akoradia_Writup_Project-4

Project 4 Task 1 – Nutrition Tracker App

by Ashay Koradia (AndrewID: akoradia)

1. Project Idea Overview

- **App Name:** Nutrition Tracker
- **API Used:** Nutritionix Track API
- **Use Case:** User types "1 cup nachos and 1 cup salsa" → The app fetches and displays calorie count and nutritional info.
- **Why this is useful:** Many users want a quick estimate of their calorie intake based on real-world food entries. This app simplifies that with natural language input and accurate data.

How to Run:

```
chmod +x build.sh
./build.sh
```

Dashboard URL from code spaces: https://super-waffle-g5rpgvqqrgjh66q-8080.app.github.dev/dashboard

2. Description:

My mobile application allows users to enter a natural language description of food item. It uses the **Nutritionix Track API** to fetch nutritional information, such as calorie count and macronutrients. This helps users quickly get detailed food insights in an intuitive way.

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1. API Usage Demonstration

a. API Chosen:

- **Name:** Nutritionix Track API
- **Documentation URL:** https://docx.syndigo.com/developers/docs/getting-started-1

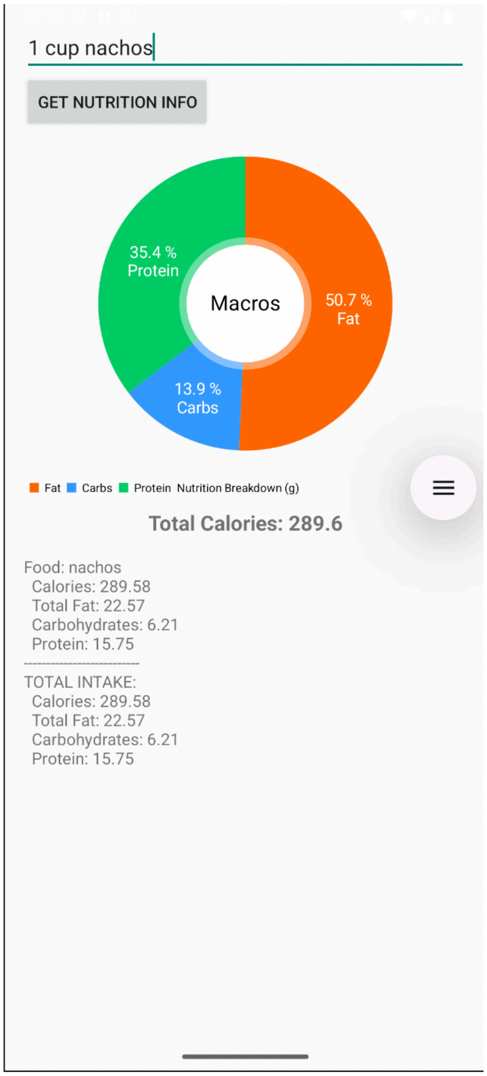
b. Java App to Fetch from API

Created a Java application using HttpURLConnection to send a POST request to the Nutritionix API with a natural language query such as:

```
{
  "query": "1 cup nachos and 1 cup salsa"
}
```

The API returns a JSON response, from which I extracted nutritional details like calories, protein, and fat. The app show a pie chart of the distribution and prints the values to the screen.

Screenshot of app output:



Total Calories: 289.6

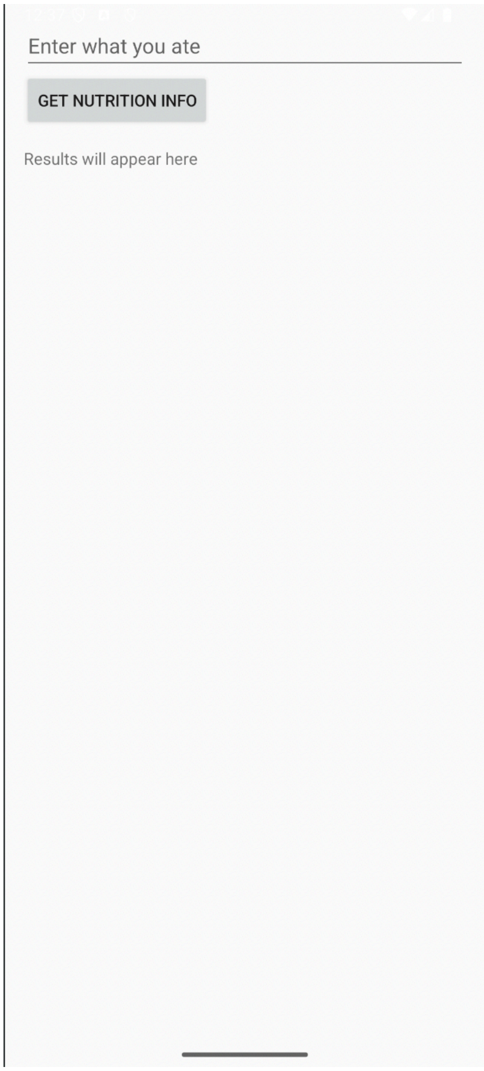
```
Food: nachos
  Calories: 289.58
  Total Fat: 22.57
  Carbohydrates: 6.21
  Protein: 15.75
------------------------------
TOTAL INTAKE:
  Calories: 289.58
  Total Fat: 22.57
  Carbohydrates: 6.21
  Protein: 15.75
```

