

Напредни бази на податоци

Фаза 4 - Индекси и оптимизација на прашалници

Проект: GEOCAB

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## View 1: vw\_active\_driver\_status – Активни возачи

**Опис и филтри:** Овој поглед се користи кога корисникот бара такси. Ги прикажува сите активни возачи. Апликацијата го повикува ова view за да се прикаже кои возачи се достапни и слободни. Примарен филтер е `is_available` и `driver_status = 'active'`, а може да се филтрира и според `naselba` и `vehicle_class` (Economy class/ Luxury class)

**Време на извршување:** 45ms — ова е прифатливо време за апликацијата. Бидејќи времето е прифатливо (под 100ms), нема потреба од индексирање за овој поглед.

The screenshot displays a database management interface. At the top, the SQL script for creating the view `vw_active_driver_status` is shown. The script uses `CREATE OR REPLACE VIEW` and includes a `SELECT` statement that retrieves driver information from a table named `d`.

```
-- VIEW 1: vw_active_driver_status
--
CREATE OR REPLACE VIEW vw_active_driver_status
(driver_id, driver_name, driver_phone, driver_rating, is_available, working_start,
current_location_id, grad, naselba, current_street, vehicle_plate, vehicle_color,
vehicle_model, vehicle_class, vehicle_brand, base_price, price_per_km, driver_status)
AS
SELECT d.driver_id,
       d.name AS driver name,
```

Below the script, the view is queried with `select * from vw_active_driver_status`. The results are shown in a table with 8 columns: `driver_id`, `driver_name`, `driver_phone`, `driver_rating`, `is_available`, `working_start`, `current_location_id`, and a `Value` column. The table contains 29 rows of data, representing active drivers.

	driver_id	driver_name	driver_phone	driver_rating	is_available	working_start	current_location_id	Value
1	1	Marko Dimitrov	+38972000001	4.34	[v]	2026-05-01 18:19:23.102		1
2	2	Nikola Stojanov	+38972000002	4.04	[v]	2026-05-01 13:38:22.209		
3	3	Stefan Petrovski	+38972000003	3.63	[v]	2026-05-01 18:22:03.560		
4	5	Goran Trajkov	+38972000005	4.47	[v]	2026-05-01 13:50:57.246		
5	6	Bojan Georgiev	+38972000006	4.03	[v]	2026-05-01 12:24:32.556		
6	7	Andrej Kostov	+38972000007	3.61	[ ]	2026-05-01 13:14:04.838		
7	9	Viktor Ristov	+38972000009	3.57	[ ]	2026-05-01 18:58:01.544		
8	10	Aleksandar Popov	+38972000010	4.18	[v]	2026-05-01 15:40:21.845		
9	11	Dejan Jovanov	+38972000011	4.8	[v]	2026-05-01 14:06:42.577		
10	13	Ilija Mitrev	+38972000013	3.69	[v]	2026-05-01 12:48:02.847		
11	14	Dimitar Ivanov	+38972000014	4.36	[v]	2026-05-01 15:22:24.002		
12	15	Kiril Sokolov	+38972000015	4.51	[v]	2026-05-01 19:05:21.238		
13	17	Vladimir Spasov	+38972000017	4.07	[ ]	2026-05-01 19:08:44.871		
14	18	Vasko Angelov	+38972000018	4.3	[ ]	2026-05-01 14:00:32.842		
15	19	Riste Vasilev	+38972000019	4.79	[ ]	2026-05-01 13:39:57.835		
16	21	Igor Grucev	+38972000021	4.53	[v]	2026-05-01 15:56:56.268		
17	22	Damjan Nikolovski	+38972000022	3.86	[v]	2026-05-01 14:47:21.017		
18	23	Darko Filipov	+38972000023	3.56	[v]	2026-05-01 12:57:51.996		
19	25	Luka Andonov	+38972000025	4.15	[v]	2026-05-01 13:00:28.231		
20	26	Emil Zafirov	+38972000026	4.05	[v]	2026-05-01 15:10:04.437		
21	27	Stojan Kolev	+38972000027	4.68	[ ]	2026-05-01 12:02:42.587		
22	29	Boris Bojkov	+38972000029	4.1	[ ]	2026-05-01 16:34:17.975		

The bottom of the interface shows a status bar with the following information: Save, Cancel, Script, 200, 150, Rows: 1, 150 row(s) fetched - 45ms (10ms fetch), on 2026-05-05 at 21:09.

## View 2: vw\_ride\_details – Преглед на секое возење

**Опис и филтри:** Овој поглед се користи на екранот „Мои возења“ каде корисникот ги гледа сите свои возења со детали за возач, локации и цена. Примарен филтер е според user\_id, а може да се филтрира и според driver\_id или ride\_id.

**Време на извршување: 15.130s** — ова е неприфатливо време.

```
-- VIEW 2: vw_ride_details
--
CREATE OR REPLACE VIEW vw_ride_details AS
SELECT
  r.ride_id,
  -- Korisnik
  u.user_id,
  u.name AS user_name,
  u.phone AS user_phone,
  d.driver_id,
  d.name AS driver_name,
  d.phone AS driver_phone,
  d.rating AS driver_rating,
  v.plate AS vehicle_plate,
  v.cc AS vehicle_cc
FROM rides r
JOIN users u ON r.user_id = u.user_id
JOIN drivers d ON r.driver_id = d.driver_id
JOIN vehicles v ON r.vehicle_id = v.vehicle_id
```

ride_id	user_id	user_name	user_phone	driver_id	driver_name	driver_phone	driver_rating	vehicle_plate	vehicle_cc
3,000,010	71	Marko Petrovski	+38971000071	85	Gjorgi Dimovski	+38972000085	4.87	KU0385VT	Sina
3,000,138	139	Miro Petrovski	+38971000139	102	Nikola Stojanov	+38972000102	4.53	KU0202QM	Siva
3,000,306	307	Simeon Dimovski	+38971000307	39	Zlatko Georgievski	+38972000039	4.12	KU0139NN	Temnosina
3,000,566	567	Andrej Filipov	+38971000567	128	Vlatko Stamenov	+38972000128	4.55	KU0228QM	Kafena
3,000,644	645	Kiril Kitanov	+38971000645	118	Vasko Angelov	+38972000118	4.86	KU0218SU	Kafena
3,001,260	1,261	Marko Petreski	+38971001261	10	Aleksandar Popov	+38972000010	4.18	KU0310KO	Cma
3,001,374	1,375	Spas Sokolov	+38971001375	196	Lazo Spiridonov	+38972000196	4	KU0296SU	Zelena
3,001,682	1,683	Stefan Bogdanov	+38971001683	157	Andrej Kostov	+38972000157	4.97	KU0257FH	Beza
3,002,237	2,238	Slobodanka Angel	+38971002238	27	Stojan Kolev	+38972000027	4.68	KU0327RD	Beza
3,002,531	2,532	Iva Nikolova	+38971002532	139	Zlatko Georgievski	+38972000139	3.88	KU0239TL	Temnosina
3,003,116	3,117	Kosta Jankov	+38971003117	49	Dragan Bogdanov	+38972000049	4.74	KU0349XB	Temnosina
3,003,476	3,477	Zlatko Ristov	+38971003477	108	Filip Manev	+38972000108	4.97	KU0208UC	Kafena
3,003,860	3,861	Dejan Rangelov	+38971003861	101	Marko Dimitrov	+38972000101	4.75	KU0201LF	Bela
3,004,020	4,021	Stojan Ristov	+38971004021	161	Dejan Jovanov	+38972000161	4.19	KU0261ZJ	Bela
3,004,217	4,218	Milena Angelova	+38971004218	50	Petar Ansov	+38972000050	4.81	KU0350CI	Cma
3,004,505	4,506	Monika Georgieva	+38971004506	109	Viktor Ristov	+38972000109	4.14	KU0209ZJ	Temnosina
3,004,577	4,578	Ivana Angelova	+38971004578	9	Viktor Ristov	+38972000009	3.57	KU0309FH	Temnosina
3,004,587	4,588	Tamara Stamenov	+38971004588	67	Vladimir Spasov	+38972000067	4.58	KU0167XB	Beza
3,004,742	4,743	Vangel Bogdanov	+38971004743	177	Stojan Kolev	+38972000177	4.58	KU0277BR	Beza
3,004,851	4,852	Tamara Bogdanov	+38971004852	58	Filip Manev	+38972000058	4.54	KU0158EQ	Kafena

## Explain plan:

Node Type	Entity	Cost	Rows	Condition
Hash Join		4745.55 - 1457335.71	10000078	(vt.vehicles_model_id = vm.vehicles_model_id)
Hash Join		4732.40 - 1430277.71	10000078	(vo.vehicle_type_id = vt.vehicle_type_id)
Hash Join		4720.82 - 1402426.63	10000078	(r.vehicle_ownership_id = vo.vehicle_ownership_id)
Hash Join		4711.07 - 1375795.83	10000078	(r.status_id = s.status_id)
Hash Join		4699.50 - 1347944.76	10000078	(r.driver_id = d.driver_id)
Hash Join		4692.00 - 1321130.80	10000078	(r.dropoff_location_id = ld.location_id)
Hash Join		4073.00 - 864424.72	10000078	(r.pickup_location_id = lp.location_id)
Hash Join		3454.00 - 524906.58	10000078	(r.user_id = u.user_id)
Seq Scan	rides	0.00 - 240811.78	10000078	
Hash		2100.00 - 2100.00	70000	
Seq Scan	users	0.00 - 2100.00	70000	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		5.00 - 5.00	200	
Seq Scan	drivers	0.00 - 5.00	200	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		6.00 - 6.00	300	
Seq Scan	vehicle_owners...	0.00 - 6.00	300	
Hash		10.70 - 10.70	70	
Seq Scan	vehicle_types	0.00 - 10.70	70	
Hash		11.40 - 11.40	140	
Seq Scan	vehicles_model	0.00 - 11.40	140	

select \* from vw\_ride\_details

## Пред индексирање на idx\_rides\_user\_id во табелата Rides:

select \* from vw\_ride\_details where user\_id = 1;

