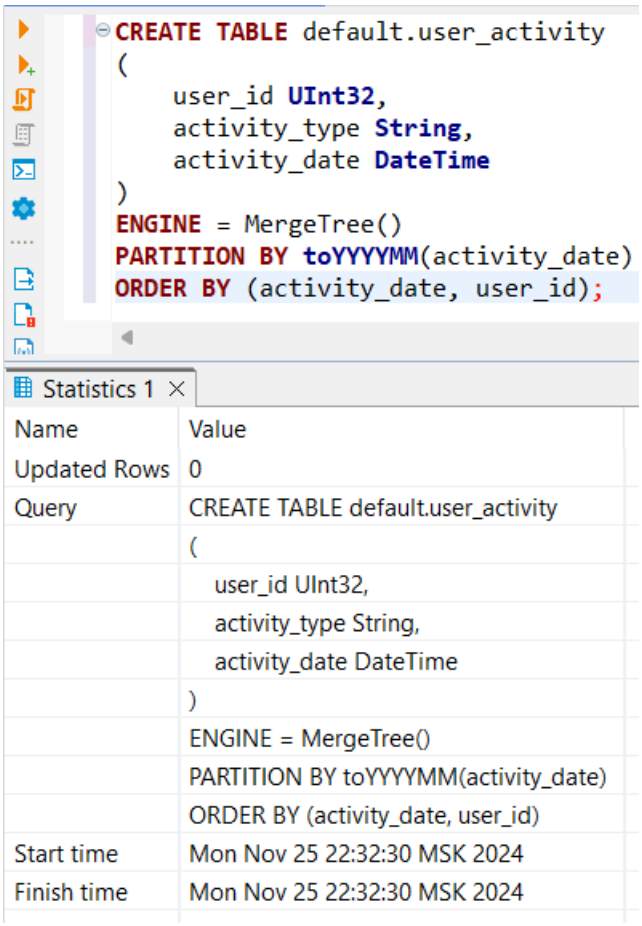
1. Создание таблицы

```
CREATE TABLE default.user_activity
(
    user_id UInt32,
    activity_type String,
    activity_date DateTime
)
ENGINE = MergeTree()
PARTITION BY toYYYYMM(activity_date)
ORDER BY (activity_date, user_id);
```



2. Заполнение таблицы

```
INSERT INTO default.user_activity (user_id, activity_type, activity_date)
VALUES
    (5001, 'login', '2023-05-01 08:30:00'),
    (5001, 'purchase', '2023-05-01 09:15:00'),
    (5001, 'logout', '2023-05-01 10:00:00'),
    (5002, 'login', '2023-05-01 09:00:00'),
    (5002, 'logout', '2023-05-01 11:30:00'),
    (5003, 'login', '2023-05-02 10:00:00'),
    (5003, 'purchase', '2023-05-02 10:30:00'),
    (5004, 'login', '2023-05-02 14:00:00'),
    (5004, 'logout', '2023-05-02 15:45:00'),
    (5005, 'login', '2023-05-03 09:30:00'),
    (5005, 'purchase', '2023-05-03 10:00:00'),
    (5005, 'purchase', '2023-05-03 11:15:00'),
    (5005, 'logout', '2023-05-03 12:00:00');
```

```
INSERT INTO default.user_activity (user_id, activity_type, activity_date)
VALUES
    (5001, 'login', '2023-05-01 08:30:00'),
    (5001, 'purchase', '2023-05-01 09:15:00'),
    (5001, 'logout', '2023-05-01 10:00:00'),
    (5002, 'login', '2023-05-01 09:00:00'),
    (5002, 'logout', '2023-05-01 11:30:00'),
    (5003, 'login', '2023-05-02 10:00:00'),
    (5003, 'purchase', '2023-05-02 10:30:00'),
    (5004, 'login', '2023-05-02 14:00:00'),
    (5004, 'logout', '2023-05-02 15:45:00'),
    (5005, 'login', '2023-05-03 09:30:00'),
    (5005, 'purchase', '2023-05-03 10:00:00'),
    (5005, 'purchase', '2023-05-03 11:15:00'),
    (5005, 'logout', '2023-05-03 12:00:00');
```

