

Task 1 – Cloud SQL

Implemented a Cloud SQL MySQL database for structured student data. Created database and tables, inserted records, and executed analytical queries. Secured the database by creating a read-only user and restricting access through authorized IP networking.

1. Cloud SQL instance overview page
2. college_db creation
3. students table structure
4. INSERT query execution
5. Query result:
 - o marks > 75
 - o count per department
6. Read-only user creation
7. Authorized network / IP restriction

The screenshot shows a Google Cloud Cloud Shell terminal window. The terminal output is as follows:

```
saddalasathco@cloudshell:~ [mazenet-001]$ gcloud sql connect college-mysql --user root
Allowing you to connect for incoming connection for 5 minutes...done.
Connecting to database with SQL user [root].Enter password:
Welcome to the MySQL monitor. Commands end with ; or \.
Your MySQL connection id is 46
Server version: 8.0.41-google (Google)

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Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE college_db;
Query OK, 1 row affected (0.21 sec)

mysql> USE college_db;
Database changed
mysql> CREATE TABLE students (
    >     student_id INT PRIMARY KEY,
    >     name VARCHAR(100),
    >     department VARCHAR(50),
    >     marks INT
    > );
Query OK, 0 rows affected (0.23 sec)

mysql> INSERT INTO students VALUES
    >     (1, 'Rahul', 'CSE', 82),
    >     (2, 'Anita', 'ECE', 74),
    >     (3, 'Pradeep', 'EEE', 90),
    >     (4, 'Suma', 'MECH', 68),
    >     (5, 'Kiran', 'ECE', 78);
Query OK, 5 rows affected (0.20 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> SELECT * FROM students;
+-----+-----+-----+
| student_id | name | department | marks |
+-----+-----+-----+
| 1 | Rahul | CSE | 82 |
| 2 | Anita | ECE | 74 |

```

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console.cloud.google.com/sql/instances/college-mysql/overview?project=mazenet-001&cloudshell=true

Google Cloud Search (/) for resources, docs, products and more

CLOUD SHELL Terminal (mazenet-001) Open editor

```

mysql> SELECT * FROM students;
+-----+-----+-----+
| student_id | name | department | marks |
+-----+-----+-----+
| 1 | Rahul | CSE | 82 |
| 2 | Anila | ECE | 74 |
| 3 | Vikram | CSE | 90 |
| 4 | Suma | EEE | 68 |
| 5 | Kiran | ECE | 78 |
+-----+-----+-----+
5 rows in set (0.21 sec)

mysql> SELECT * FROM students WHERE marks > 75;
+-----+-----+-----+
| student_id | name | department | marks |
+-----+-----+-----+
| 1 | Rahul | CSE | 82 |
| 3 | Vikram | CSE | 90 |
| 5 | Kiran | ECE | 78 |
+-----+-----+-----+
3 rows in set (0.20 sec)

mysql> SELECT department, COUNT(*) AS total_students
    -> FROM students
    -> GROUP BY department;
+-----+-----+
| department | total students |
+-----+-----+
| CSE | 2 |
| ECE | 2 |
| EEE | 1 |
+-----+-----+
3 rows in set (0.20 sec)

mysql> 
```

24°C Sunny 12:36 22-12-2025

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console.cloud.google.com/firestore/databases/satheesh26/data/panel/chats/LAP87LcSoqIAoeehmvR7?cloudshell=true&project=mazenet-001

Google Cloud Search (/) for resources, docs, products and more

CLOUD SHELL Terminal (mazenet-001) Open editor

```

mysql> SELECT * FROM students;
+-----+-----+-----+
| student_id | name | department | marks |
+-----+-----+-----+
| 1 | Rahul | CSE | 82 |
| 3 | Vikram | CSE | 90 |
| 5 | Kiran | ECE | 78 |
+-----+-----+-----+
5 rows in set (0.20 sec)

mysql> SELECT department, COUNT(*) AS total_students
    -> FROM students
    -> GROUP BY department;
+-----+-----+
| department | total students |
+-----+-----+
| CSE | 2 |
| ECE | 2 |
| EEE | 1 |
+-----+-----+
3 rows in set (0.20 sec)

mysql> CREATE USER 'satheesh_ro'@'*' IDENTIFIED BY 'Satheesh@123';
Query OK, 0 rows affected (0.25 sec)