	123 ride_id	123 user_id	ABC user_name	ABC user_phone	123 driver_id	ABC driver_name	ABC driver_phone	123 driver_rating	ABC vehicle_plate	ABC vehicle_co	Value
1	3,070,000	1	Marko Dimitrov	+38971000001	49	Dragan Bogdanov	+38972000049	4.74	KU0349XB	Temnosina	3070000
2	3,140,000	1	Marko Dimitrov	+38971000001	155	Goran Trajkov	+38972000155	3.98	KU0255VT	Sina	
3	3,210,000	1	Marko Dimitrov	+38971000001	65	Kiril Sokolov	+38972000065	4.12	KU0165NN	Sina	
4	3,280,000	1	Marko Dimitrov	+38971000001	85	Gjorgi Dimovski	+38972000085	4.87	KU0185JX	Sina	

Save Cancel Script 200 142 Rows: 1 142 row(s) fetched - 8.44s (4ms fetch), on 2026-05-05 at 22:44:0

## По креирање на индексот:

select \* from vw\_ride\_details where user\_id = 1;

	123 ride_id	123 user_id	ABC user_name	ABC user_phone	123 driver_id	ABC driver_name	ABC driver_phone	123 driver_rating	ABC vehicle_plate	ABC vehicle_co	Value
1	12,170,000	1	Marko Dimitrov	+38971000001	21	Igor Grujev	+38972000021	4.53	KU0321NN	Bela	12170000
2	12,030,000	1	Marko Dimitrov	+38971000001	79	Boris Bojkov	+38972000079	4.49	KU0179FH	Temnosina	
3	9,230,000	1	Marko Dimitrov	+38971000001	59	Viktor Ristov	+38972000059	3.8	KU0159JX	Temnosina	
4	10,700,000	1	Marko Dimitrov	+38971000001	53	Stefan Petrovski	+38972000053	4.8	KU0153FH	Srebrena	

Save Cancel Script 200 142 Rows: 1 142 row(s) fetched - 51ms (2ms fetch), on 2026-05-05 at 22:49:0

## Пред индексирање на idx\_rides\_driver\_id во табелата Rides:

select \* from vw\_ride\_details where driver\_id=56;

	123 ride_id	123 user_id	ABC user_name	ABC user_phone	123 driver_id	ABC driver_name	ABC driver_phone	123 driver_rating	Value
1	3,041,298	41,299	Miro Filipov	+38971041299	56	Bojan Georgiev	+38972000056	4.87	3041298
2	3,041,571	41,572	Danica Bogdanova	+38971041572	56	Bojan Georgiev	+38972000056	4.87	
3	3,041,653	41,654	Natasha Ivanova	+38971041654	56	Bojan Georgiev	+38972000056	4.87	
4	3,041,719	41,720	Teodora Pavlova	+38971041720	56	Bojan Georgiev	+38972000056	4.87	
5	3,041,720	41,721	Marko Petreski	+38971041721	56	Bojan Georgiev	+38972000056	4.87	
6	3,041,851	41,852	Stana Hristova	+38971041852	56	Bojan Georgiev	+38972000056	4.87	
7	3,042,057	42,058	Milena Jankova	+38971042058	56	Bojan Georgiev	+38972000056	4.87	
8	3,042,189	42,190	Slobodanka Popova	+38971042190	56	Bojan Georgiev	+38972000056	4.87	

S... Can... Sc... 200 200+ Rows: 1 200 row(s) fetched - 1.514s (3ms fetch), on 2026-05-10 at 13:20:33

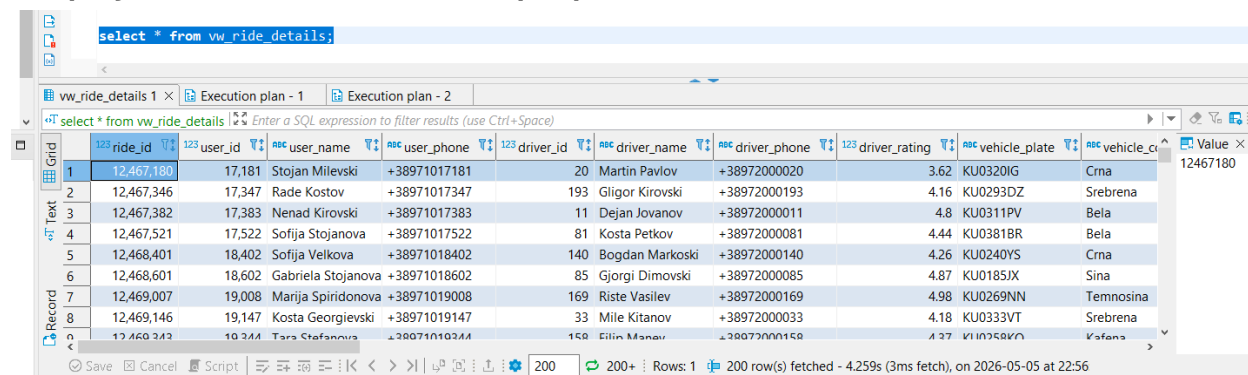
## По креирање на индексот:

select \* from vw\_ride\_details where driver\_id=56;

	123 ride_id	123 user_id	ABC user_name	ABC user_phone	123 driver_id	ABC driver_name	ABC driver_phone	123 driver_rating	Value
1	3,000,148	149	Viktor Mitrev	+38971000149	56	Bojan Georgiev	+38972000056	4.87	3000148
2	3,000,703	704	Marija Kirovska	+38971000704	56	Bojan Georgiev	+38972000056	4.87	
3	3,001,210	1,211	Igor Tasev	+38971001211	56	Bojan Georgiev	+38972000056	4.87	
4	3,001,279	1,280	Anastasija Pavlova	+38971001280	56	Bojan Georgiev	+38972000056	4.87	
5	3,001,319	1,320	Marija Arsova	+38971001320	56	Bojan Georgiev	+38972000056	4.87	
6	3,001,447	1,448	Zorica Maneva	+38971001448	56	Bojan Georgiev	+38972000056	4.87	
7	3,001,493	1,494	Slavica Rangelova	+38971001494	56	Bojan Georgiev	+38972000056	4.87	
8	3,001,684	1,685	Goran Rangelov	+38971001685	56	Bojan Georgiev	+38972000056	4.87	

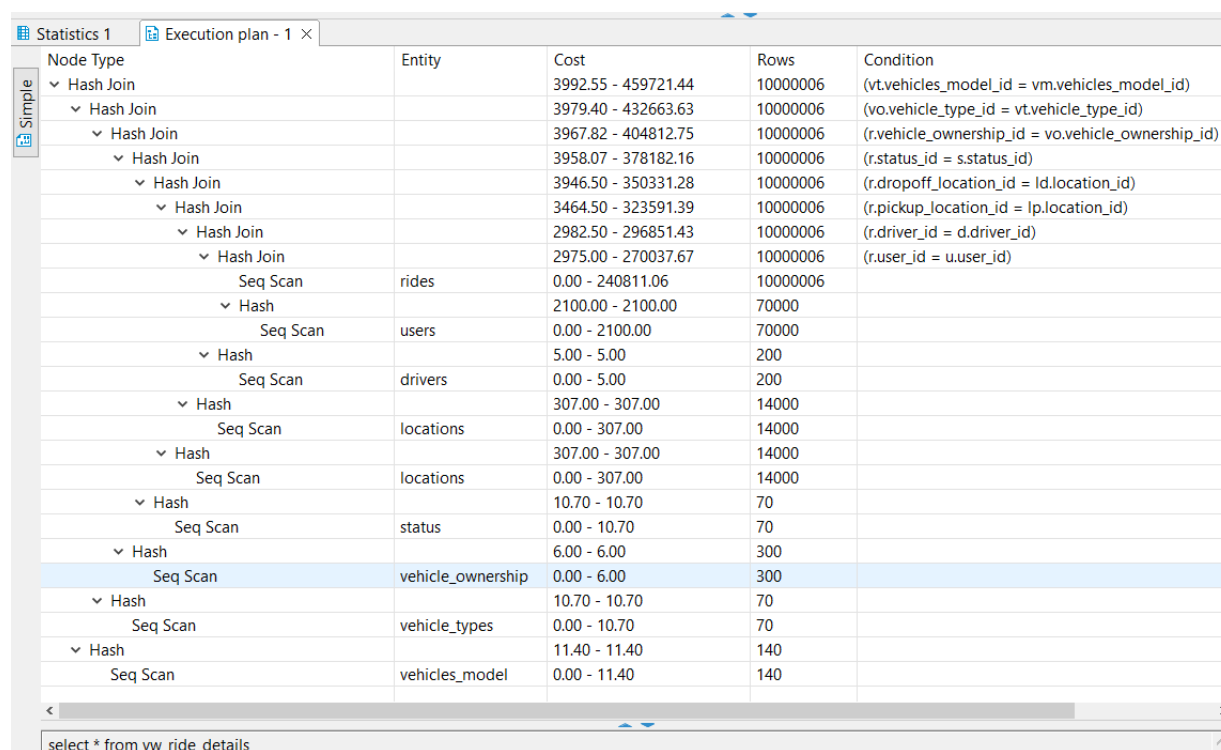
S... Can... Sc... 200 200+ Rows: 1 200 row(s) fetched - 862ms (8ms fetch), on 2026-05-10 at 13:16:04

