        Hash Cond: ((b.tconst)::text = (r_1.tconst)::text)"
"      → Parallel Seq Scan on title_basics b (cost=0.00..221368.85 rows=4648833 width=22) (actual time=1.542..2574.679 rows=3715698 loops=3)"
"        Filter: (genres IS NOT NULL)"
"        Rows Removed by Filter: 172370"
"      → Parallel Hash (cost=17220.12..17220.12 rows=680412 width=10) (actual time=110.883..110.883 rows=544330 loops=3)"
"        Buckets: 262144  Batches: 16  Memory Usage: 6880kB"
"      → Parallel Seq Scan on title_ratings r_1 (cost=0.00..17220.12 rows=680412 width=10) (actual time=0.017..35.225 rows=544330 loops=3)"
"    → Parallel Hash (cost=17220.12..17220.12 rows=680412 width=16) (actual time=141.259..141.259 rows=544330 loops=3)"
"      Buckets: 262144  Batches: 16  Memory Usage: 7584kB"
"    → Parallel Seq Scan on title_ratings r (cost=0.00..17220.12 rows=680412 width=16) (actual time=0.074..40.606 rows=544330 loops=3)"
```

```
"Planning Time: 0.458 ms"
"Execution Time: 5523.932 ms"
```

## Average Rating Per Genre Per Decade Query

```
"Incremental Sort (cost=327835.24..328244.18 rows=1310 width=80) (actual time=3190.257..3191.724 rows=
339 loops=1)"
"  Sort Key: ((floor(((tb.startyear / 10))::double precision) * '10'::double precision)), (count(*)) DESC"
"  Presorted Key: ((floor(((tb.startyear / 10))::double precision) * '10'::double precision))"
"  Full-sort Groups: 7  Sort Method: quicksort  Average Memory: 27kB  Peak Memory: 27kB"
"  → Finalize GroupAggregate (cost=327832.24..328203.43 rows=1310 width=80) (actual time=3190.179..31
91.615 rows=339 loops=1)"
"    Group Key: ((floor(((tb.startyear / 10))::double precision) * '10'::double precision)), genre.genre"
"    → Gather Merge (cost=327832.24..328137.93 rows=2620 width=80) (actual time=3190.170..3191.235 r
ows=973 loops=1)"
"      Workers Planned: 2"
"      Workers Launched: 2"
"      → Sort (cost=326832.22..326835.49 rows=1310 width=80) (actual time=3180.273..3180.282 rows
=324 loops=3)"
"        Sort Key: ((floor(((tb.startyear / 10))::double precision) * '10'::double precision)), genre.genre"
"        Sort Method: quicksort  Memory: 63kB"
"        Worker 0: Sort Method: quicksort  Memory: 63kB"
"        Worker 1: Sort Method: quicksort  Memory: 63kB"
"        → Partial HashAggregate (cost=326734.91..326764.39 rows=1310 width=80) (actual time=318
0.096..3180.157 rows=324 loops=3)"
"          Group Key: (floor(((tb.startyear / 10))::double precision) * '10'::double precision), genre.genr
e"
"            Batches: 1  Memory Usage: 193kB"
"            Worker 0: Batches: 1  Memory Usage: 193kB"
"            Worker 1: Batches: 1  Memory Usage: 321kB"
"            → Nested Loop (cost=20989.92..312265.33 rows=1446958 width=46) (actual time=88.34
4..3104.233 rows=292018 loops=3)"
"              → Parallel Hash Join (cost=20989.90..277813.14 rows=144696 width=22) (actual time=
88.318..3015.738 rows=130080 loops=3)"
"                Hash Cond: ((tb.tconst)::text = (tr.tconst)::text)"
"                → Parallel Seq Scan on title_basics tb (cost=0.00..245669.27 rows=4249132 width=
26) (actual time=0.470..1862.680 rows=3408648 loops=3)"
"                  Filter: ((startyear >= 1900) AND (startyear <= 2025))"
"                  Rows Removed by Filter: 479420"
"                  → Parallel Hash (cost=18921.15..18921.15 rows=165500 width=16) (actual time=87.05
2..87.053 rows=130343 loops=3)"
"                    Buckets: 524288  Batches: 1  Memory Usage: 25248kB"
"                    → Parallel Seq Scan on title_ratings tr (cost=0.00..18921.15 rows=165500 width=1
6) (actual time=0.099..48.292 rows=130343 loops=3)"
"                      Filter: (numvotes > 100)"
"                      Rows Removed by Filter: 413986"
"                      → Memoize (cost=0.01..0.12 rows=10 width=32) (actual time=0.000..0.000 rows=2 loop
s=390239)"
"                        Cache Key: tb.genres"
"                        Cache Mode: binary"
"                        Hits: 130256  Misses: 1290  Evictions: 0  Overflows: 0  Memory Usage: 246kB"
"                        Worker 0: Hits: 128299  Misses: 1284  Evictions: 0  Overflows: 0  Memory Usage: 245
kB"
"                        Worker 1: Hits: 127818  Misses: 1292  Evictions: 0  Overflows: 0  Memory Usage: 246k
```