3. Criteria:

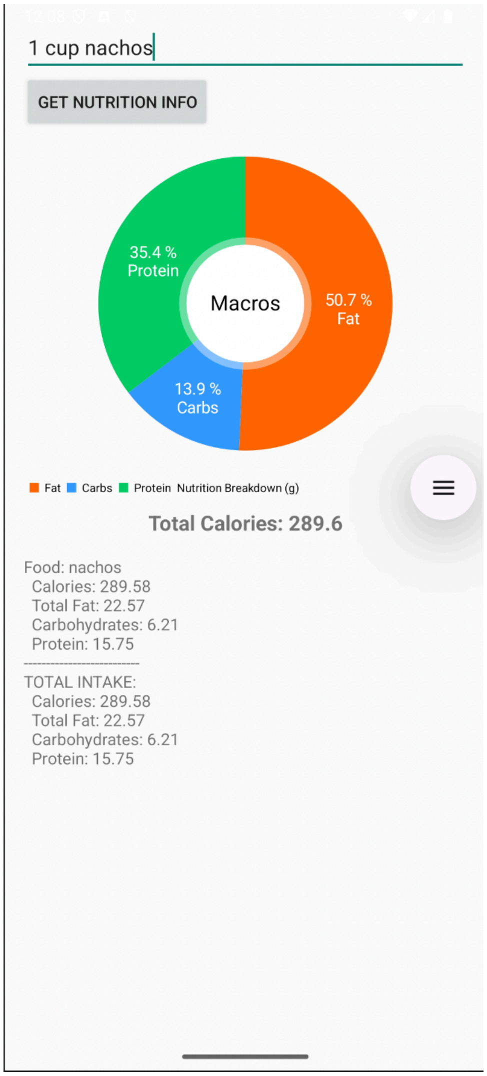
a. Has at least three different kinds of views in your Layout (TextView, EditText, ImageView, etc.)

Yes. My app layout includes the following Android views:

- **TextView** – used to label input fields and display static messages.
- **EditText –** allows the user to input the food description in natural language.
- **Button** – used to trigger the API call.
- **RecyclerView** (or **TextView/ImageView**, if simpler) – used to display the nutrition information response.



screenshot of the layout before the nutrition information is fetched



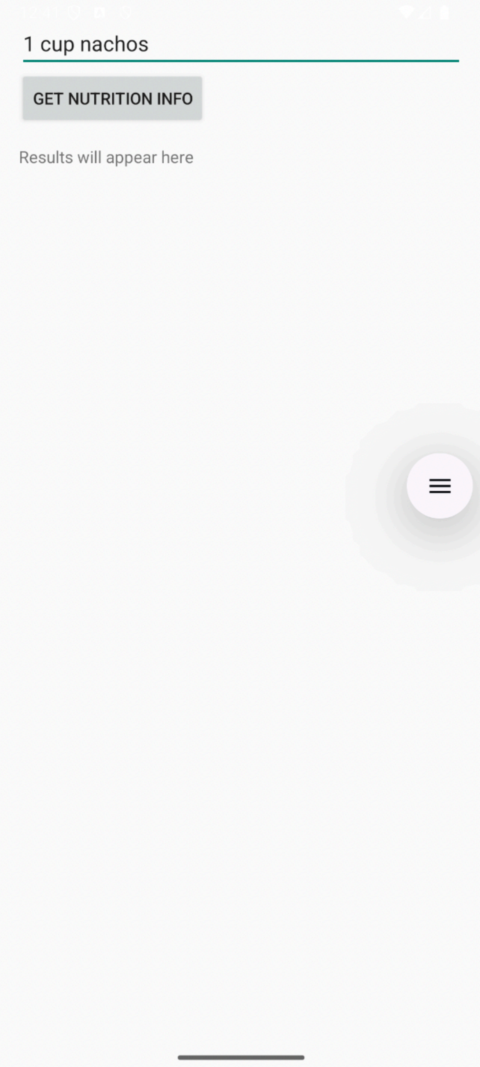
Total Calories: 289.6

```
Food: nachos
  Calories: 289.58
  Total Fat: 22.57
  Carbohydrates: 6.21
  Protein: 15.75
------------------------------
TOTAL INTAKE:
  Calories: 289.58
  Total Fat: 22.57
  Carbohydrates: 6.21
  Protein: 15.75
```