## Извршување на целотот view по креирање на индексите:



ride_id	user_id	user_name	user_phone	driver_id	driver_name	driver_phone	driver_rating	vehicle_plate	vehicle_color
12,467,180	17,181	Stojan Milevski	+38971017181	20	Martin Pavlov	+38972000020	3.62	KU0320IG	Crna
12,467,346	17,347	Rade Kostov	+38971017347	193	Gligor Kirovski	+38972000193	4.16	KU0293DZ	Srebrna
12,467,382	17,383	Nenad Kirovski	+38971017383	11	Dejan Jovanov	+38972000011	4.8	KU0311PV	Bela
12,467,521	17,522	Sofija Stojanova	+38971017522	81	Kosta Petkov	+38972000081	4.44	KU0381BR	Bela
12,468,401	18,402	Sofija Velkova	+38971018402	140	Bogdan Markoski	+38972000140	4.26	KU0240YS	Crna
12,468,601	18,602	Gabriela Stojanova	+38971018602	85	Gjorgi Dimovski	+38972000085	4.87	KU0185JX	Sina
12,469,007	19,008	Marija Spiridonova	+38971019008	169	Riste Vasiliev	+38972000169	4.98	KU0269NN	Temnosina
12,469,146	19,147	Kosta Georgievski	+38971019147	33	Mile Kitanov	+38972000033	4.18	KU0333VT	Srebrna
12,469,342	19,344	Tara Stefanova	+38971019344	159	Elita Manas	+38972000159	4.37	KU0358VY	Kafena

## Execution plan по индекси:



Node Type	Entity	Cost	Rows	Condition
Hash Join		3992.55 - 459721.44	10000006	(vt.vehicles_model_id = vm.vehicles_model_id)
Hash Join		3979.40 - 432663.63	10000006	(vo.vehicle_type_id = vt.vehicle_type_id)
Hash Join		3967.82 - 404812.75	10000006	(r.vehicle_ownership_id = vo.vehicle_ownership_id)
Hash Join		3958.07 - 378182.16	10000006	(r.status_id = s.status_id)
Hash Join		3946.50 - 350331.28	10000006	(r.dropoff_location_id = ld.location_id)
Hash Join		3464.50 - 323591.39	10000006	(r.pickup_location_id = lp.location_id)
Hash Join		2982.50 - 296851.43	10000006	(r.driver_id = d.driver_id)
Hash Join		2975.00 - 270037.67	10000006	(r.user_id = u.user_id)
Seq Scan	rides	0.00 - 240811.06	10000006	
Hash		2100.00 - 2100.00	70000	
Seq Scan	users	0.00 - 2100.00	70000	
Hash		5.00 - 5.00	200	
Seq Scan	drivers	0.00 - 5.00	200	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		6.00 - 6.00	300	
Seq Scan	vehicle_ownership	0.00 - 6.00	300	
Hash		10.70 - 10.70	70	
Seq Scan	vehicle_types	0.00 - 10.70	70	
Hash		11.40 - 11.40	140	
Seq Scan	vehicles_model	0.00 - 11.40	140	

## View 3: vw\_payment\_history – Историја на плаќање за корисниците

**Опис и филтри:** Овој поглед се користи за финансиски преглед и следење на сите трансакции извршени во системот. Апликацијата го повикува ова view кога корисникот сака да ја види својата историја на плаќања или кога сметководството генерира извештаи за вкупниот промет и пресметаните попусти.

Примарен филтер за пребарување е user\_id или payment\_time (период од-до), а податоците овозможуваат и детално филтрирање според начинот на плаќање (payment\_method), статусот на трансакцијата (payment\_status) и износот на плаќање (amount).

## Време на извршување: 28m 56s — екстремно неприфатливо!

The screenshot shows a SQL IDE with a script editor at the top and a results grid below. The script defines a view named `vw_payment_history` that selects payment details and user information. The results grid displays 20 rows of data, including payment IDs, user IDs, names, phone numbers, ride IDs, and various timestamps.

```
-- VIEW 3: vw_payment_history
--
CREATE OR REPLACE VIEW vw_payment_history AS
SELECT
  p.payment_id,
  -- Корисник
  u.user_id,
  u.name AS user_name,
  u.phone AS user_phone,
```

payment_id	user_id	user_name	user_phone	ride_id	ride_requested_at	ride_started_at	ride_ended_at
2266	2267	Simeon Filipov	+38971002267	3,002,266	2025-10-02 15:36:47.000	2025-10-02 15:39:47.000	2025-10-02 15:59:47.000
6,676	6,677	Simeon Mitrev	+38971006677	3,006,676	2024-05-23 21:59:48.000	2024-05-23 22:06:48.000	2024-05-23 22:21:48.000
13,663	13,664	Nina Kirovska	+38971013664	3,013,663	2024-05-03 17:41:29.000	2024-05-03 17:48:29.000	2024-05-03 17:55:29.000
22,979	22,980	Tamara Ansova	+38971022980	3,022,979	2024-06-03 22:00:13.000	2024-06-03 22:13:13.000	2024-06-03 22:16:13.000
45,767	45,768	Teodora Spiridonova	+38971045768	3,045,767	2024-05-06 17:55:55.000	2024-05-06 18:01:55.000	2024-05-06 18:12:55.000
46,203	46,204	Sara Ilievska	+38971046204	3,046,203	2024-09-12 07:29:08.000	2024-09-12 07:42:08.000	2024-09-12 07:52:08.000
52,631	52,632	Teodora Nikolova	+38971052632	3,052,631	2026-02-15 13:05:10.000	2026-02-15 13:18:10.000	2026-02-15 13:29:10.000
53,542	53,543	Zdravko Kolev	+38971053543	3,053,542	2026-04-24 11:26:59.000	2026-04-24 11:35:59.000	2026-04-24 11:46:59.000
57,576	57,577	Kosta Donev	+38971057577	3,057,576	2025-02-14 19:03:14.000	2025-02-14 19:08:14.000	2025-02-14 19:25:14.000
74,966	4,967	Gorancho Petrovski	+38971004967	3,074,966	2024-07-27 09:13:03.000	2024-07-27 09:20:03.000	2024-07-27 09:39:03.000
90,043	20,044	Iva Ilievska	+38971020044	3,090,043	2025-04-15 20:48:31.000	2025-04-15 20:53:31.000	2025-04-15 21:06:31.000
102,082	32,083	Nenad Tasev	+38971032083	3,102,082	2025-03-10 19:36:00.000	2025-03-10 19:46:00.000	2025-03-10 20:01:00.000
102,117	32,118	Slavica Angelova	+38971032118	3,102,117	2024-10-01 19:15:42.000	2024-10-01 19:24:42.000	2024-10-01 19:41:42.000
103,358	33,359	Mile Georgievski	+38971033359	3,103,358	2025-04-13 12:34:54.000	2025-04-13 12:46:54.000	2025-04-13 12:57:54.000
116,874	46,875	Spas Filipov	+38971046875	3,116,874	2025-12-01 18:06:27.000	2025-12-01 18:19:27.000	2025-12-01 18:20:27.000
132,471	62,472	Maja Nikolova	+38971062472	3,132,471	2026-02-18 22:33:26.000	2026-02-18 22:40:26.000	2026-02-18 22:47:26.000
145,741	5,742	Marina Velkova	+38971005742	3,145,741	2025-04-19 21:09:57.000	2025-04-19 21:17:57.000	2025-04-19 21:26:57.000
159,504	19,505	Spas Jankov	+38971019505	3,159,504	2025-10-03 21:26:36.000	2025-10-03 21:31:36.000	2025-10-03 21:45:36.000
182,484	42,485	Vuk Rangelov	+38971042485	3,182,484	2024-07-29 13:48:11.000	2024-07-29 13:57:11.000	2024-07-29 14:02:11.000
200,351	60,352	Tara Bogdanova	+38971060352	3,200,351	2026-03-29 18:27:31.000	2026-03-29 18:33:31.000	2026-03-29 18:52:31.000
207,722	67,723	Vlatko Iliev	+38971067723	3,207,722	2026-04-10 10:17:05.000	2026-04-10 10:21:05.000	2026-04-10 10:35:05.000

## Explain plan:

The screenshot displays the execution plan for the `vw_payment_history` view. The plan shows a series of nested hash joins and sequential scans across various tables, including `payment_methods`, `status`, `locations`, `vehicle_ownership`, `vehicle_types`, and `vehicles_model`. The plan also includes cost estimates, row counts, and conditions for each step.

Node Type	Entity	Cost	Rows	Condition
Gather		534289.62 - 5067047.78	13999728	
Hash Join		533289.62 - 3666074.98	5833220	(vt.vehicles_model_id = vm.vehicles_model_id)
Hash Join		533276.47 - 3460706.44	5833220	(vo.vehicle_type_id = vt.vehicle_type_id)
Hash Join		533264.90 - 3444455.59	5833220	(r.vehicle_ownership_id = vo.vehicle_ownership_id)
Hash Join		533255.15 - 3428917.33	5833220	(r.dropoff_location_id = ld.location_id)
Hash Join		532677.15 - 974822.53	5833220	(r.status_id = sr.status_id)
Hash Join		532665.57 - 958571.68	5833220	(p.status_id = sp.status_id)
Hash Join		532654.00 - 942320.84	5833220	(p.payment_method_id = pm.payment_method_id)
Hash Join		532640.85 - 926531.95	5833220	(r.driver_id = d.driver_id)
Parallel Hash Join		532633.35 - 910887.78	5833220	(p.ride_id = r.ride_id)
Hash		5.00 - 5.00	200	
Hash		11.40 - 11.40	140	
Seq Scan	payment_methods	0.00 - 11.40	140	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		6.00 - 6.00	300	
Seq Scan	vehicle_ownership	0.00 - 6.00	300	
Hash		10.70 - 10.70	70	
Seq Scan	vehicle_types	0.00 - 10.70	70	
Hash		11.40 - 11.40	140	
Seq Scan	vehicles_model	0.00 - 11.40	140	

```
select * from vw_payment_history
```