```

chat_insert.py

26°C Sunny 13:06 22-12-2025

```

mysql> CREATE USER 'satheesh_ro'@'%' IDENTIFIED BY 'Satheesh@123';
Query OK, 0 rows affected (0.25 sec)

mysql> GRANT SELECT ON college_db.* TO 'satheesh_ro'@'%';
Query OK, 0 rows affected (0.24 sec)

mysql> ^C
mysql> saddalasathesh@cloudshell:~ (mazenet-001)$ FLUSH PRIVILEGES;
bash: FLUSH: command not found
saddalasathesh@cloudshell:~ (mazenet-001)$ ^C
saddalasathesh@cloudshell:~ (mazenet-001)$ gcloud beta sql connect college-mysql --project=mazenet-001 --user=root
Starting Cloud SQL Proxy for MySQL instance mazenet-001:us-central1:college-mysql --port 9470
2025/12/22 07:10:50 Authorization with Application Default Credentials
2025/12/22 07:10:50 (mazenet-001:us-central1:college-mysql) Listening on 127.0.0.1:9470
2025/12/22 07:10:50 The proxy has started successfully and is ready for new connections!
Connecting to database with SQL user [root].Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 127
Server version: 8.0.41-google (Google)
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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.20 sec)

mysql> SHOW GRANTS FOR 'satheesh_ro'@'%';
+-----+
| Grants for satheesh_ro@% |
+-----+
| GRANT USAGE ON *.* TO `satheesh_ro`@`%` |
| GRANT SELECT ON `college_db`.* TO `satheesh_ro`@`%` |
+-----+
2 rows in set (0.20 sec)

mysql> exit;

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Sunny

```

Task 2 – Firestore Chat

Designed a Firestore (Native mode) NoSQL data model for chat messages. Implemented message insertion, two-user querying, and timestamp-based sorting. Applied Firestore security rules to ensure only authenticated users can access their own chats.

1. Firestore database (Native mode)
2. chats collection
3. Multiple chat documents (10+)
4. Query builder or Python output
5. Firestore security rules screen

Google Cloud Terminal (mazenet-001) x +

```
GNU nano 7.2                               chat_insert.py
from google.cloud import firestore
db = firestore.Client()
db.collection("chats").add({
    "sender": "satheesh@gmail.com",
    "receiver": "ajay@gmail.com",
    "message": "Hello from Cloud Shell",
    "timestamp": firestore.SERVER_TIMESTAMP
})
print("Chat message inserted successfully")
```

Help Write Out Where Is Cut Execute Location Undo Set Mark To Bracket Previous
Exit Read File Replace Paste Justify Go To Line Redo Copy Who Was Next

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Google Cloud Terminal (mazenet-001) x +

```
mysql> GRANT SELECT ON college.* TO 'satheesh_ro'@'%';
Query OK, 0 rows affected (0.24 sec)

mysql> ^C
mysql: saddr@satheesh@cloudshell:~ (mazenet-001)$ ^C
saddr@satheesh@cloudshell:~ (mazenet-001)$ FLUSH PRIVILEGES;
+-----+
| FLUSH command not found
+-----+
saddr@satheesh@cloudshell:~ (mazenet-001)$ ^
saddr@satheesh@cloudshell:~ (mazenet-001)$ gcloud beta sql connect college-mysql --project=mazenet-001 --user=root
Starting Cloud SQL Proxy: [/usr/bin/cloud-sql-proxy mazenet-001:us-central1:college-mysql --port 9470]
2025/12/22 07:10:50 [mazenet-001:us-central1:college-mysql] Listening on 127.0.0.1:9470
2025/12/22 07:10:50 The proxy has started successfully and is ready for new connections!
Connecting to database with user [root].Enter password:
Welcome to the MySQL monitor. Commands end with ; or \g.
Your MySQL connection id is 127
Server version: 8.0.41-google (Google)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.20 sec)

mysql> SHOW GRANTS FOR 'satheesh_ro'@'%';
+-----+
| Grants for satheesh_ro@% |
+-----+
| GRANT USAGE ON *.* TO `satheesh_ro`@`%` |
| GRANT SELECT ON `college`.* TO `satheesh_ro`@`%` |
+-----+
2 rows in set (0.20 sec)

mysql> exit;
Bye
saddr@satheesh@cloudshell:~ (mazenet-001)$ nano chat_insert.py
saddr@satheesh@cloudshell:~ (mazenet-001)$
```

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Required-by:
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ python chat_insert.py
Traceback (most recent call last):
File "/home/saddalasathesh/chat insert.py", line 5, in <module>
db.collection("chats").add(
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/collection.py", line 134, in add
write_result = document.ref.create(document_data, **kwargs)
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/document.py", line 99, in create
write_results = batch.commit(**kwargs)
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/batch.py", line 61, in commit
commit_response = self._client._firestore_api.commit()
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/services/firestore_client.py", line 1450, in commit
response = rpc()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/gapic_v1/method.py", line 131, in __call__
return wrapped_func(*args, **kwargs)
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 294, in retry_wrapped_func
return retry_target()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 156, in retry_target
next_sleep = _retry_error_helpers()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/base.py", line 214, in _retry_error_helper
raise final_exc from source_exc
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 147, in retry_target
result = target()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/timeout.py", line 130, in func_with_timeout
return func(*args, **kwargs)
File "/usr/local/lib/python3.12/dist-packages/google/api_core/grpc_helpers.py", line 78, in error_remapped_callable
raise exceptions.from_grpc_error(exc) from exc
google.api_core.exceptions.NotFound: 404 The database (default) does not exist for project mazenet-001 Please visit https://console.cloud.google.com/datastore/setup?project=mazenet-001 to add a Cloud Datastore or Cloud Firestore database.
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ nano chat_insert.py
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ python chat_insert.py
Chat message inserted successfully
saddalasathesh@saddalasathesh:~ (mazenet-001)\$