Statistics 1

Name	Value
Updated Rows	13
Query	INSERT INTO default.user_activity (user_id, activity_type, activity_date)

3. Выполнение мутаций

```
ALTER TABLE default.user_activity
UPDATE activity_type = 'order'
WHERE user_id = 5001 AND activity_type = 'purchase';
```

```
ALTER TABLE default.user_activity
UPDATE activity_type = 'order'
WHERE user_id = 5001 AND activity_type = 'purchase';
```

Statistics 1

Name	Value
Updated Rows	1
Query	ALTER TABLE default.user_activity
	UPDATE activity_type = 'order'
	WHERE user_id = 5001 AND activity_type = 'purchase'
Start time	Mon Nov 25 22:45:17 MSK 2024
Finish time	Mon Nov 25 22:45:17 MSK 2024

4. Проверка результатов

```
select
        *
from
        default.user_activity
order by
        user_id, activity_date
```

```
select
    *
from
    default.user_activity
order by
    user_id, activity_date
```

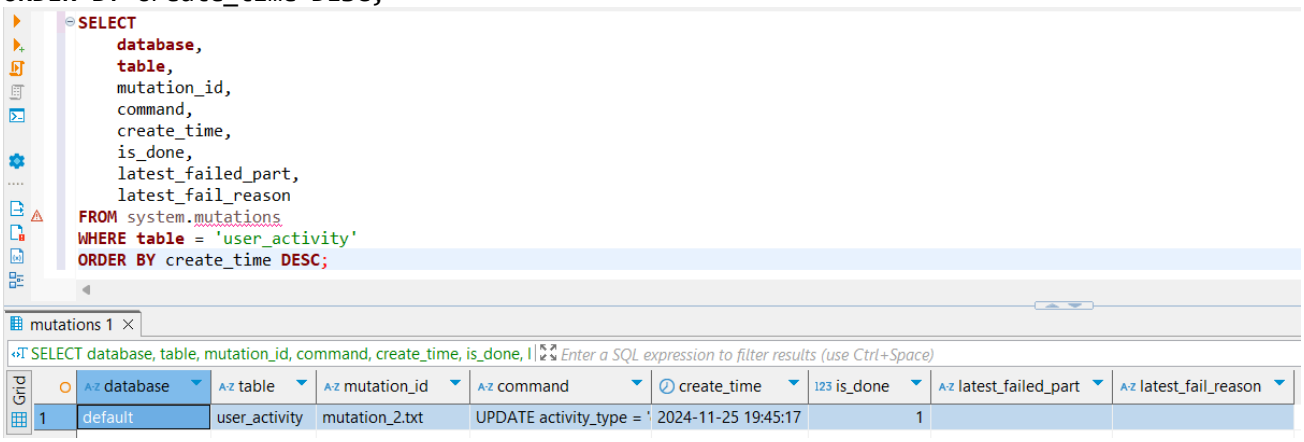
user_activity 1

select * from default.user_activity order by user_id, activity_date

Grid | Text

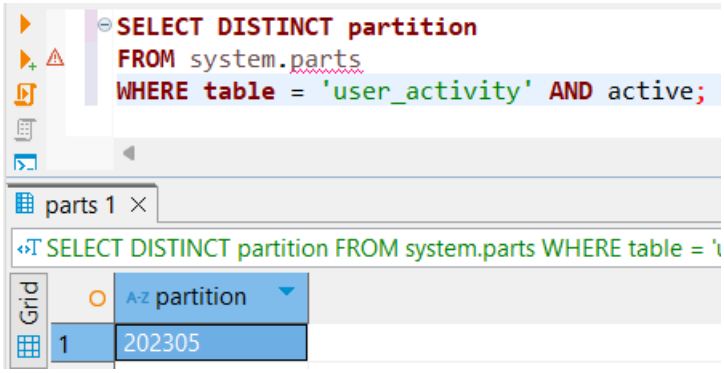
	user_id	activity_type	activity_date
1	5,001	login	2023-05-01 05:30:00
2	5,001	order	2023-05-01 06:15:00
3	5,001	logout	2023-05-01 07:00:00
4	5,002	login	2023-05-01 06:00:00

```
SELECT
    database,
    table,
    mutation_id,
    command,
    create_time,
    is_done,
    latest_failed_part,
    latest_fail_reason
FROM system.mutations
WHERE table = 'user_activity'
ORDER BY create_time DESC;
```