## Пред индексирање на ride\_id во табелата Payments:

select \* from vw\_payment\_history where user\_id = 226

	123 payment_id	123 user_id	abc user_name	abc user_phone	123 ride_id	ride_requested_at	ride_started_at	ride_ended_at	123 distan
1	2,266	2,267	Simeon Filipov	+38971002267	3,002,266	2025-10-02 15:36:47.000	2025-10-02 15:39:47.000	2025-10-02 15:59:47.000	
2	72,266	2,267	Simeon Filipov	+38971002267	3,072,266	2025-03-04 14:21:10.000	2025-03-04 14:27:10.000	2025-03-04 14:40:10.000	
3	142,266	2,267	Simeon Filipov	+38971002267	3,142,266	2024-07-22 14:10:54.000	2024-07-22 14:19:54.000	2024-07-22 14:21:54.000	
4	212,266	2,267	Simeon Filipov	+38971002267	3,212,266	2024-08-04 14:52:54.000	2024-08-04 14:56:54.000	2024-08-04 15:16:54.000	
5	282,266	2,267	Simeon Filipov	+38971002267	3,282,266	2024-09-21 14:52:34.000	2024-09-21 15:03:34.000	2024-09-21 15:14:34.000	
6	352,266	2,267	Simeon Filipov	+38971002267	3,352,266	2025-03-04 17:21:20.000	2025-03-04 17:32:20.000	2025-03-04 17:38:20.000	
7	422,266	2,267	Simeon Filipov	+38971002267	3,422,266	2025-10-20 16:48:46.000	2025-10-20 16:52:46.000	2025-10-20 17:12:46.000	
8	492,266	2,267	Simeon Filipov	+38971002267	3,492,266	2025-10-11 18:53:00.000	2025-10-11 19:03:00.000	2025-10-11 19:10:00.000	

Save Cancel Script 200 200+ Rows: 1 200 row(s) fetched - 3.440s (1ms fetch), on 2026-05-05 at 23:40

CET en\_US Writable Smart Insert 77 : 1 [54] Sel: 54 | 1

## По креирање на индексот:

```
select * from vw_payment_history where user_id = 2267;  
CREATE INDEX idx_payments_ride_id  
ON payments(ride_id DESC NULLS LAST);
```

vw\_payment\_history 1 x Execution plan - 1

select \* from vw\_payment\_history where user\_id = 226

	123 payment_id	123 user_id	abc user_name	abc user_phone	123 ride_id	ride_requested_at	ride_started_at	ride_ended_at	123 distan
1	3,642,266	2,267	Simeon Filipov	+38971002267	6,642,266	2025-07-05 20:54:09.000	2025-07-05 21:02:09.000	2025-07-05 21:15:09.000	
2	10,642,266	2,267	Simeon Filipov	+38971002267	6,642,266	2025-07-05 20:54:09.000	2025-07-05 21:02:09.000	2025-07-05 21:15:09.000	
3	4,692,266	2,267	Simeon Filipov	+38971002267	7,692,266	2024-05-12 14:13:04.000	2024-05-12 14:21:04.000	2024-05-12 14:39:04.000	
4	11,692,266	2,267	Simeon Filipov	+38971002267	7,692,266	2024-05-12 14:13:04.000	2024-05-12 14:21:04.000	2024-05-12 14:39:04.000	
5	3,502,266	2,267	Simeon Filipov	+38971002267	6,502,266	2025-02-06 07:56:50.000	2025-02-06 08:07:50.000	2025-02-06 08:09:50.000	
6	10,502,266	2,267	Simeon Filipov	+38971002267	6,502,266	2025-02-06 07:56:50.000	2025-02-06 08:07:50.000	2025-02-06 08:09:50.000	
7	5,042,266	2,267	Simeon Filipov	+38971002267	8,042,266	2024-05-21 07:56:34.000	2024-05-21 08:09:34.000	2024-05-21 08:17:34.000	
8	12,042,266	2,267	Simeon Filipov	+38971002267	8,042,266	2024-05-21 07:56:34.000	2024-05-21 08:09:34.000	2024-05-21 08:17:34.000	
9	1,962,266	2,267	Simeon Filipov	+38971002267	4,962,266	2024-10-02 20:02:32.000	2024-10-02 20:11:32.000	2024-10-02 20:21:32.000	

Save Cancel Script 200 200+ Rows: 1 200 row(s) fetched - 349ms (3ms fetch), on 2026-05-05 at 23:46

## Пред индексирање на payments\_date во табелата Payments:

```
select * from vw_payment_history where DATE(payment_time) = '2025-10-02';
```

vw\_payment\_history 1 x Execution plan - 1

select \* from vw\_payment\_history where DATE(payment\_time) = '2025-10-02'

	123 payment_id	123 user_id	abc user_name	abc user_phone	123 ride_id	ride_requested_at	ride_started_at	ride_ended_at	123 distan
1	13,322,173	22,174	Slavica Ilieva	+38971022174	9,322,173	2025-10-02 15:40:27.000	2025-10-02 15:48:27.000	2025-10-02 15:56:27.000	
2	13,354,445	54,446	Dorotea Zafirova	+38971054446	9,354,445	2025-10-02 14:53:45.000	2025-10-02 14:56:45.000	2025-10-02 15:04:45.000	
3	13,361,678	61,679	Viktor Petrovski	+38971061679	9,361,678	2025-10-02 16:04:37.000	2025-10-02 16:13:37.000	2025-10-02 16:17:37.000	
4	13,413,483	43,484	Tamara Kirovska	+38971043484	9,413,483	2025-10-02 16:06:20.000	2025-10-02 16:16:20.000	2025-10-02 16:24:20.000	
5	13,422,837	52,838	Slobodanka Petreska	+38971052838	9,422,837	2025-10-02 19:08:05.000	2025-10-02 19:15:05.000	2025-10-02 19:21:05.000	
6	13,453,661	13,662	Marina Velkova	+38971013662	9,453,661	2025-10-02 16:41:18.000	2025-10-02 16:50:18.000	2025-10-02 17:09:18.000	
7	13,491,897	51,898	Hana Jankova	+38971051898	9,491,897	2025-10-02 12:14:32.000	2025-10-02 12:18:32.000	2025-10-02 12:23:32.000	
8	13,523,342	13,343	Jovan Sokolov	+38971013343	9,523,342	2025-10-02 08:55:55.000	2025-10-02 09:06:55.000	2025-10-02 09:14:55.000	
9	13,568,793	58,794	Sofija Rangelova	+38971058794	9,568,793	2025-10-02 06:57:47.000	2025-10-02 07:08:47.000	2025-10-02 07:12:47.000	
10	13,597,567	17,568	Karolina Spiridonova	+38971017568	9,597,567	2025-10-02 16:40:19.000	2025-10-02 16:53:19.000	2025-10-02 16:57:19.000	

Save Cancel Script 200 200+ Rows: 1 200 row(s) fetched - 2m 7s (2ms fetch), on 2026-05-05 at 23:56:



### По креирање на индексот:

**vw\_payment\_history 1** × **Execution plan - 1**

```
select * from vw_payment_history where DATE(payment_id) <= Enter a SQL expression to filter results (use Ctrl+Space)
```

	payment_id	user_id	nec user_name	nec user_phone	ride_id	ride_requested_at	ride_started_at	ride_ended_at	distance
1	59,107	59,108	Adelina Maneva	+38971059108	3,059,107	2025-10-02 18:37:41.000	2025-10-02 18:48:41.000	2025-10-02 19:03:41.000	
2	179,157	39,158	Slavica Petreska	+38971039158	3,179,157	2025-10-02 12:06:03.000	2025-10-02 12:16:03.000	2025-10-02 12:32:03.000	
3	316,429	36,430	Slavica Popova	+38971036430	3,316,429	2025-10-02 17:33:39.000	2025-10-02 17:41:39.000	2025-10-02 17:48:39.000	
4	333,952	53,953	Vangel Bojkov	+38971053953	3,333,952	2025-10-02 09:58:29.000	2025-10-02 10:02:29.000	2025-10-02 10:17:29.000	
5	435,254	15,255	Vuk Filipov	+38971015255	3,435,254	2025-10-02 21:43:33.000	2025-10-02 21:47:33.000	2025-10-02 22:08:33.000	
6	438,327	18,328	Nina Stamenova	+38971018328	3,438,327	2025-10-02 11:40:33.000	2025-10-02 11:49:33.000	2025-10-02 11:56:33.000	
7	464,486	44,487	Kosta Sokolov	+38971044487	3,464,486	2025-10-02 19:01:48.000	2025-10-02 19:04:48.000	2025-10-02 19:23:48.000	
8	481,696	61,697	Simeon Gruев	+38971061697	3,481,696	2025-10-02 22:50:41.000	2025-10-02 22:58:41.000	2025-10-02 23:05:41.000	
9	564,653	4,654	Bilja Ilieva	+38971004654	3,564,653	2025-10-02 14:31:17.000	2025-10-02 14:36:17.000	2025-10-02 14:43:17.000	
10	668,705	38,706	Kira Georgieva	+38971038706	3,668,705	2025-10-02 13:13:19.000	2025-10-02 13:26:19.000	2025-10-02 13:27:19.000	
11	681,002	51,003	Ljuba Petrovski	+38971051003	3,681,002	2025-10-02 17:38:07.000	2025-10-02 17:51:07.000	2025-10-02 17:51:07.000	

Save Cancel Script | Rows: 200+ | 200 row(s) fetched - 34.81s (2ms fetch), on 2026-05-06 at 00:02

### Извршување на целотот view по креирање на индексите:

vw\_payment\_history 1 ×

Execution plan - 1

select \* from vw\_payment\_history

Enter a SQL expression to filter results (use Ctrl+Space)