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Google Cloud Terminal (mazenet-001) | CLOUD SHELL | Open editor | Search | More | Help | S | : | X

Required-by:
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ python chat_insert.py
Traceback (most recent call last):
File "/home/saddalasathesh/chat insert.py", line 5, in <module>
db.collection("chats").add(
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/collection.py", line 134, in add
write_result = document.ref.create(document_data, **kwargs)
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/document.py", line 99, in create
write_results = batch.commit(**kwargs)
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/batch.py", line 61, in commit
commit_response = self._client._firestore_api.commit()
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/services/firestore_client.py", line 1450, in commit
response = rpc()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/gapic_v1/method.py", line 131, in __call__
return wrapped_func(*args, **kwargs)
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 294, in retry_wrapped_func
return retry_target()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 156, in retry_target
next_sleep = _retry_error_helpers()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/base.py", line 214, in _retry_error_helper
raise final_exc from source_exc
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 147, in retry_target
result = target()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/timeout.py", line 130, in func_with_timeout
return func(*args, **kwargs)
File "/usr/local/lib/python3.12/dist-packages/google/api_core/grpc_helpers.py", line 78, in error_remapped_callable
raise exceptions.from_grpc_error(exc) from exc
google.api_core.exceptions.NotFound: 404 The database (default) does not exist for project mazenet-001 Please visit https://console.cloud.google.com/datastore/setup?project=mazenet-001 to add a Cloud Datastore or Cloud Firestore database.
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ nano chat_insert.py
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ python chat_insert.py
Chat message inserted successfully
saddalasathesh@saddalasathesh:~ (mazenet-001)\$

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Required-by:
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ python chat_insert.py
Traceback (most recent call last):
File "/home/saddalasathesh/chat insert.py", line 5, in <module>
db.collection("chats").add(
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/collection.py", line 134, in add
write_result = document.ref.create(document_data, **kwargs)
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/document.py", line 99, in create
write_results = batch.commit(**kwargs)
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/batch.py", line 61, in commit
commit_response = self._client._firestore_api.commit()
File "/home/saddalasathesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/services/firestore_client.py", line 1450, in commit
response = rpc()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/gapic_v1/method.py", line 131, in __call__
return wrapped_func(*args, **kwargs)
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 294, in retry_wrapped_func
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File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 156, in retry_target
next_sleep = _retry_error_helpers()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/base.py", line 214, in _retry_error_helper
raise final_exc from source_exc
File "/usr/local/lib/python3.12/dist-packages/google/api_core/retry/retry_unary.py", line 147, in retry_target
result = target()
File "/usr/local/lib/python3.12/dist-packages/google/api_core/timeout.py", line 130, in func_with_timeout
return func(*args, **kwargs)
File "/usr/local/lib/python3.12/dist-packages/google/api_core/grpc_helpers.py", line 78, in error_remapped_callable
raise exceptions.from_grpc_error(exc) from exc
google.api_core.exceptions.NotFound: 404 The database (default) does not exist for project mazenet-001 Please visit https://console.cloud.google.com/datastore/setup?project=mazenet-001 to add a Cloud Datastore or Cloud Firestore database.
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ nano chat_insert.py
saddalasathesh@saddalasathesh:~ (mazenet-001)\$ python chat_insert.py
Chat message inserted successfully
saddalasathesh@saddalasathesh:~ (mazenet-001)\$

26°C Sunny 13:15 22-12-2025

Google Cloud Platform - mazenet-001 | firestore

Firestore Database - satheesh26

Panel view | Query builder

/ > chats > QB4pBmHkk8ZEdCJghaAN

satheesh26	chats	QB4pBmHkk8ZEdCJghaAN
+ Start collection	+ Add document	+ Start collection
chats	BsixvgcyhbPX0UVqlKHm	+ Add field
	LAP87LcSoqlAoeehmvr7	message: "Hello from Cloud Shell"
	QB4pBmHkk8ZEdCJghaAN	receiver: "ajay@gmail.com"
	ZgJvXfk4Tiomh521Lgh	sender: "satheesh@gmail.com"
	m7xnJti80gJeElmiQodM	timestamp: 22 December 2025 at 13:14:37...
	xFJhF6n0PQ3Y1db7niUF	

CLOUD SHELL Terminal (mazenet-001) | Open editor

News for you Indian H-1B visa...