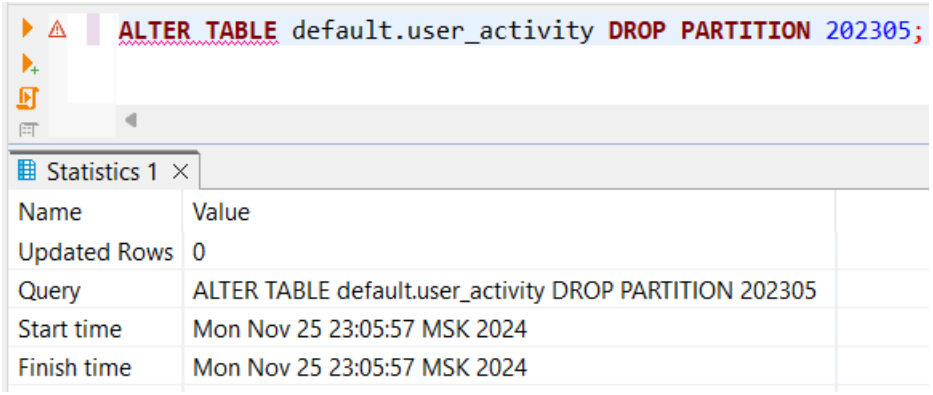


5. Манипуляция с партициями

```
SELECT DISTINCT partition
FROM system.parts
WHERE table = 'user_activity' AND active;
```

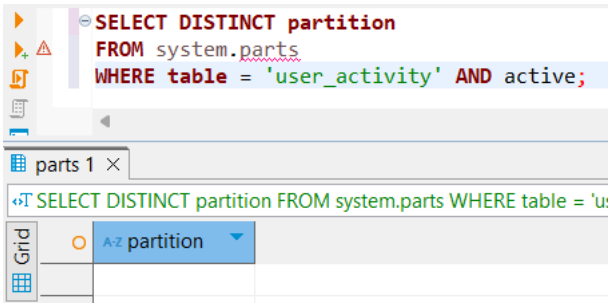



```
ALTER TABLE default.user_activity DROP PARTITION 202305;
```

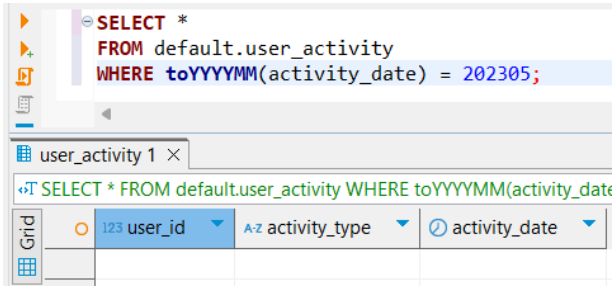


6. Проверка состояния таблицы

```
SELECT DISTINCT partition
FROM system.parts
WHERE table = 'user_activity' AND active;
```



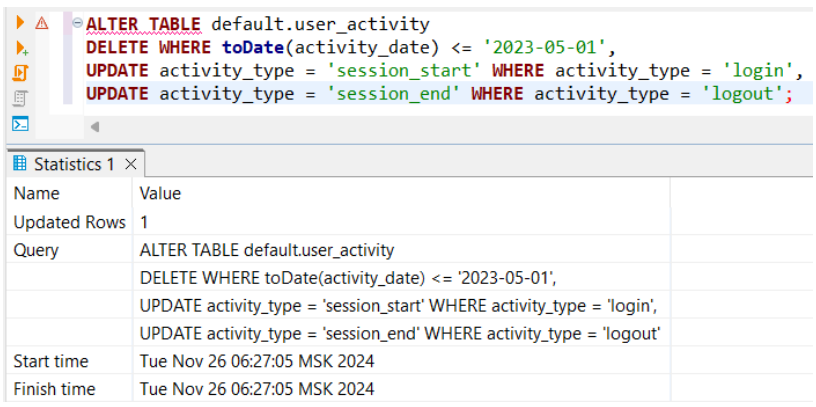

```
SELECT *
FROM default.user_activity
WHERE toYYYYMM(activity_date) = 202305;
```