<

**Execution plan по индекси:**

Execution plan - 1				
Node Type	Entity	Cost	Rows	Condition
Hash Join		477250.41 - 1888494.86	14000002	(vt.vehicles_model_id = vm.vehicles_model_id)
Hash Join		477237.26 - 1395619.14	14000002	(vo.vehicle_type_id = vt.vehicle_type_id)
Hash Join		477225.69 - 1356632.56	14000002	(r.vehicle_ownership_id = vo.vehicle_ownership_id)
Hash Join		477215.94 - 1319353.63	14000002	(r.dropoff_location_id = ld.location_id)
Hash Join		476733.94 - 1282110.60	14000002	(r.pickup_location_id = lp.location_id)
Hash Join		476251.94 - 1244867.47	14000002	(r.status_id = sr.status_id)
Hash Join		476240.36 - 1205880.89	14000002	(p.status_id = sp.status_id)
Hash Join		476228.79 - 1166894.31	14000002	(p.payment_method_id = pm.payment_method_id)
Hash Join		476215.64 - 1129018.66	14000002	(r.driver_id = d.driver_id)
Hash Join		476208.14 - 1091482.40	14000002	(r.user_id = u.user_id)
Hash		5.00 - 5.00	200	
Hash		11.40 - 11.40	140	
Seq Scan	payment_m...	0.00 - 11.40	140	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		6.00 - 6.00	300	
Seq Scan	vehicle_own...	0.00 - 6.00	300	
Hash		10.70 - 10.70	70	
Seq Scan	vehicle_types	0.00 - 10.70	70	
Hash		11.40 - 11.40	140	
Seq Scan	vehicles_mo...	0.00 - 11.40	140	



## View 4: vw\_driver\_profile – Детали за профил на секој возач

**Опис и филтри:** Овој поглед се користи за приказ на достапните возачи во реално време и нивните тековни карактеристики. Апликацијата го повикува ова view кога системот треба да му додели возило на корисникот или кога се пресметува цената на возењето врз основа на моделот и класата на возилото што го управува активниот возач.

Примарен филтер за пребарување е driver\_id или current\_naselba, а податоците овозможуваат и прецизно филтрирање според рејтингот на возачот (driver\_rating), класата на возилото (vehicle\_class) и цената по километар (price\_per\_km).

**Време на извршување: 214ms** — ова е **прифатливо** време за апликацијата.

**Заклучок:** Бидејќи времето е прифатливо, **нема потреба од индексирање** за овој поглед. Табелите вклучени во овој поглед (drivers, active\_drivers, locations) се релативно мали и PostgreSQL ефикасно ги обработува.

The screenshot shows a database management tool interface. At the top, the SQL definition for the view 'vw\_driver\_profile' is displayed. Below it, the view is executed, and the results are shown in a table grid. The table has 8 columns: driver\_id, driver\_name, driver\_phone, driver\_rating, registration\_date, is\_available, and working\_start. The first row is highlighted, showing driver\_id 150, driver\_name Petar Arsov, driver\_phone +38972000150, driver\_rating 4.29, registration\_date 2022-07-06, is\_available [v], and working\_start 2026-05-01 15:18:28.2. The status bar at the bottom indicates 150 rows fetched in 214ms.

```
-- =====
-- VIEW 4: vw_driver_profile
-- =====

CREATE OR REPLACE VIEW vw_driver_profile AS
SELECT
  d.driver_id,
  d.name AS driver_name,
  d.phone AS driver_phone,
  d.rating AS driver_rating,
  d.registration_date,
```

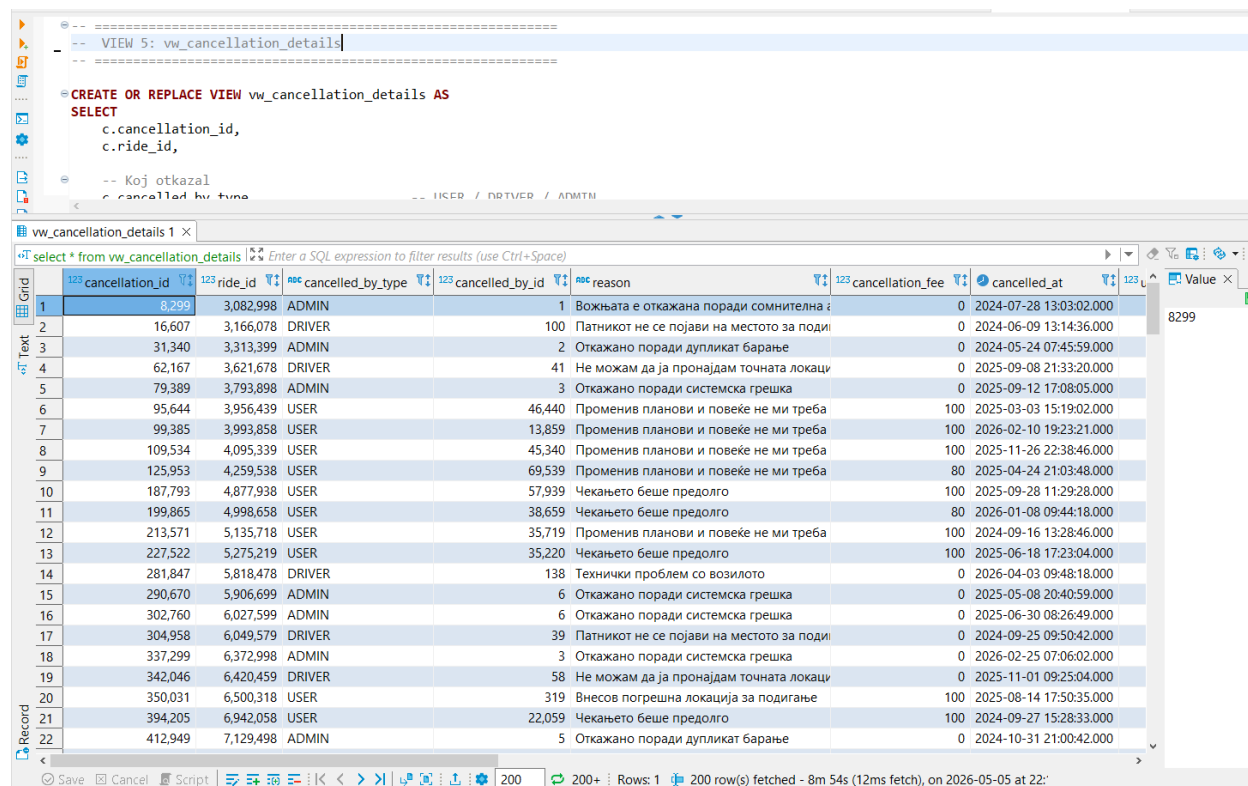
	driver_id	driver_name	driver_phone	driver_rating	registration_date	is_available	working_start
1	150	Petar Arsov	+38972000150	4.29	2022-07-06	[v]	2026-05-01 15:18:28.2
2	50	Petar Arsov	+38972000050	4.81	2021-11-10	[v]	2026-05-01 15:37:37.1
3	50	Petar Arsov	+38972000050	4.81	2021-11-10	[v]	2026-05-01 15:37:37.1
4	151	Marko Dimitrov	+38972000151	4.86	2022-09-07	[v]	2026-05-01 16:17:40.4
5	101	Marko Dimitrov	+38972000101	4.75	2021-10-04	[v]	2026-05-01 17:45:56.0
6	51	Marko Dimitrov	+38972000051	3.78	2021-05-21	[v]	2026-05-01 19:29:03.1
7	51	Marko Dimitrov	+38972000051	3.78	2021-05-21	[v]	2026-05-01 19:29:03.1
8	1	Marko Dimitrov	+38972000001	4.34	2023-01-27	[v]	2026-05-01 18:19:23.1
9	1	Marko Dimitrov	+38972000001	4.34	2023-01-27	[v]	2026-05-01 18:19:23.1
10	102	Nikola Stojanov	+38972000102	4.53	2023-01-31	[v]	2026-05-01 15:59:22.0
11	2	Nikola Stojanov	+38972000002	4.04	2021-07-22	[v]	2026-05-01 13:38:22.2
12	2	Nikola Stojanov	+38972000002	4.04	2021-07-22	[v]	2026-05-01 13:38:22.2
13	153	Stefan Petrovski	+38972000153	4.96	2021-08-07	[v]	2026-05-01 14:19:08.9
14	103	Stefan Petrovski	+38972000103	4.88	2023-02-22	[v]	2026-05-01 16:26:38.1
15	53	Stefan Petrovski	+38972000053	4.8	2023-02-17	[v]	2026-05-01 14:05:03.7
16	53	Stefan Petrovski	+38972000053	4.8	2023-02-17	[v]	2026-05-01 14:05:03.7
17	3	Stefan Petrovski	+38972000003	3.63	2021-08-19	[v]	2026-05-01 18:22:03.5
18	3	Stefan Petrovski	+38972000003	3.63	2021-08-19	[v]	2026-05-01 18:22:03.5
19	154	Daniel Iliev	+38972000154	4.09	2022-10-16	[v]	2026-05-01 13:47:30.8
20	54	Daniel Iliev	+38972000054	4.19	2022-10-22	[v]	2026-05-01 15:06:37.6
21	54	Daniel Iliev	+38972000054	4.19	2022-10-22	[v]	2026-05-01 15:06:37.6
22	155	Goran Trajkov	+38972000155	2.00	2022-01-31	[v]	2026-05-01 11:50:31.7

## View 5: vw\_cancellation\_details – Детали за секое откажано возење

**Опис и филтри:** Овој поглед се користи за анализа на прекинатите возења и наплата на пенали во случаи кога услугата не е реализирана. Апликацијата го повикува ова view за да ги идентификува причините за откажување и да утврди кој ја прекинал сесијата (корисникот, возачот или администраторот) за соодветно да се пресмета таксата за откажување.

Примарен филтер за пребарување е ride\_id или cancelled\_by\_type, а податоците овозможуваат и детално следење според причината за откажување (reason), износот на казната (cancellation\_fee) и локацијата каде најчесто се откажуваат возењата (pickup\_naselba).