Cloud Shell | Open editor | Help | Documentation | 13:16 | 22-12-2025

Google Cloud Platform - mazenet-001 | firestore

Firestore Database - satheesh26

Panel view | Query builder

Run | Clear | Documentation

Query scope: Collection | Collection: /chats | Limit: 100 | Add to query

Results | Analysis

Query results

Document ID	message	receiver	sender	timestamp
BsixvgcyhbPX0UVqlKHm	"chat text"	"ajay26@gmail.com"		22 December 2025 at 12:59:26 UTC+5:30
LAP87LcSoqlAoeehmvr7	"chat text"	"ajay26@gmail.com"		22 December 2025 at 13:14:37 UTC+5:30
QB4pBmHkk8ZEdCJghaAN	"Hello from Cloud Shell"	"ajay@gmail.com"	"satheesh@gmail.com"	22 December 2025 at 13:14:37 UTC+5:30
ZgJvXfk4Tiomh521Lgh			"saddalasatheesh@gmail.com"	
m7xnJti80gJeElmiQodM	"chat text"	"ajay26@gmail.com"		
xFJhF6n0PQ3Y1db7niUF	"chat text"	"ajay26@gmail.com"		22 December 2025 at 12:59:26 UTC+5:30

Rows per page: 50 | 1 - 6 of 6

CLOUD SHELL Terminal (mazenet-001) | Open editor | Help | Documentation | 13:18 | 22-12-2025

The screenshot shows two main windows from the Google Cloud Platform interface.

Top Window: Firestore Studio

- Left Sidebar:** Shows the project name "mazenet-001" and the "Database" section with "Firestore studio" selected.
- Panel View:** Set to "Query builder".
 - Query scope:** Collection (selected), Collection: "/chats".
 - Limit:** 100.
 - Selection:** ORDER BY timestamp (Field: timestamp, Order: ascending).
- Results:** Displays the query results in a table:

Document ID	message	receiver	sender	timestamp
LAP87LcSqlAoeehmvr7	"chat text"	"ajay26@gmail.com"		22 December 2025 at 12:59:26 UTC+5:30
xJhF6n0PQ3Y1db7niUF	"chat text"	"ajay26@gmail.com"		22 December 2025 at 12:59:26 UTC+5:30
QB4pbmHkk8ZEdCJghaAN	"Hello from Cloud Shell"	"ajay@gmail.com"	"satheesh@gmail.com"	22 December 2025 at 13:14:37 UTC+5:30

Bottom Window: Cloud Shell Terminal

- Terminal:** (mazenet-001) running on a Mac OS X system.
- System Status:** 26°C, Sunny.
- Taskbar:** Shows various application icons including Finder, Mail, Safari, and Google Chrome.

Second Window: Indexes - Firestore - mazenet-001

- Left Sidebar:** Shows the project name "mazenet-001" and the "Indexes" section.
- Content Area:** A modal dialog titled "Create composite index" is open.
 - Description:** Please read the documentation for best practices on indexing different field types and indexing for different types of queries. [Learn more](#).
 - Note:** The /chats collection requires additional indexing to run your query.
 - Composite Indexes:** Fields: receiver: ASC, sender: ASC, timestamp: ASC, __name__: ASC. Status: Needs creation.
 - Buttons:** Cancel, Create.
 - Text:** Run your desired query in your app code to get a link to generate the required index, or create one here.
 - Buttons:** Create index.

The screenshot shows the Google Cloud Firestore studio interface. On the left, a sidebar lists options like Firestore, Database, Security, and Indexes. Under Database, 'Indexes' is selected. In the main area, under 'Composite', there is a table showing an existing index:

Collection ID	Fields	Query scope	Size	Entries	Last updated	Index ID	Actions
chats	receiver, sender, timestamp, name	Collection	-	-	-	CICAg0JXh4EK	⋮

Below the table, a terminal window shows the command used to create the index:

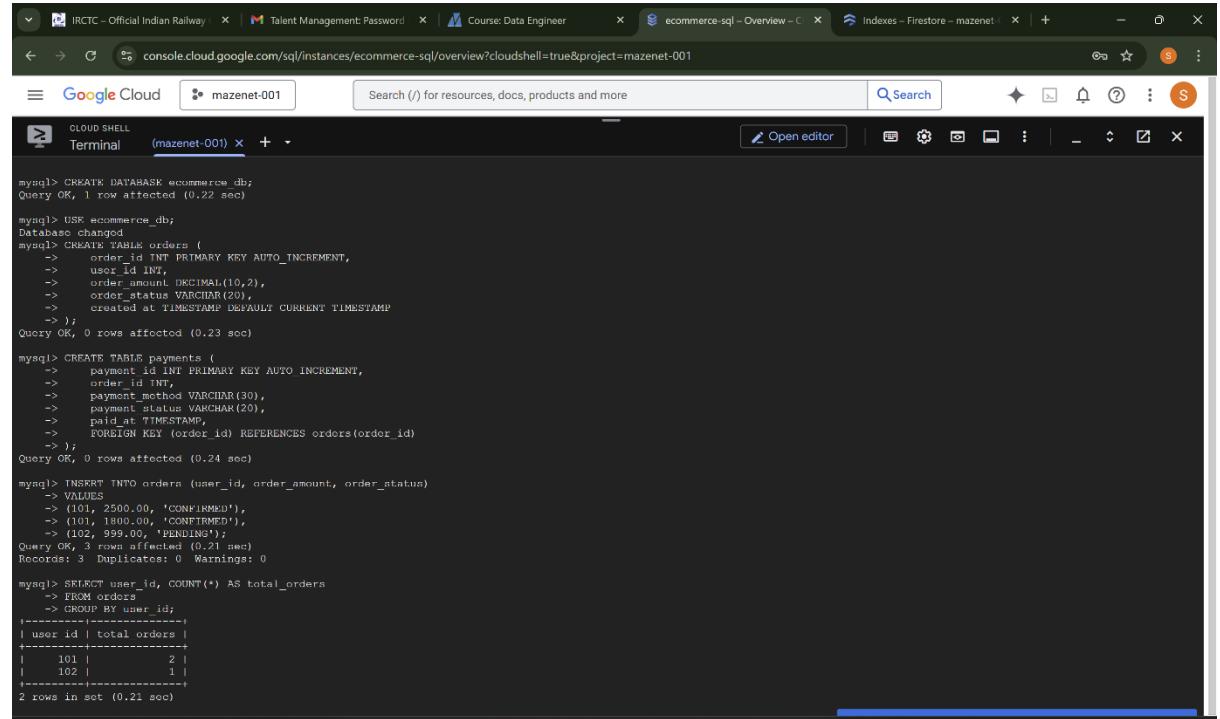
```
saddalasatheesh@cloudshell:~ (mazenet-001)$ python query_chats.py
/home/saddalasatheesh/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/base_collection.py:315: UserWarning: Detected filter using positional arguments. Prefer using the 'filter' keyword argument instead.
    return query.where(field_path, op_string, value)
/home/saddalasatheesh/query_chats.py:7: UserWarning: Detected filter using positional arguments. Prefer using the 'filter' keyword argument instead.
    .where("receiver", "in", ["satheesh@gmail.com", "ajay@gmail.com"]) \
('receiver': 'ajay@gmail.com', 'message': 'Hello from Cloud Shell', 'sender': 'satheesh@gmail.com', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 7, 44, 37, 936000, tzinfo=atimezone.utc)}
saddalasatheesh@cloudshell:~ (mazenet-001)$
```

Task 3 – E-commerce

Used Cloud SQL for orders and payments to ensure ACID compliance and transactional consistency. Used Firestore for high-volume, time-based user activity logs. Implemented SQL aggregation queries and NoSQL time-ordered queries with indexing for scalability.

1. Orders & payments tables in Cloud SQL
2. SQL query: total orders per user

3. user_activity_logs collection
4. 50 activity documents
5. Query last 50 logs output



```

mysql> CREATE DATABASE ecommerce_db;
Query OK, 1 row affected (0.22 sec)

mysql> USE ecommerce_db;
Database changed

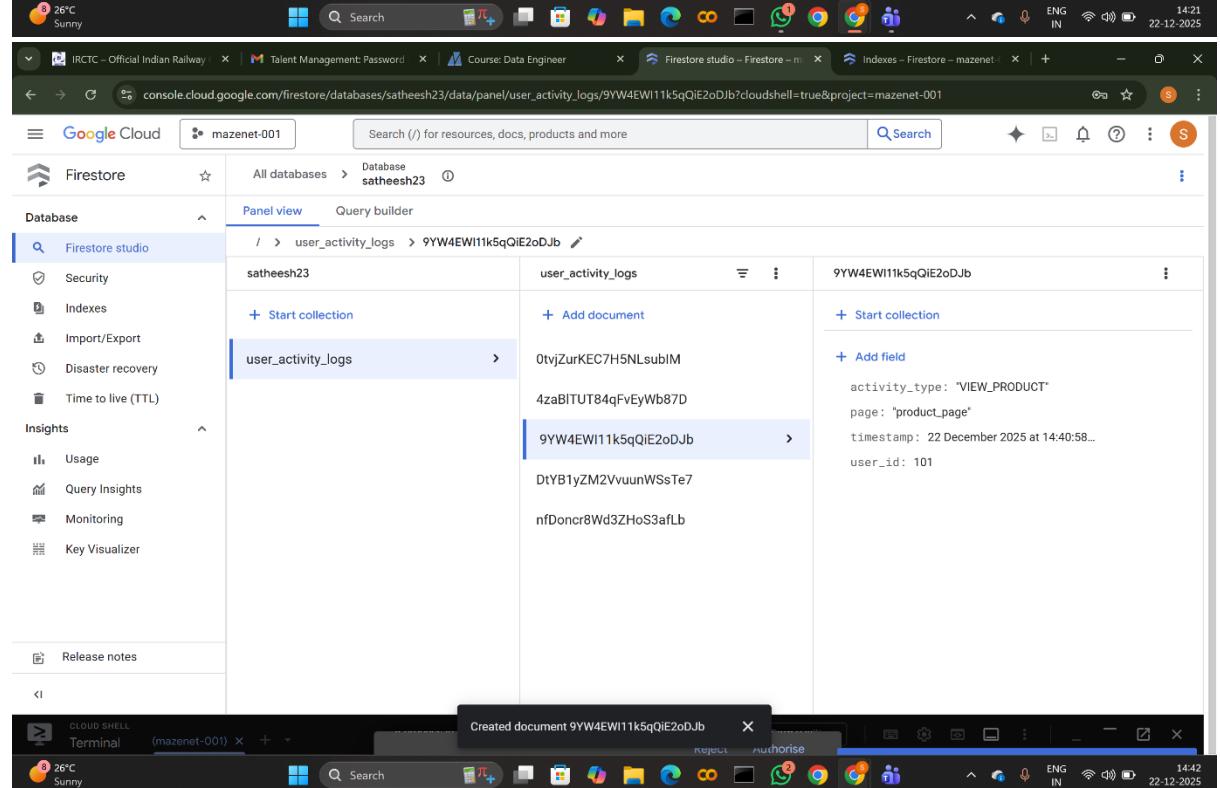
mysql> CREATE TABLE orders (
    ->     order_id INT PRIMARY KEY AUTO_INCREMENT,
    ->     user_id INT,
    ->     order_amount DECIMAL(10,2),
    ->     order_status VARCHAR(20),
    ->     created_at TIMESTAMP DEFAULT CURRENT_TIMESTAMP
    -> );
Query OK, 0 rows affected (0.23 sec)

mysql> CREATE TABLE payments (
    ->     payment_id INT PRIMARY KEY AUTO_INCREMENT,
    ->     order_id INT,
    ->     payment_method VARCHAR(30),
    ->     payment_status VARCHAR(20),
    ->     paid_at TIMESTAMP,
    ->     FOREIGN KEY (order_id) REFERENCES orders(order_id)
    -> );
Query OK, 0 rows affected (0.24 sec)

mysql> INSERT INTO orders (user_id, order_amount, order_status)
    -> VALUES
    -> (101, 2500.00, 'CONFIRMED'),
    -> (101, 1800.00, 'CONFIRMED'),
    -> (102, 999.00, 'PENDING');
Query OK, 3 rows affected (0.21 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> SELECT user_id, COUNT(*) AS total_orders
    -> FROM orders
    -> GROUP BY user_id;
+-----+
| user_id | total orders |
+-----+
| 101     |      2          |
| 102     |      1          |
+-----+
2 rows in set (0.21 sec)