7. Исследуйте, как работают другие типы мутаций

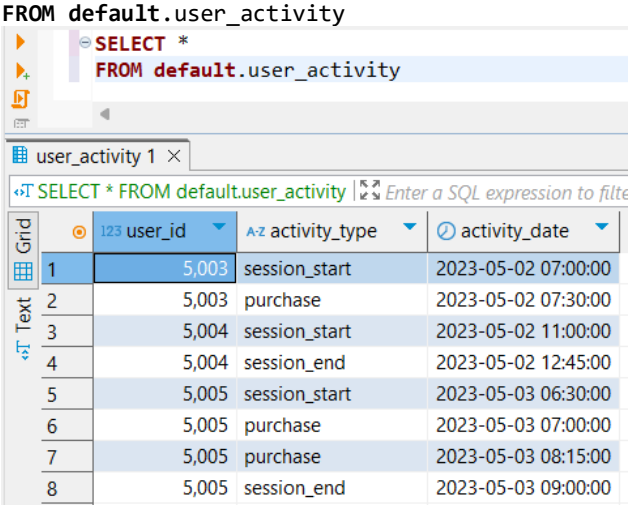
```
INSERT INTO default.user_activity (user_id, activity_type, activity_date)
VALUES
    (5001, 'login', '2023-05-01 08:30:00'),
    (5001, 'purchase', '2023-05-01 09:15:00'),
    (5001, 'logout', '2023-05-01 10:00:00'),
    (5002, 'login', '2023-05-01 09:00:00'),
    (5002, 'logout', '2023-05-01 11:30:00'),
    (5003, 'login', '2023-05-02 10:00:00'),
    (5003, 'purchase', '2023-05-02 10:30:00'),
    (5004, 'login', '2023-05-02 14:00:00'),
    (5004, 'logout', '2023-05-02 15:45:00'),
    (5005, 'login', '2023-05-03 09:30:00'),
    (5005, 'purchase', '2023-05-03 10:00:00'),
    (5005, 'purchase', '2023-05-03 11:15:00'),
    (5005, 'logout', '2023-05-03 12:00:00');

ALTER TABLE default.user_activity
DELETE WHERE toDate(activity_date) <= '2023-05-01',
UPDATE activity_type = 'session_start' WHERE activity_type = 'login',
UPDATE activity_type = 'session_end' WHERE activity_type = 'logout';
```



Name	Value
Updated Rows	1
Query	ALTER TABLE default.user_activity
	DELETE WHERE toDate(activity_date) <= '2023-05-01',
	UPDATE activity_type = 'session_start' WHERE activity_type = 'login',
	UPDATE activity_type = 'session_end' WHERE activity_type = 'logout'
Start time	Tue Nov 26 06:27:05 MSK 2024
Finish time	Tue Nov 26 06:27:05 MSK 2024

```
SELECT *
FROM default.user_activity
```

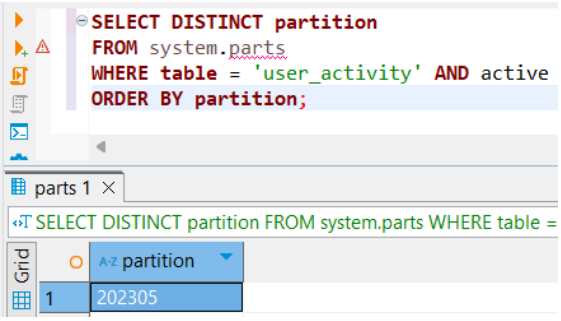


	user_id	activity_type	activity_date
1	5,003	session_start	2023-05-02 07:00:00
2	5,003	purchase	2023-05-02 07:30:00
3	5,004	session_start	2023-05-02 11:00:00
4	5,004	session_end	2023-05-02 12:45:00
5	5,005	session_start	2023-05-03 06:30:00
6	5,005	purchase	2023-05-03 07:00:00
7	5,005	purchase	2023-05-03 08:15:00
8	5,005	session_end	2023-05-03 09:00:00