**Време на извршување: 8m 54s** — ова е неприфатливо време.



```
-- =====  
-- VIEW 5: vw_cancellation_details  
-- =====  
  
CREATE OR REPLACE VIEW vw_cancellation_details AS  
SELECT  
  c.cancellation_id,  
  c.ride_id,  
  -- Koj otkazal  
  c.cancelled_by_type
```

	123	123	123	123	123	123	123
	cancellation_id	ride_id	cancelled_by_type	cancelled_by_id	reason	cancellation_fee	cancelled_at
1	8,299	3,082,998	ADMIN		1 Возњата е откажана поради сомнителна з	0	2024-07-28 13:03:02.000
2	16,607	3,166,078	DRIVER	100	Патникот не се појави на местото за поди	0	2024-06-09 13:14:36.000
3	31,340	3,313,399	ADMIN	2	Откажано поради дупликат барање	0	2024-05-24 07:45:59.000
4	62,167	3,621,678	DRIVER	41	Не можам да ја пронајдам точната локаци	0	2025-09-08 21:33:20.000
5	79,389	3,793,898	ADMIN	3	Откажано поради системска грешка	0	2025-09-12 17:08:05.000
6	95,644	3,956,439	USER	46,440	Променив планови и повеќе не ми треба	100	2025-03-03 15:19:02.000
7	99,385	3,993,858	USER	13,859	Променив планови и повеќе не ми треба	100	2026-02-10 19:23:21.000
8	109,534	4,095,339	USER	45,340	Променив планови и повеќе не ми треба	100	2025-11-26 22:38:46.000
9	125,953	4,259,538	USER	69,539	Променив планови и повеќе не ми треба	80	2025-04-24 21:03:48.000
10	187,793	4,877,938	USER	57,939	Чекањето беше предолго	100	2025-09-28 11:29:28.000
11	199,865	4,998,658	USER	38,659	Чекањето беше предолго	80	2026-01-08 09:44:18.000
12	213,571	5,135,718	USER	35,719	Променив планови и повеќе не ми треба	100	2024-09-16 13:28:46.000
13	227,522	5,275,219	USER	35,220	Чекањето беше предолго	100	2025-06-18 17:23:04.000
14	281,847	5,818,478	DRIVER	138	Технички проблем со возилото	0	2026-04-03 09:48:18.000
15	290,670	5,906,699	ADMIN	6	Откажано поради системска грешка	0	2025-05-08 20:40:59.000
16	302,760	6,027,599	ADMIN	6	Откажано поради системска грешка	0	2025-06-30 08:26:49.000
17	304,958	6,049,579	DRIVER	39	Патникот не се појави на местото за поди	0	2024-09-25 09:50:42.000
18	337,299	6,372,998	ADMIN	3	Откажано поради системска грешка	0	2026-02-25 07:06:02.000
19	342,046	6,420,459	DRIVER	58	Не можам да ја пронајдам точната локаци	0	2025-11-01 09:25:04.000
20	350,031	6,500,318	USER	319	Внесов погрешна локација за подигање	100	2025-08-14 17:50:35.000
21	394,205	6,942,058	USER	22,059	Чекањето беше предолго	100	2024-09-27 15:28:33.000
22	412,949	7,129,498	ADMIN	5	Откажано поради дупликат барање	0	2024-10-31 21:00:42.000

Save Cancel Script 200 200+ Rows: 1 200 row(s) fetched - 8m 54s (12ms fetch), on 2026-05-05 at 22:

## Explain plan:

Simple

vw_cancellation_details 1		Execution plan - 1			
Node Type	Entity	Cost	Rows	Condition	
Hash Join		37099.87 - 692350.06	6000000	(vt.vehicle_type_id = pr.vehicle_type_id)	
Gather		37062.87 - 449813.06	1000000		
Hash Join		36062.87 - 348813.06	416667	(vo.vehicle_type_id = vt.vehicle_type_id)	
Hash Join		36051.29 - 347641.51	416667	(r.vehicle_ownership_id = vo.vehicle_ownership_id)	
Hash Join		36041.54 - 346522.56	416667	(r.status_id = s.status_id)	
Hash Join		36029.97 - 345351.02	416667	(r.driver_id = d.driver_id)	
Parallel Hash Join		36022.47 - 344226.59	416667	(r.user_id = u.user_id)	
Hash Join		33414.00 - 322338.31	416667	(r.pickup_location_id = lp.location_id)	
Parallel Hash Join		32836.00 - 304292.23	416667	(r.ride_id = c.ride_id)	
Parallel Seq Scan	rides	0.00 - 182477.99	4166699		
Parallel Hash		21116.67 - 21116.67	416667		
Hash		307.00 - 307.00	14000		
Seq Scan	locations	0.00 - 307.00	14000		
Parallel Hash		1811.76 - 1811.76	41176		
Parallel Seq Scan	users	0.00 - 1811.76	41176		
Hash		5.00 - 5.00	200		
Seq Scan	drivers	0.00 - 5.00	200		
Hash		10.70 - 10.70	70		
Seq Scan	status	0.00 - 10.70	70		
Hash		6.00 - 6.00	300		
Seq Scan	vehicle_ownership	0.00 - 6.00	300		
Hash		10.70 - 10.70	70		
Seq Scan	vehicle_types	0.00 - 10.70	70		
Hash		22.00 - 22.00	1200		
Seq Scan	pricing_rules	0.00 - 22.00	1200		

select \* from vw\_cancellation\_details

## Пред индексирање на idx\_cancellations\_ride\_id во табелата Cancellation:

vw_cancellation_details 1 x		Execution plan - 1											
select * from vw_cancellation_details where user_id = 1897 Enter a SQL expression to filter results (use Ctrl+Space)													
Grid	123 cancellation_id	123 ride_id	123 cancelled_by_type	123 cancelled_by_id	123 reason	123 cancellation_fee	cancelled_at	123 user_id	123 user_name	123 user_phone	Value x		
1	1.897	3,018,978	DRIVER	124	Не можам да	0	08-11 20:28:10.000	18,979	Viktor Kostov	+38971018979	1897		
2	8.897	3,088,978	DRIVER	27	Патнички не е	0	10-09 06:30:08.000	18,979	Viktor Kostov	+38971018979			
3	15.897	3,158,978	DRIVER	66	Технички прс	0	10-30 08:30:27.000	18,979	Viktor Kostov	+38971018979			
4	22.897	3,228,978	DRIVER	164	Не можам да	0	01-20 20:48:44.000	18,979	Viktor Kostov	+38971018979			
5	29.897	3,298,978	DRIVER	77	Патнички не е	0	07-31 08:21:22.000	18,979	Viktor Kostov	+38971018979			
6	36.897	3,368,978	DRIVER	150	Технички прс	0	09-05 11:45:28.000	18,979	Viktor Kostov	+38971018979			
7	43.897	3,438,978	DRIVER	67	Не можам да	0	03-10 15:48:08.000	18,979	Viktor Kostov	+38971018979			
143 Rows: 0 143 row(s) fetched - 2.442s (4ms fetch), on 2026-05-06 at 00:25													

## По креирање на индексот:

vw_cancellation_details 1		Execution plan - 1							
select * from vw_cancellation_details where user_id = 1897									
Grid	123 cancellation_id	123 cancelled_at	123 user_id	123 user_name	123 user_phone	123 driver_id	123 driver_name	123 driver_phone	123 vehicle_class
1	на патнички	0 2024-08-11 20:28:10.000	18,979	Viktor Kostov	+38971018979	124	Oliver Stefanov	+38972000124	Luxury class
2	е	0 2025-10-09 06:30:08.000	18,979	Viktor Kostov	+38971018979	27	Stojan Kolev	+38972000027	Luxury class
3	е	0 2025-10-30 08:30:27.000	18,979	Viktor Kostov	+38971018979	66	Hristijan Markov	+38972000066	Economy class
4	на патнички	0 2026-01-20 20:48:44.000	18,979	Viktor Kostov	+38971018979	164	Dimitar Ivanov	+38972000164	Luxury class
5	е	0 2025-07-31 08:21:22.000	18,979	Viktor Kostov	+38971018979	77	Stojan Kolev	+38972000077	Luxury class
6	е	0 2024-09-05 11:45:28.000	18,979	Viktor Kostov	+38971018979	150	Petar Arsov	+38972000150	Economy class
7	на патнички	0 2025-03-10 15:48:08.000	18,979	Viktor Kostov	+38971018979	67	Vladimir Spasov	+38972000067	Economy class
8	е	0 2024-09-20 21:09:31.000	18,979	Viktor Kostov	+38971018979	96	Lazo Spiridonov	+38972000096	Economy class
9	е	0 2024-11-04 19:29:23.000	18,979	Viktor Kostov	+38971018979	124	Oliver Stefanov	+38972000124	Luxury class
10	на патнички	0 2024-09-18 07:31:53.000	18,979	Viktor Kostov	+38971018979	101	Marko Dimitrov	+38972000101	Economy class
11	е	0 2024-12-21 20:24:39.000	18,979	Viktor Kostov	+38971018979	140	Bogdan Markoski	+38972000140	Luxury class
12	е	0 2026-02-26 16:50:21.000	18,979	Viktor Kostov	+38971018979	185	Gianni Dimovski	+38972000185	Economy class
143 Rows: 1 143 row(s) fetched - 368ms (1ms fetch), on 2026-05-06 at 00:33									

Извршување на целотот view по креирање на индексите:

vw\_cancellation\_details 1 ×Execution plan - 1

select \* from vw\_cancellation\_details

Enter a SQL expression to filter results (use Ctrl+Space)