```

B"
"          → Function Scan on unnest genre (cost=0.01..0.11 rows=10 width=32) (actual time=
0.003..0.003 rows=3 loops=3866)"
"Planning Time: 0.384 ms"
"Execution Time: 3191.939 ms"

```

## Rating by Runtime Category Query

```

"Sort (cost=279484.59..279485.14 rows=220 width=72) (actual time=2729.746..2742.881 rows=4 loops=1)"
"  Sort Key: (count(*)) DESC"
"  Sort Method: quicksort  Memory: 25kB"
"  → Finalize GroupAggregate (cost=279413.69..279476.03 rows=220 width=72) (actual time=2729.711..274
2.850 rows=4 loops=1)"
"    Group Key: (CASE WHEN (tb.runtimeminutes < 60) THEN 'Short (<60min)::text WHEN ((tb.runtimeminu
tes >= 60) AND (tb.runtimeminutes <= 89)) THEN 'Medium (60-89min)::text WHEN ((tb.runtimeminutes >= 9
0) AND (tb.runtimeminutes <= 119)) THEN 'Feature (90-119min)::text WHEN (tb.runtimeminutes >= 120) THE
N 'Long (120+min)::text ELSE 'Unknown::text END)"
"    → Gather Merge (cost=279413.69..279465.03 rows=440 width=72) (actual time=2729.701..2742.837 r
ows=12 loops=1)"
"      Workers Planned: 2"
"      Workers Launched: 2"
"      → Sort (cost=278413.67..278414.22 rows=220 width=72) (actual time=2717.376..2717.463 rows=4 l
oops=3)"
"        Sort Key: (CASE WHEN (tb.runtimeminutes < 60) THEN 'Short (<60min)::text WHEN ((tb.runtime
minutes >= 60) AND (tb.runtimeminutes <= 89)) THEN 'Medium (60-89min)::text WHEN ((tb.runtimeminutes
>= 90) AND (tb.runtimeminutes <= 119)) THEN 'Feature (90-119min)::text WHEN (tb.runtimeminutes >= 120)
THEN 'Long (120+min)::text ELSE 'Unknown::text END)"
"        Sort Method: quicksort  Memory: 25kB"
"        Worker 0: Sort Method: quicksort  Memory: 25kB"
"        Worker 1: Sort Method: quicksort  Memory: 25kB"
"        → Partial HashAggregate (cost=278399.06..278405.11 rows=220 width=72) (actual time=2717.3
42..2717.430 rows=4 loops=3)"
"          Group Key: CASE WHEN (tb.runtimeminutes < 60) THEN 'Short (<60min)::text WHEN ((tb.ru
ntimeminutes >= 60) AND (tb.runtimeminutes <= 89)) THEN 'Medium (60-89min)::text WHEN ((tb.runtimemi
nutes >= 90) AND (tb.runtimeminutes <= 119)) THEN 'Feature (90-119min)::text WHEN (tb.runtimeminutes >=
120) THEN 'Long (120+min)::text ELSE 'Unknown::text END"
"          Batches: 1  Memory Usage: 40kB"
"          Worker 0: Batches: 1  Memory Usage: 40kB"
"          Worker 1: Batches: 1  Memory Usage: 40kB"
"          → Parallel Hash Join (cost=29048.27..276733.07 rows=222132 width=38) (actual time=231
8.734..2669.084 rows=378455 loops=3)"
"            Hash Cond: ((tb.tconst)::text = (tr.tconst)::text)"
"            → Parallel Seq Scan on title_basics tb (cost=0.00..221368.85 rows=1586656 width=14)
(actual time=1.124..1763.865 rows=1279299 loops=3)"
"              Filter: (runtimeminutes IS NOT NULL)"
"              Rows Removed by Filter: 2608769"
"              → Parallel Hash (cost=17220.12..17220.12 rows=680412 width=16) (actual time=309.121..
309.123 rows=544330 loops=3)"
"                Buckets: 262144  Batches: 16  Memory Usage: 7584kB"
"                → Parallel Seq Scan on title_ratings tr (cost=0.00..17220.12 rows=680412 width=16)
(actual time=0.084..91.199 rows=544330 loops=3)"
"Planning Time: 0.633 ms"
"Execution Time: 2743.001 ms"

```