8. Попробуйте создать новую партицию и вставить в нее данные

Проверка существующих партиций:

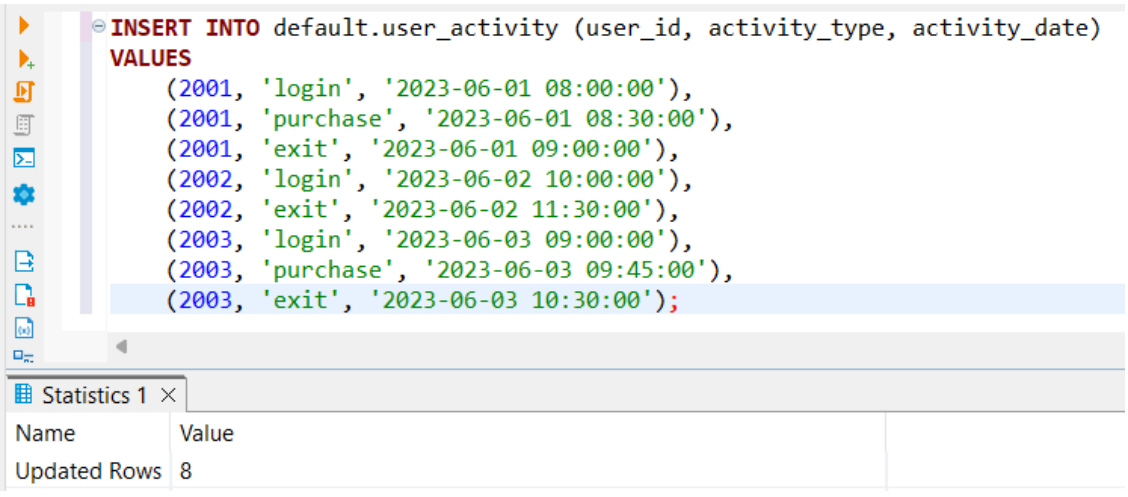
```
SELECT DISTINCT partition
FROM system.parts
WHERE table = 'user_activity' AND active
ORDER BY partition;
```



	partition
1	202305

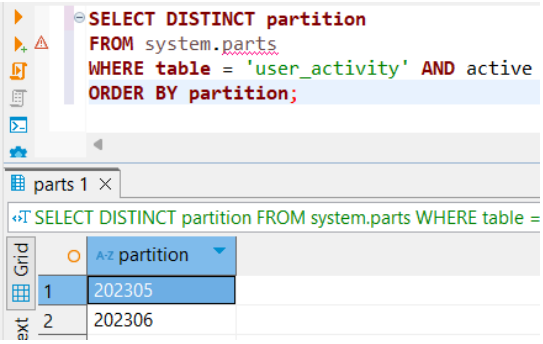
Вставка новых данных с автоматическим созданием новой партиции за июнь 2023 года:

```
INSERT INTO default.user_activity (user_id, activity_type, activity_date)
VALUES
    (2001, 'login', '2023-06-01 08:00:00'),
    (2001, 'purchase', '2023-06-01 08:30:00'),
    (2001, 'exit', '2023-06-01 09:00:00'),
    (2002, 'login', '2023-06-02 10:00:00'),
    (2002, 'exit', '2023-06-02 11:30:00'),
    (2003, 'login', '2023-06-03 09:00:00'),
    (2003, 'purchase', '2023-06-03 09:45:00'),
    (2003, 'exit', '2023-06-03 10:30:00');
```