```



Created document 9YW4EWI11k5qQlE2oDjb

The screenshot shows the Google Cloud Firestore studio interface. The left sidebar contains navigation links for Firestore, Security, Indexes, Import/Export, Disaster recovery, Time to live (TTL), Insights (Usage, Query Insights, Monitoring, Key Visualizer), and Release notes. The main panel displays a database named 'satheesh23' under 'Database'. A collection named 'user_activity_logs' is selected. Inside this collection, a document with the ID 'yMletJwgOV9xf0DCGdR2' is expanded. The document contains the following fields:

- activity_type: "REMOVE_FROM_CART"
- page: "cart_page"
- timestamp: 22 December 2025 at 14:54:24...
- user_id: 101

Below the document, there are several other document IDs listed: r3RKgz9GS0y3OpI5j5lw, ruxjX4EDrpHXAJny9NmW, sukmwGEx7hxUT2tdp4VJ, tA34h5QbY0hQKZzPk19, xvP96pdaxhKTXLzMbkrZ, yMletJwgOV9xf0DCGdR2, yNQ1dknjj0wyuz0SPnrc, and zaL9b7BHoYQqAN1hJpj.

The terminal window shows the command to update the document:

```
gcloud firestore documents update --collection-path user_activity_logs --document-path yMletJwgOV9xf0DCGdR2 --update-field activity_type=ADD_TO_CART --update-field page=product_page
```

The terminal also displays the current weather: 26°C Sunny.

The terminal window shows the updated document state:

```
activity_type: "ADD_TO_CART"
page: "product_page"
timestamp: 22 December 2025 at 14:54:18...
user_id: 101
```

The terminal also displays the current weather: 26°C Sunny.

Google Cloud | mazenet-001 | Search (/) for resources, docs, products and more | S

Firestore | All databases > Database satheesh23 ⓘ

Panel view | **Query builder**

Run | Clear | Documentation ⓘ

Query scope: Collection | Collection: /user_activity_logs

Limit: 100

Add to query

Results | Analysis

Query results

Document ID	activity_type	page	timestamp	user_id	user_id
0tvjZurKEC7HNLsLublM					
1MSUrEXs1bnFc9dDbveR	"SEARCH"	"checkout_page"	22 December 2025 at 14:54:19 UTC+5:30	101	
1MpufxIgoGH9aqNsOGyY	"REMOVE_FROM_CART"	"home_page"	22 December 2025 at 14:54:12 UTC+5:30	101	
1UyEW6RbGO4DXJIEiDT	"ADD_TO_CART"	"search_page"	22 December 2025 at 14:54:21 UTC+5:30	101	
2HAE9fHF4xb72XNEMkd	"REMOVE_FROM_CART"	"product_page"	22 December 2025 at 14:54:22 UTC+5:30	101	
2i41TzsauWnoCcQOXTGe	"VIEW_PRODUCT"	"cart_page"	22 December 2025 at 14:54:08 UTC+5:30	101	
2oHzEer0ZACKil7d404A	"ADD_TO_CART"	"search_page"	22 December 2025 at 14:54:03 UTC+5:30	101	
3aoTzZK6jMuHfohOKaJY	"REMOVE_FROM_CART"	"product_page"	22 December 2025 at 14:54:08 UTC+5:30	101	