Grid

Record

	123 cancellation_fee	cancelled_at	123 user_id	anc user_name	anc user_phone	123 driver_id	anc driver_name	anc driver_phone	anc vehicle_class	
1	на патнику	0	2024-06-20 11:43:36.000	27,380	Tamara Pavlova	+38971027380	68	Vasko Angelov	+38972000068	Luxury class
2	ивност	0	2024-12-16 08:18:34.000	53,699	Viktor Spiridonov	+38971053699	200	Petar Arsov	+38972000200	Economy class
3		0	2025-04-30 13:44:15.000	48,599	Riste Spiridonov	+38971048599	176	Emil Zafirov	+38972000176	Luxury class
4		80	2026-04-12 08:20:43.000	12,419	Emil Kirovski	+38971012419	150	Petar Arsov	+38972000150	Economy class
5	ивност	0	2024-07-28 13:03:02.000	12,999	Risto Jovanov	+38971012999	106	Bojan Georgiev	+38972000106	Economy class
6	е	0	2024-06-09 13:14:36.000	26,079	Mile Dimovski	+38971026079	100	Petar Arsov	+38972000100	Economy class
7		0	2024-05-24 07:45:59.000	33,400	Anastasija Georgie	+38971033400	185	Gjorgi Dimovski	+38972000185	Economy class
8	на патнику	0	2025-09-08 21:33:20.000	61,679	Viktor Petrovski	+38971061679	41	Tome Velkov	+38972000041	Economy class
9		0	2025-09-12 17:08:05.000	23,899	Emil Petkov	+38971023899	130	Radoslav Todorov	+38972000130	Luxury class
10	евоз	100	2025-03-03 15:19:02.000	46,440	Neda Arsova	+38971046440	31	Kosta Petkov	+38972000031	Luxury class
11	евоз	100	2026-02-10 19:23:21.000	13,859	Miro Tasev	+38971013859	82	Mladen Hristov	+38972000082	Luxury class
12	евоз	100	2025-11-26 22:38:46.000	45,340	Ema Georgievska	+38971045340	187	Ivan Petrevski	+38972000187	Luxury class

Save Cancel Script 200 200+ Rows: 1 200 row(s) fetched - 4m 2s (1ms fetch), on 2026-05-06 at 00:39:

Execution plan по индекси:

Statistics 1 ×Execution plan - 1 ×

Simple

Node Type	Entity	Cost	Rows	Condition
Hash Join		33134.94 - 599773.12	6000006	(vt.vehicle_type_id = pr.vehicle_type_id)
Gather		33097.94 - 357235.88	1000001	
Hash Join		32097.94 - 256235.78	250000	(vo.vehicle_type_id = vt.vehicle_type_id)
Hash Join		32086.36 - 255528.23	250000	(r.vehicle_ownership_id = vo.vehicle_ownership_id)
Hash Join		32076.61 - 254852.96	250000	(r.pickup_location_id = lp.location_id)
Hash Join		31594.61 - 253714.51	250000	(r.status_id = s.status_id)
Hash Join		31583.04 - 253006.96	250000	(r.driver_id = d.driver_id)
Parallel Hash Join		31575.54 - 252329.30	250000	(r.user_id = u.user_id)
Parallel Hash Join		29249.07 - 249346.54	250000	(r.ride_id = c.ride_id)
Parallel Seq Scan	rides	0.00 - 165811.02	2500002	
Parallel Hash		20175.81 - 20175.81	322581	
Parallel Hash		1811.76 - 1811.76	41176	
Parallel Seq Scan	users	0.00 - 1811.76	41176	
Hash		5.00 - 5.00	200	
Seq Scan	drivers	0.00 - 5.00	200	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		6.00 - 6.00	300	
Seq Scan	vehicle_own...	0.00 - 6.00	300	
Hash		10.70 - 10.70	70	
Seq Scan	vehicle_types	0.00 - 10.70	70	
Hash		22.00 - 22.00	1200	
Seq Scan	pricing_rules	0.00 - 22.00	1200	

select \* from vw\_cancellation\_details

## View 6: vw\_user\_notifications – Детали за сите нотификации кои пристигнуваат на еден корисник

**Опис и филтри:** Овој поглед се користи за управување и следење на комуникацијата со корисниците преку системот за известувања. Апликацијата го повикува ова view за да ги прикаже сите испратени пораки до одреден корисник, поврзувајќи ги со контекстот на конкретно возење и адресата за подигнување.

Примарен филтер за пребарување е user\_id или sent\_time, а податоците овозможуваат и филтрирање според успешноста на испораката (notification\_status), текстот на пораката (message\_text) и статусот на возењето (ride\_status) за кое е пратено известувањето.

**Време на извршување: 8m 25s ова е неприфатливо време.**

```
-- VIEW 6: vw_user_notifications
--
-- CREATE OR REPLACE VIEW vw_user_notifications AS
SELECT
  n.notification_id,
  -- Korisnik
  u.user_id,
  u.name AS user_name,
  -- Poraka
```

	notification_id	user_id	user_name	message_id	message_text	sent_time	ride_id	ride_status
21	38,048,461	5,328	Anastasija Spiridonova	4	Vozacot pristigna na lokacijata za podiganje	2026-04-27 07:47:47.000	3,005,327	2026
22	38,083,938	59,908	Iva Stamenova	4	Vozacot pristigna na lokacijata za podiganje	2026-03-02 12:14:26.000	3,059,907	2026
23	38,086,983	64,591	Tome Karov	4	Vozacot pristigna na lokacijata za podiganje	2025-07-20 11:42:58.000	3,064,590	2025
24	38,149,537	20,829	Mile Gruiev	4	Vozacot pristigna na lokacijata za podiganje	2025-10-05 09:29:26.000	3,160,828	2025
25	38,157,423	32,957	Rade Milevski	4	Vozacot pristigna na lokacijata za podiganje	2024-09-23 19:26:12.000	3,172,956	2024
26	38,251,438	37,596	Ema Dimovska	4	Vozacot pristigna na lokacijata za podiganje	2024-10-03 18:39:02.000	3,317,595	2024
27	38,279,163	10,252	Despina Bogdanova	4	Vozacot pristigna na lokacijata za podiganje	2025-02-26 10:10:17.000	3,360,251	2025
28	38,327,428	14,508	Tina Spiridonova	4	Vozacot pristigna na lokacijata za podiganje	2025-07-20 14:37:45.000	3,434,507	2025
29	38,344,340	40,527	Gorrancho Danev	4	Vozacot pristigna na lokacijata za podiganje	2025-08-30 11:53:41.000	3,460,526	2025
30	38,354,328	55,891	Stojan Ilkov	4	Vozacot pristigna na lokacijata za podiganje	2025-11-09 07:55:04.000	3,475,890	2025
31	38,370,047	5,328	Anastasija Spiridonova	7	Plakjanjeto e uspesno	2026-04-27 08:10:47.000	3,005,327	2026
32	38,370,619	59,908	Iva Stamenova	7	Plakjanjeto e uspesno	2026-03-02 12:32:26.000	3,059,907	2026
33	38,370,672	64,591	Tome Karov	7	Plakjanjeto e uspesno	2025-07-20 12:07:58.000	3,064,590	2025
34	38,371,646	20,829	Mile Gruiev	7	Plakjanjeto e uspesno	2025-10-05 09:36:26.000	3,160,828	2025
35	38,371,756	32,957	Rade Milevski	7	Plakjanjeto e uspesno	2024-09-23 19:44:12.000	3,172,956	2024
36	38,373,280	37,596	Ema Dimovska	7	Plakjanjeto e uspesno	2024-10-03 18:54:02.000	3,317,595	2024
37	38,373,719	10,252	Despina Bogdanova	7	Plakjanjeto e uspesno	2025-02-26 10:11:17.000	3,360,251	2025
38	38,374,458	14,508	Tina Spiridonova	7	Plakjanjeto e uspesno	2025-07-20 14:56:45.000	3,434,507	2025
39	38,374,727	40,527	Gorrancho Danev	7	Plakjanjeto e uspesno	2025-08-30 11:56:41.000	3,460,526	2025
40	38,374,896	55,891	Stojan Ilkov	7	Plakjanjeto e uspesno	2025-11-09 08:10:04.000	3,475,890	2025

## Explain plan:

vw\_user\_notifications 1

Execution plan - 1

Summary

Node Type	Entity	Cost	Rows	Condition
Hash Join		794173.28 - 4466259.80	37820104	(r.status_id = sr.status_id)
Hash Join		794161.71 - 3982758.72	37820104	(n.status_id = sn.status_id)
Hash Join		794150.13 - 3877458.68	37820104	(n.message_id = m.message_id)
Hash Join		794136.98 - 3775162.40	37820104	(n.ride_id = r.ride_id)
Hash Join		3386.00 - 1276442.82	37820104	(n.user_id = u.user_id)
Seq Scan	notifications	0.00 - 656290.04	37820104	
Hash		2100.00 - 2100.00	70000	
Seq Scan	users	0.00 - 2100.00	70000	
Hash		568092.01 - 568092.01	10000078	
Hash Join		1143.00 - 568092.01	10000078	(r.pickup_location_id = lp.location_id)
Hash Join		565.00 - 384907.86	10000078	(r.dropoff_location_id = ld.location_id)
Seq Scan	rides	0.00 - 240811.78	10000078	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		307.00 - 307.00	14000	
Seq Scan	locations	0.00 - 307.00	14000	
Hash		11.40 - 11.40	140	
Seq Scan	messages	0.00 - 11.40	140	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	
Hash		10.70 - 10.70	70	
Seq Scan	status	0.00 - 10.70	70	

select \* from vw\_user\_notifications

## Пред индексирање на idx\_notifications\_user\_id во табелата Notification:

select * from vw_user_notifications where user_id = 16095;	
vw_user_notifications 1 × Execution plan - 1	
select * from vw_user_notifications where user_id = 16095; Enter a SQL expression to filter results (use Ctrl+Space)	
Grid	Value ×
1 123 notification_id 123 user_id 16,095 Vuk Spiridonov 123 message_id 123 message_text sent_time 123 ride_id 123 ride_rei	37450962
2 37,496,462 16,095 Vuk Spiridonov 1 Vaseto baranje e uspesno isprateno 2026-01-02 16:17:20.000 3,086,094 2026-01-0	
3 37,678,462 16,095 Vuk Spiridonov 1 Vaseto baranje e uspesno isprateno 2026-01-11 09:14:05.000 3,436,094 2026-01-1	
4 37,775,962 16,095 Vuk Spiridonov 2 Vozacot go prifati vaseto baranje 2026-01-02 16:22:20.000 3,086,094 2026-01-0	
5 37,821,462 16,095 Vuk Spiridonov 2 Vozacot go prifati vaseto baranje 2026-01-15 20:23:06.000 3,156,094 2026-01-1	
6 38,003,462 16,095 Vuk Spiridonov 2 Vozacot go prifati vaseto baranje 2026-01-11 09:22:05.000 3,436,094 2026-01-1	
7 38,100,962 16,095 Vuk Spiridonov 4 Vozacot pristigna na lokacijata za podiganje 2026-01-02 16:22:20.000 3,086,094 2026-01-0	
8 38,146,462 16,095 Vuk Spiridonov 4 Vozacot pristigna na lokacijata za podiganje 2026-01-15 20:21:06.000 3,156,094 2026-01-1	
9 38,328,462 16,095 Vuk Spiridonov 4 Vozacot pristigna na lokacijata za podiganje 2026-01-11 09:20:05.000 3,436,094 2026-01-1	
10 38,522,495 16,095 Vuk Spiridonov 7 Plakjanjeto e uspesno 2026-01-15 20:20:06.000 3,156,094 2026-01-1	
Save Cancel Script Rows: 1 200 row(s) fetched - 12m 30s (10ms fetch), on 2026-05-06 at 00	