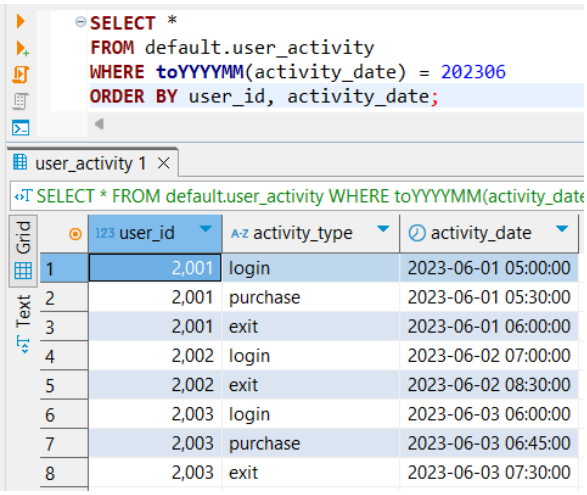
Проверка создания новой партиции

```
SELECT DISTINCT partition
FROM system.parts
WHERE table = 'user_activity' AND active
ORDER BY partition;
```



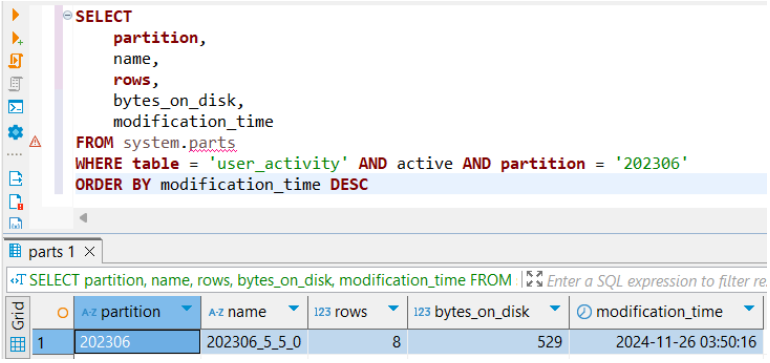
Проверка данных в новой партиции

```
SELECT *
FROM default.user_activity
WHERE toYYYYMM(activity_date) = 202306
ORDER BY user_id, activity_date;
```



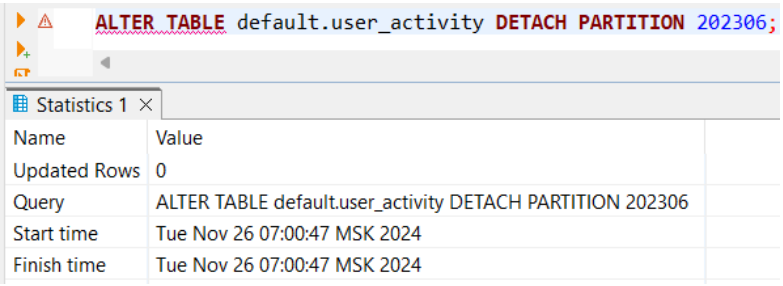
Получение детальный сведений партиции

```
SELECT
    partition,
    name,
    rows,
    bytes_on_disk,
    modification_time
FROM system.parts
WHERE table = 'user_activity' AND active AND partition = '202306'
ORDER BY modification_time DESC
```



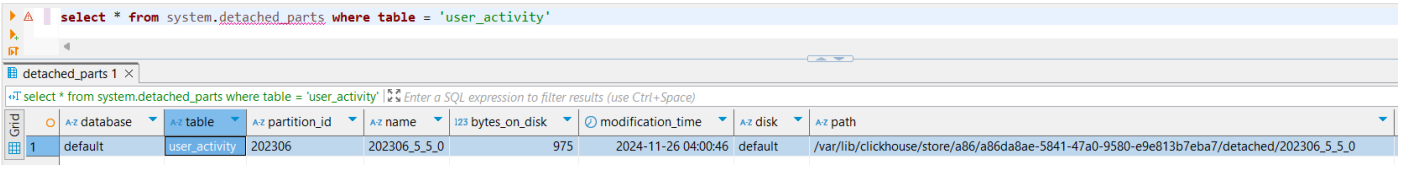
Отсоединение партиции

```
ALTER TABLE default.user_activity DETACH PARTITION 202306;
```