CLOUD SHELL Terminal (mazenet-001) | Open editor | 27°C Sunny | ENG IN | 14:58 | 22-12-2025

Google Cloud | mazenet-001 | Search (/) for resources, docs, products and more | S

Firestore | All databases > Database satheesh23 ⓘ

Panel view | **Query builder**

Query scope: Collection | Collection: /user_activity_logs

Limit: 100

Selection: WHERE | Field: user_id | Operator: == | Value type: number | Value: 101

Add to query

Results | Analysis

Query results

Document ID	activity_type	page	timestamp	user_id
1MSUrEXs1bnFc9dDbveR	"SEARCH"	"checkout_page"	22 December 2025 at 14:54:19 UTC+5:30	101
1MpufxIgoGH9aqNsOGyY	"REMOVE_FROM_CART"	"home_page"	22 December 2025 at 14:54:12 UTC+5:30	101
1UyEW6RbGO4DXJIEiDT	"ADD_TO_CART"	"search_page"	22 December 2025 at 14:54:21 UTC+5:30	101
2HAE9fHF4xb72XNEMkd	"REMOVE_FROM_CART"	"product_page"	22 December 2025 at 14:54:22 UTC+5:30	101
2i41TzsauWnoCcQOXTGe	"VIEW_PRODUCT"	"cart_page"	22 December 2025 at 14:54:08 UTC+5:30	101
2oHzEer0ZACKil7d404A	"ADD_TO_CART"	"search_page"	22 December 2025 at 14:54:03 UTC+5:30	101
3aoTzZK6jMuHfohOKaJY	"REMOVE_FROM_CART"	"product_page"	22 December 2025 at 14:54:08 UTC+5:30	101
3yDSaWSSRMBhFqfOLIM	"VIEW_PRODUCT"	"cart_page"	22 December 2025 at 14:54:26 UTC+5:30	101

CLOUD SHELL Terminal (mazenet-001) | Open editor | 8 Trending videos Kids have the be... | Search | 14:59 | 22-12-2025

Google Cloud Search bar: mazenet-001

Database: satheesh23

Panel view: Query builder

Query scope: Collection /user_activity_logs

Limit: 100

Selection: ORDER BY timestamp (Field: timestamp, Order: ascending)

Results

Document ID	activity_type	page	timestamp	user-id	user_id
4zaBITUT84qFvWb7D	"VIEW_PRODUCT"	"product_page"	22 December 2025 at 14:40:58 UTC+5:30	101	101
9YW4EWI11k5qIE2oDjb	"VIEW_PRODUCT"	"product_page"	22 December 2025 at 14:40:58 UTC+5:30	101	101
pNy1lGTiucXUrcUwUhij	"VIEW_PRODUCT"	"product_page"	22 December 2025 at 14:40:58 UTC+5:30	101	101
eYgQmRuAz7lIgzlvFjDH	"SEARCH"	"product_page"	22 December 2025 at 14:52:55 UTC+5:30	101	101
yNQ1dknjj0wyuz0SPnrc	"REMOVE_FROM_CART"	"checkout_page"	22 December 2025 at 14:53:55 UTC+5:30	101	101
Jg0cNn161tr04cNoFsdq	"REMOVE_FROM_CART"	"checkout_page"	22 December 2025 at 14:53:56 UTC+5:30	101	101
qo9Ix204CYINmgcyG4HD	"VIEW_PRODUCT"	"checkout_page"	22 December 2025 at 14:53:56 UTC+5:30	101	101
8w01qUuhwmx9sZCPqc	"SEARCH"	"product_page"	22 December 2025 at 14:53:57 UTC+5:30	101	101

CLOUD SHELL Terminal (mazenet-001)

Query summary:

- Results returned: 53
- Execution duration: 0.012460 seconds
- Read operations: 53
- Indexes used: [0] properties: (timestamp ASC, __name__ ASC)

Debugging statistics

Sat Dec 22 2023

console.firebaseio.google.com/project/mazenet-001.firebaseio/databases/sathee23/indexes?create_composite=Cldwcm9qZWNoct9tXplbmVOLTAwMS9kYXRhYmFzZXMvc2F0aGVlc2gyM...