Screenshot of the layout after the information is fetched

b. Requires input from the user

Yes. The app prompts the user to enter a food description (e.g., “2 eggs and toast”) into an **EditText** field. This input is then sent to the server for nutrition analysis.


1 cup nachos

Results will appear here

c. Makes an HTTP request (using an appropriate HTTP method) to your web service

Yes. The app makes a **POST** request to a custom web service endpoint (hosted on GitHub Codespaces) using an HttpURLConnection or OkHttp client in a background thread (AsyncTask or similar). The web service acts as a bridge to the Nutritionix API.

This is defined in your RequestManager.java file-

The http POST request URL is: https://super-waffle-g5rpgvqqrgjh66q-8080.app.github.dev/Project-4-mongo-nutrition-web-app/api/nutrition

Request

```
{
   "query": "1 cup nachos and 1 cup salsa"
}
```

d. Receives and parses an XML or JSON formatted reply from the web service

Yes. The web service responds with a **JSON** response containing only the relevant nutrition information. The Android app parses this response using a JSON parser, extracting fields such as:

- Calories
- Protein
- Carbohydrates
- Fat
- Food name

JSON Response

```
{
   "foods": [
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         "food_name": "nachos",
         "brand_name": null,
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         "serving_unit": "cup",
         "serving_weight_grams": 129.09,
         "nf_calories": 289.58,
         "nf_total_fat": 22.57,
         "nf_saturated_fat": 9.22,
        "nf_cholesterol": 66.3,
        "nf_sodium": 409.39,
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                "value": 0.4463
            },
            {
                "attr_id": 417,
                "value": 10.38
            },
            {
                "attr_id": 418,
                "value": 0
            },
            {
                    "attr_id": 421,
                    "value": 33.216
                },
                {
                    "attr_id": 430,
                    "value": 11.1585
                },
                {
                    "attr_id": 431,
                    "value": 0
                },
                {
                    "attr_id": 432,
                    "value": 10.38
                },
                {
                    "attr_id": 435,
                    "value": 10.38
                },
                {
                    "attr_id": 601,
                    "value": 0
                },
                {
                    "attr_id": 606,
                    "value": 0.0545
                },
                {
                    "attr_id": 607,
                    "value": 0
                },
                {
                    "attr_id": 608,
                    "value": 0
                },
                {
                    "attr_id": 609,
                    "value": 0
                },
                {
                    "attr_id": 610,
                    "value": 0
                },
                {
                    "attr_id": 611,
                    "value": 0
                },
                {
                    "attr_id": 612,
                    "value": 0
                },
                {
                    "attr_id": 613,
                    "value": 0.0415
                },
                {
                    "attr_id": 614,
                    "value": 0.0104
                },
                {
                    "attr_id": 617,
                    "value": 0.0441
                },
                {
                    "attr_id": 618,
                    "value": 0.192
                },
                {
                    "attr_id": 619,
                    "value": 0.0104
                },
                {
```