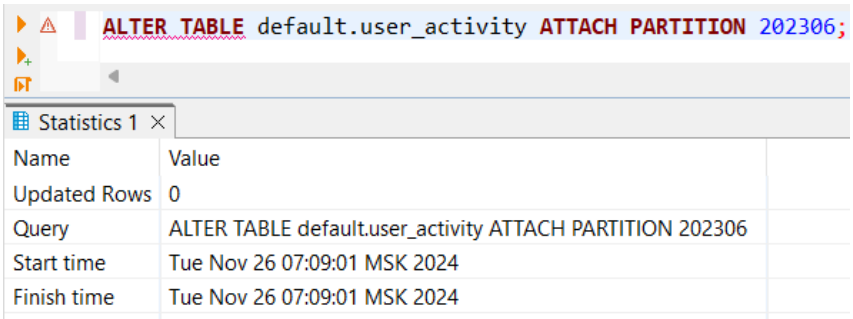
Получение списка отсоединенных партиций

```
select * from system.detached_parts where table = 'user_activity'
```



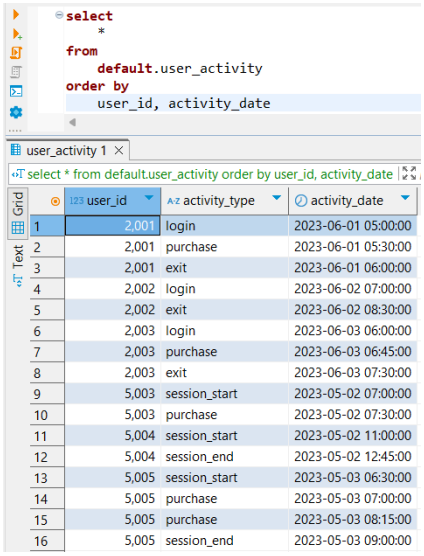
Присоединение партиции обратно

```
ALTER TABLE default.user_activity ATTACH PARTITION 202306;
```



Проверка данных

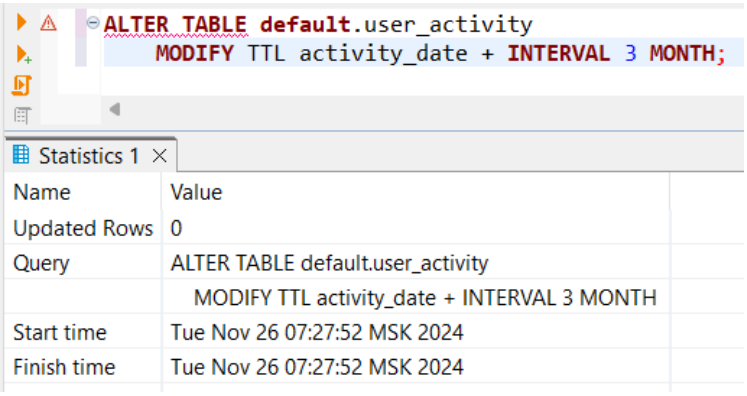
```
select
	*
from
	default.user_activity
order by
	user_id, activity_date
```



9. Изучите возможность использования TTL (Time to Live) для автоматического удаления старых партиций

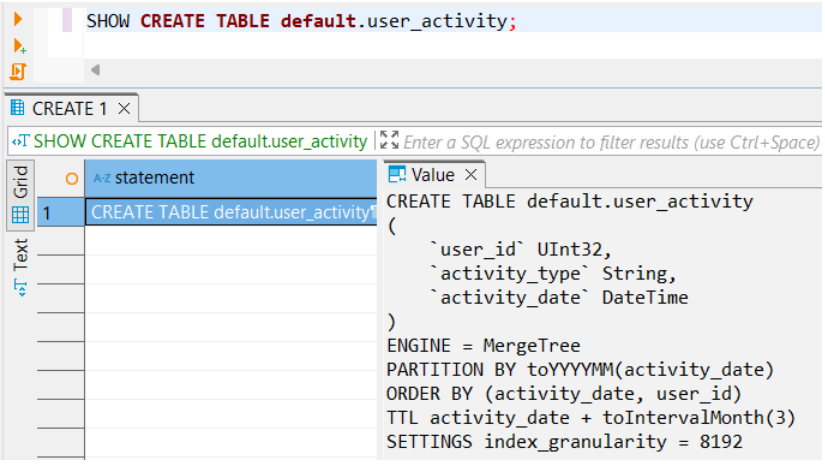
Добавление TTL к существующей таблице

```
ALTER TABLE default.user_activity
    MODIFY TTL activity_date + INTERVAL 3 MONTH;
```