Firebase mazenet-001

Project Overview Cloud Firestore Database sathee23 Ask Gemini about the core concepts of using Firestore

Data Rules Indexes Disaster recovery Usage

Composite Single field Add index

Collection ID	Fields indexed	Query scope	Index ID	Status
user_activity_logs	user_id, timestamp, __name__	Collection	CICAgOjXh4EK	Enabled

Items per page: 10 1-1 of 1 < > |

Related development tools

Blaze Pay as you go Modify

27°C Sunny

```
subprocess.Popen("mazenet-001.firebaseio.py last 50 log", shell=True)
/home/saddalasathoos/.local/lib/python3.12/site-packages/google/cloud/firestore_v1/baso_collection.py:315: UserWarning: Detected filter using positional arguments. Prefer using the 'filter' keyword argument instead.
    return query.where(field_path, op_string, value)
*Last 50 user activities:
```

```
activity_type: 'SEARCH', 'user_id': 101, 'page': 'cart page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 26, 830000, tzinfo=datetime.timezone.utc)}
'activity_type': 'VIEW_PRODUCT', 'user_id': 101, 'page': 'cart page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 26, 356000, tzinfo=datetime.timezone.utc)}
'activity_type': 'CHECKOUT', 'user_id': 101, 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 26, 537000, tzinfo=datetime.timezone.utc)}
'activity_type': 'SEARCH', 'page': 'search_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 26, 1690000, tzinfo=datetime.timezone.utc)}
'page': 'cart page', 'activity_type': 'REMOVE FROM CART', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 26, 189000, tzinfo=datetime.timezone.utc)}
'page': 'search page', 'user_id': 101, 'activity_type': 'REMOVE FROM CART', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 23, 880000, tzinfo=datetime.timezone.utc)}
'activity_type': 'REMOVE FROM CART', 'page': 'home page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 22, 841000, tzinfo=datetime.timezone.utc)}
'activity_type': 'REMOVE_FROM_CART', 'user_id': 101, 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 22, 557000, tzinfo=datetime.timezone.utc)}
'activity_type': 'ADD_TO_CART', 'page': 'search_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 21, 560000, tzinfo=datetime.timezone.utc)}
'user_id': 101, 'activity_type': 'CHECKOUT', 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 21, 321000, tzinfo=datetime.timezone.utc)}
'user_id': 101, 'page': 'product_page', 'activity_type': 'ADD_TO_CART', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 20, 283000, tzinfo=datetime.timezone.utc)}
'page': 'checkout_page', 'activity_type': 'SEARCH', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 19, 990000, tzinfo=datetime.timezone.utc)}
'activity_type': 'ADD_TO_CART', 'page': 'product_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 18, 951000, tzinfo=datetime.timezone.utc)}
'page': 'product_page', 'activity_type': 'REMOVE_FROM_CART', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 18, 690000, tzinfo=datetime.timezone.utc)}
'page': 'product_page', 'activity_type': 'REMOVE FROM CART', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 17, 596000, tzinfo=datetime.timezone.utc)}
'page': 'home page', 'activity_type': 'CHECKOUT', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 16, 300000, tzinfo=datetime.timezone.utc)}
'activity_type': 'CHECKOUT', 'user_id': 101, 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 15, 968000, tzinfo=datetime.timezone.utc)}
'user_id': 101, 'activity_type': 'SEARCH', 'page': 'cart_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 14, 930000, tzinfo=datetime.timezone.utc)}
'activity_type': 'REMOVE_FROM_CART', 'page': 'product_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 14, 691000, tzinfo=datetime.timezone.utc)}
'activity_type': 'VIEW_PRODUCT', 'page': 'product_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 14, 610000, tzinfo=datetime.timezone.utc)}
'activity_type': 'REMOVE FROM CART', 'page': 'home page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 13, 41000, tzinfo=datetime.timezone.utc)}
'activity_type': 'ADD_TO_CART', 'page': 'product_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 13, 431000, tzinfo=datetime.timezone.utc)}
'page': 'home_page', 'activity_type': 'REMOVE FROM CART', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 12, 325000, tzinfo=datetime.timezone.utc)}
'activity_type': 'REMOVE FROM CART', 'page': 'cart_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 12, 12000, tzinfo=datetime.timezone.utc)}
'user_id': 101, 'activity_type': 'REMOVE FROM CART', 'page': 'search_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 10, 984000, tzinfo=datetime.timezone.utc)}
'activity_type': 'ADD_TO_CART', 'user_id': 101, 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 10, 117000, tzinfo=datetime.timezone.utc)}
'activity_type': 'REMOVE_FROM_CART', 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 9, 639000, tzinfo=datetime.timezone.utc)}
'activity_type': 'VIEW_PRODUCT', 'page': 'product_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 9, 617000, tzinfo=datetime.timezone.utc)}
'page': 'product_page', 'activity_type': 'REMOVE FROM CART', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 8, 338000, tzinfo=datetime.timezone.utc)}
'activity_type': 'VIEW_PRODUCT', 'page': 'cart_page', 'user_id': 101, 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 8, 65000, tzinfo=datetime.timezone.utc)}
'activity_type': 'VIEW_PRODUCT', 'user_id': 101, 'page': 'search_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 7, 57000, tzinfo=datetime.timezone.utc)}
'activity_type': 'SEARCH', 'user_id': 101, 'page': 'product_page', 'timestamp': DatetimeWithNanoseconds(2025, 12, 22, 9, 24, 6, 796000, tzinfo=datetime.timezone.utc)}
```