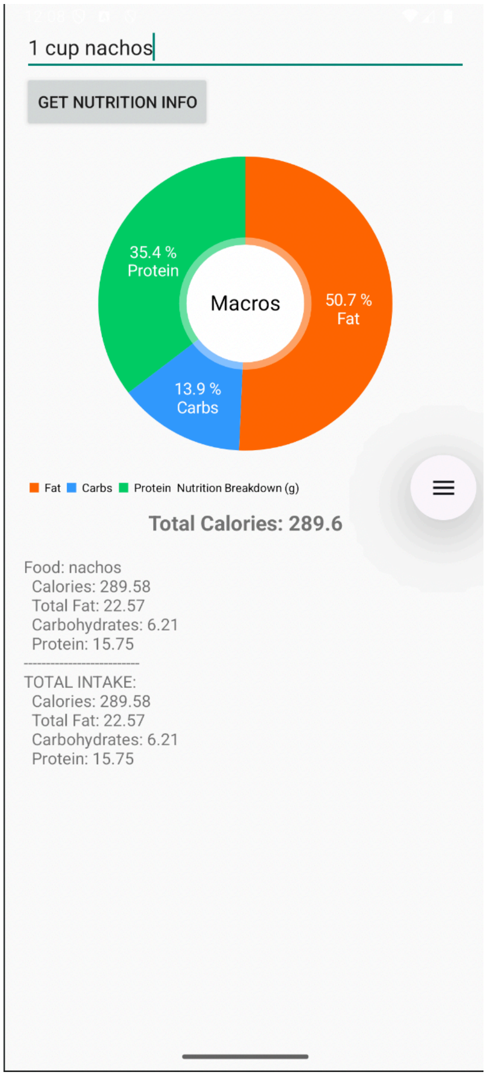
```
                "attr_id": 620,
                "value": 0
            },
            {
                "attr_id": 621,
                "value": 0
            },
            {
                "attr_id": 626,
                "value": 0
            },
            {
                "attr_id": 627,
                "value": 0
            },
            {
                "attr_id": 628,
                "value": 0
            },
            {
                "attr_id": 629,
                "value": 0
            },
            {
                "attr_id": 630,
                "value": 0
            },
            {
                "attr_id": 631,
                "value": 0
            },
            {
                "attr_id": 645,
                "value": 0.0467
            },
            {
```

```
            "attr_id": 646,
            "value": 0.2024
          }
        ],
        "nix_brand_name": null,
        "nix_brand_id": null,
        "nix_item_name": null,
        "nix_item_id": null,
        "upc": null,
        "consumed_at": "2025-04-10T15:29:34+00:00",
        "metadata": {
          "is_raw_food": false
        },
        "source": 1,
        "ndb_no": 6164,
        "tags": {
          "item": "salsa",
          "measure": "cup",
          "quantity": "1.0",
          "food_group": 8,
          "tag_id": 219
        },
        "alt_measures": [
          {
            "serving_weight": 259,
            "measure": "cup",
            "seq": 3,
            "qty": 1
          },
          {
            "serving_weight": 130,
            "measure": "cup",
            "seq": 2,
            "qty": 0.5
          },
          {
```

```
                    "serving_weight": 36,
                    "measure": "tbsp",
                    "seq": 1,
                    "qty": 2
                },
                {
                    "serving_weight": 100,
                    "measure": "g",
                    "seq": null,
                    "qty": 100
                },
                {
                    "serving_weight": 28.3495,
                    "measure": "wt. oz",
                    "seq": null,
                    "qty": 1
                },
                {
                    "serving_weight": 5.4,
                    "measure": "tsp",
                    "seq": 101,
                    "qty": 1
                }
            ],
            "lat": null,
            "lng": null,
            "meal_type": 3,
            "photo": {
                "thumb": "https://nix-tag-images.s3.amazonaws.com/219_thumb.jpg",
                "highres": "https://nix-tag-images.s3.amazonaws.com/219_highres.jpg",
                "is_user_uploaded": false
            },
            "sub_recipe": null,
            "class_code": null,
            "brick_code": null,
            "tag_id": null
        }
    ]
}
```

e. Displays new information to the user

Yes. After parsing the response, the app updates the UI to display the nutrition facts for the entered food. This can be shown using a **TextView**, **RecyclerView**, or a dynamic component that presents structured data.