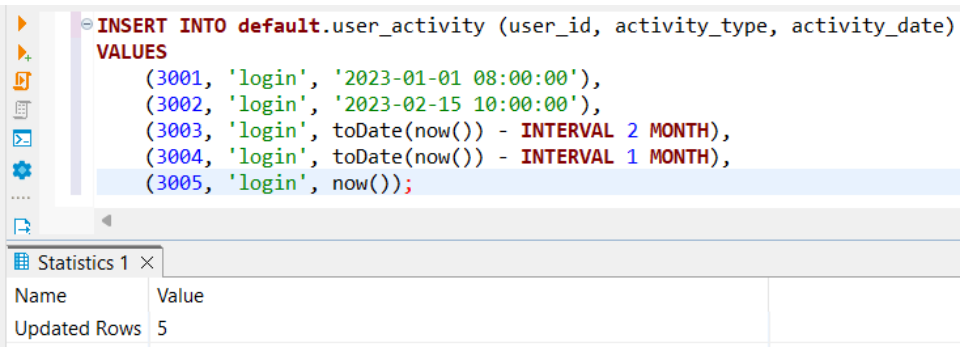
Проверка успешного добавления TTL

```
SHOW CREATE TABLE default.user_activity;
```



Вставка данных с разными датами

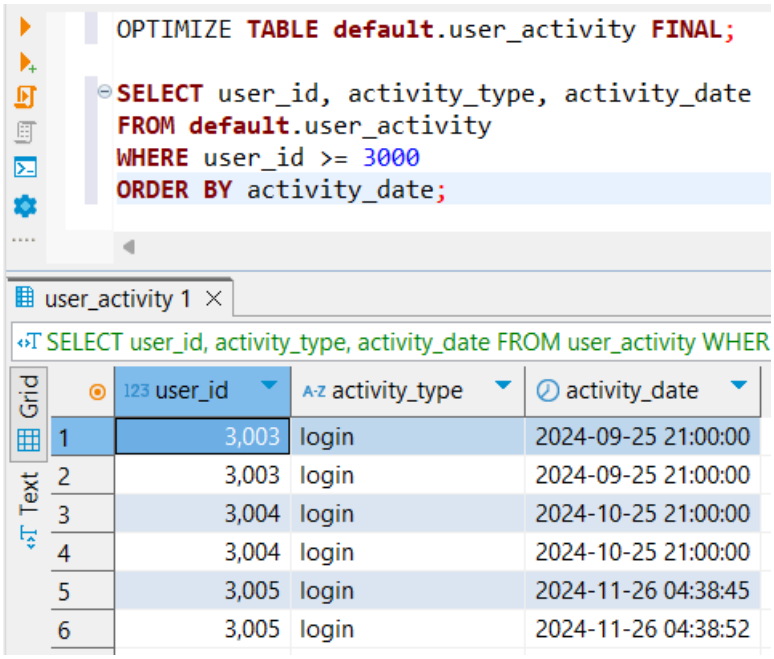
```
INSERT INTO default.user_activity (user_id, activity_type, activity_date)
VALUES
    (3001, 'login', '2023-01-01 08:00:00'),
    (3002, 'login', '2023-02-15 10:00:00'),
    (3003, 'login', toDate(now()) - INTERVAL 2 MONTH),
    (3004, 'login', toDate(now()) - INTERVAL 1 MONTH),
    (3005, 'login', now());
```



Проверка данных

```
OPTIMIZE TABLE default.user_activity FINAL;

SELECT user_id, activity_type, activity_date
FROM default.user_activity
WHERE user_id >= 3000
ORDER BY activity_date;
```



Проверка оставшихся партиций

```
SELECT DISTINCT partition
FROM system.parts
WHERE table = 'user_activity' AND active
ORDER BY partition;
```