## По креирање на индексот:

vw_user_notifications 1 × Execution plan - 1	
select * from vw_user_notifications where user_id = 16095; Enter a SQL expression to filter results (use Ctrl+Space)	
Grid	Value ×
1 52,062,962 16,095 Vuk Spiridonov 1 Vaseto baranje e uspesno isprateno 2026-03-31 15:00:42.000 7,566,094 2026-03-3	52062962
2 52,387,962 16,095 Vuk Spiridonov 2 Vozacot go prifati vaseto baranje 2026-03-31 15:04:42.000 7,566,094 2026-03-3	
3 52,712,962 16,095 Vuk Spiridonov 4 Vozacot pristigna na lokacijata za podiganje 2026-03-31 15:06:42.000 7,566,094 2026-03-3	
4 53,320,842 16,095 Vuk Spiridonov 7 Plakjanjeto e uspesno 2026-03-31 15:18:42.000 7,566,094 2026-03-3	
5 53,325,862 16,095 Vuk Spiridonov 7 Plakjanjeto e uspesno 2026-03-31 15:19:42.000 7,566,094 2026-03-3	
6 58,809,962 16,095 Vuk Spiridonov 1 Vaseto baranje e uspesno isprateno 2024-08-03 20:30:21.000 9,946,094 2024-08-0	
7 59,134,962 16,095 Vuk Spiridonov 2 Vozacot go prifati vaseto baranje 2024-08-03 20:35:21.000 9,946,094 2024-08-0	
8 59,459,962 16,095 Vuk Spiridonov 4 Vozacot pristigna na lokacijata za podiganje 2024-08-03 20:34:21.000 9,946,094 2024-08-0	
9 59,804,787 16,095 Vuk Spiridonov 7 Plakjanjeto e uspesno 2024-08-03 20:45:21.000 9,946,094 2024-08-0	
10 59,999,810 16,095 Vuk Spiridonov 7 Plakjanjeto e uspesno 2024-08-03 20:47:21.000 9,946,094 2024-08-0	
Save Cancel Script Rows: 1 200 row(s) fetched - 797ms (1ms fetch), on 2026-05-06 at 01:09	



## Пред индексирање на idx\_notifications\_ride\_id во табелата Notification:

select \* from vw\_user\_notifications where ride\_id = 3005327;

vw\_user\_notifications 1 x Execution plan - 1

select \* from vw\_user\_notifications where ride\_id = 3

	notification_id	user_id	user_name	message_id	message_text	sent_time	ride_id	ride_request_time	pickup_name
1	37,398,461	5,328	Anastasija Spirido	1	Vaseto baranje e uspešno	2026-04-27 07:41:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
2	37,723,461	5,328	Anastasija Spirido	2	Vozacot go prifati va	2026-04-27 07:46:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
3	38,048,461	5,328	Anastasija Spirido	4	Vozacot pristigna na	2026-04-27 07:47:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
4	38,370,047	5,328	Anastasija Spirido	7	Plakjanjeto e uspesno	2026-04-27 08:10:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
5	38,375,183	5,328	Anastasija Spirido	7	Plakjanjeto e uspesno	2026-04-27 08:11:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje

Save Cancel Script Rows: 0 5 row(s) fetched - 4.0s (4ms fetch), on 2026-05-06 at 01:19:34

## По креирање на индексот idx\_notifications\_ride\_id:

select \* from vw\_user\_notifications where ride\_id = 3005327;

	notification_id	user_id	user_name	message_id	message_text	sent_time	ride_id	ride_request_time	pickup_name
1	37,398,461	5,328	Anastasija Spiridonova	1	Vaseto baranje e uspesno isprateno	2026-04-27 07:41:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
2	37,723,461	5,328	Anastasija Spiridonova	2	Vozacot go prifati vaseto baranje	2026-04-27 07:46:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
3	38,048,461	5,328	Anastasija Spiridonova	4	Vozacot pristigna na lokacijata za podiganje	2026-04-27 07:47:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
4	38,370,047	5,328	Anastasija Spiridonova	7	Plakjanjeto e uspesno	2026-04-27 08:10:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje
5	38,375,183	5,328	Anastasija Spiridonova	7	Plakjanjeto e uspesno	2026-04-27 08:11:47.000	3,005,327	2026-04-27 07:41:47.000	Bedinje

Save Cancel Script Rows: 1 5 row(s) fetched - 16ms, on 2026-05-06 at 01:35:39

## Извршување на целотот view по креирање на индексите:

select \* from vw\_user\_notifications

	notification_id	user_id	user_name	message_id	message_text	sent_time	ride_id	ride_request_time	pickup_name	pick
1	37,395,153	235	Darko Petkov	1	Vaseto baranje e uspesno isprateno	2025-12-03 13:19:39.000	3,000,234	2025-12-03 13:19:39.000	Ajducka Cheshma	Bajram
2	37,395,380	588	Adelina Spiridonova	1	Vaseto baranje e uspesno isprateno	2025-01-24 19:01:41.000	3,000,587	2025-01-24 19:01:41.000	Bedinje	Edinstv
3	37,395,603	930	Zlatka Todorova	1	Vaseto baranje e uspesno isprateno	2025-12-12 12:51:01.000	3,000,929	2025-12-12 12:51:01.000	Zelen Rid	Prilepsl
4	37,395,659	1,014	Dafina Rangelova	1	Vaseto baranje e uspesno isprateno	2024-11-11 14:31:50.000	3,001,013	2024-11-11 14:31:50.000	Karposh	Karpos
5	37,395,681	1,050	Milena Todorova	1	Vaseto baranje e uspesno isprateno	2025-12-12 10:32:54.000	3,001,049	2025-12-12 10:32:54.000	Pero Chicho	Leskov.
6	37,395,689	1,058	Ivana Petreska	1	Vaseto baranje e uspesno isprateno	2025-12-17 15:02:12.000	3,001,057	2025-12-17 15:02:12.000	Bedinje	Josip P
7	37,396,099	1,692	Ema Nikolova	1	Vaseto baranje e uspesno isprateno	2025-02-13 22:48:07.000	3,001,691	2025-02-13 22:48:07.000	Ajducka Cheshma	Zletovs
8	37,396,165	1,793	Jovan Andonov	1	Vaseto baranje e uspesno isprateno	2025-11-28 15:01:11.000	3,001,792	2025-11-28 15:01:11.000	Goce Delchev	Boro M
9	37,396,167	1,795	Spas Kolev	1	Vaseto baranje e uspesno isprateno	2024-06-11 16:56:11.000	3,001,794	2024-06-11 16:56:11.000	Goce Delchev	Dositej

Save Cancel Script Rows: 1 200 row(s) fetched - 2m 6s (33ms fetch), on 2026-05-17 at 18:41

## Execution plan по индекси:

vw_user_notifications 1					
Execution plan - 1					
Execution plan - 2					
Node Type	Entity	Cost	Rows	Condition	
▼ Hash Join		428380.44 - 2748570.52	37820000	(r.dropoff_location_id = ld.location_id)	
▼ Hash Join		427898.44 - 2270581.24	37820000	(r.pickup_location_id = lp.location_id)	
▼ Hash Join		427416.44 - 2170791.69	37820000	(r.status_id = sr.status_id)	
▼ Hash Join		427404.86 - 2065491.93	37820000	(n.status_id = sn.status_id)	
▼ Hash Join		427393.29 - 1960192.18	37820000	(n.message_id = m.message_id)	
▼ Hash Join		427380.14 - 1857896.19	37820000	(n.user_id = u.user_id)	
▼ Hash Join		424405.14 - 1755637.68	37820000	(n.ride_id = r.ride_id)	
Seq Scan	notifications	0.00 - 656289.00	37820000		
▼ Hash		240811.06 - 240811.06	10000006		
Seq Scan	rides	0.00 - 240811.06	10000006		
▼ Hash		2100.00 - 2100.00	70000		
Seq Scan	users	0.00 - 2100.00	70000		
▼ Hash		11.40 - 11.40	140		
Seq Scan	messages	0.00 - 11.40	140		
▼ Hash		10.70 - 10.70	70		
Seq Scan	status	0.00 - 10.70	70		
▼ Hash		10.70 - 10.70	70		
Seq Scan	status	0.00 - 10.70	70		
▼ Hash		307.00 - 307.00	14000		
Seq Scan	locations	0.00 - 307.00	14000		
▼ Hash		307.00 - 307.00	14000		
Seq Scan	locations	0.00 - 307.00	14000		
select * from vw_user_notifications					