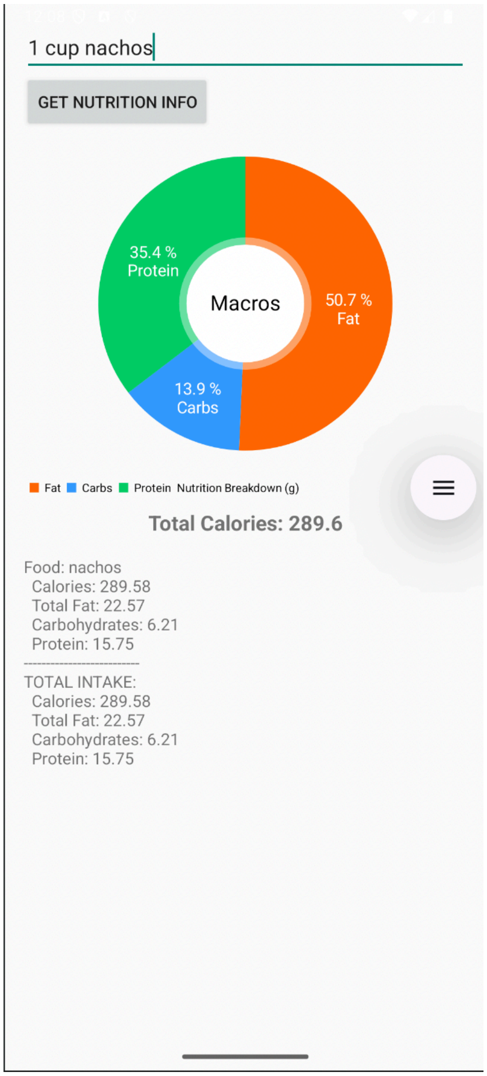
1 cup nachos

Total Calories: 289.6

```
Food: nachos
  Calories: 289.58
  Total Fat: 22.57
  Carbohydrates: 6.21
  Protein: 15.75
------------------------
TOTAL INTAKE:
  Calories: 289.58
  Total Fat: 22.57
  Carbohydrates: 6.21
  Protein: 15.75
```

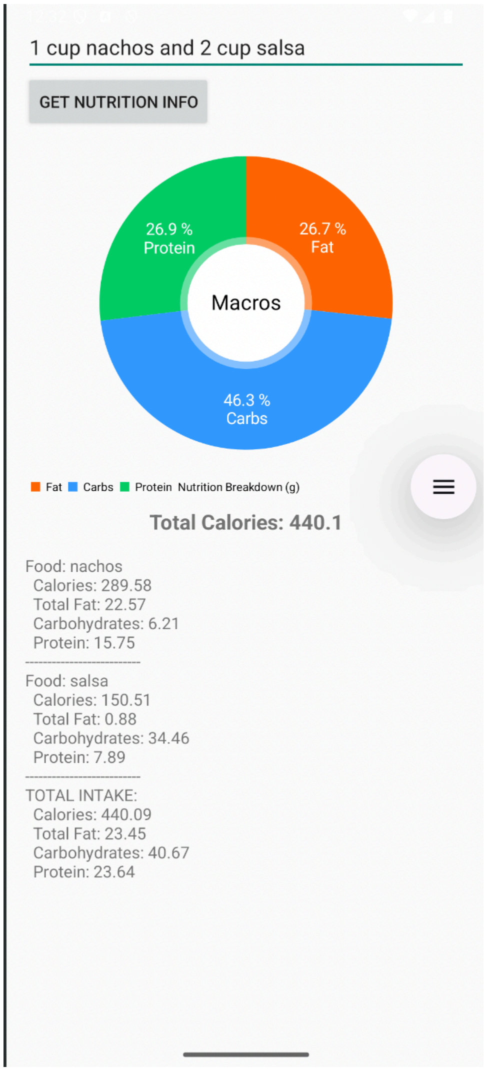
f. Is repeatable (I.e. the user can repeatedly reuse the application without restarting it.)

Yes. The app is designed to be repeatable. The user can continue entering new food queries and click the button again to receive updated nutritional information. The app clears or updates the previous results each time a new search is submitted.



Total Calories: 289.6

```
Food: nachos
 Calories: 289.58
 Total Fat: 22.57
 Carbohydrates: 6.21
 Protein: 15.75
--------------------------
TOTAL INTAKE:
 Calories: 289.58
 Total Fat: 22.57
 Carbohydrates: 6.21
 Protein: 15.75
```


1 cup nachos and 2 cup salsa
GET NUTRITION INFO
26.9 % Protein
26.7 % Fat
Macros
46.3 % Carbs
🟧 Fat 🟦 Carbs 🟩 Protein Nutrition Breakdown (g)
≡

Total Calories: 440.1

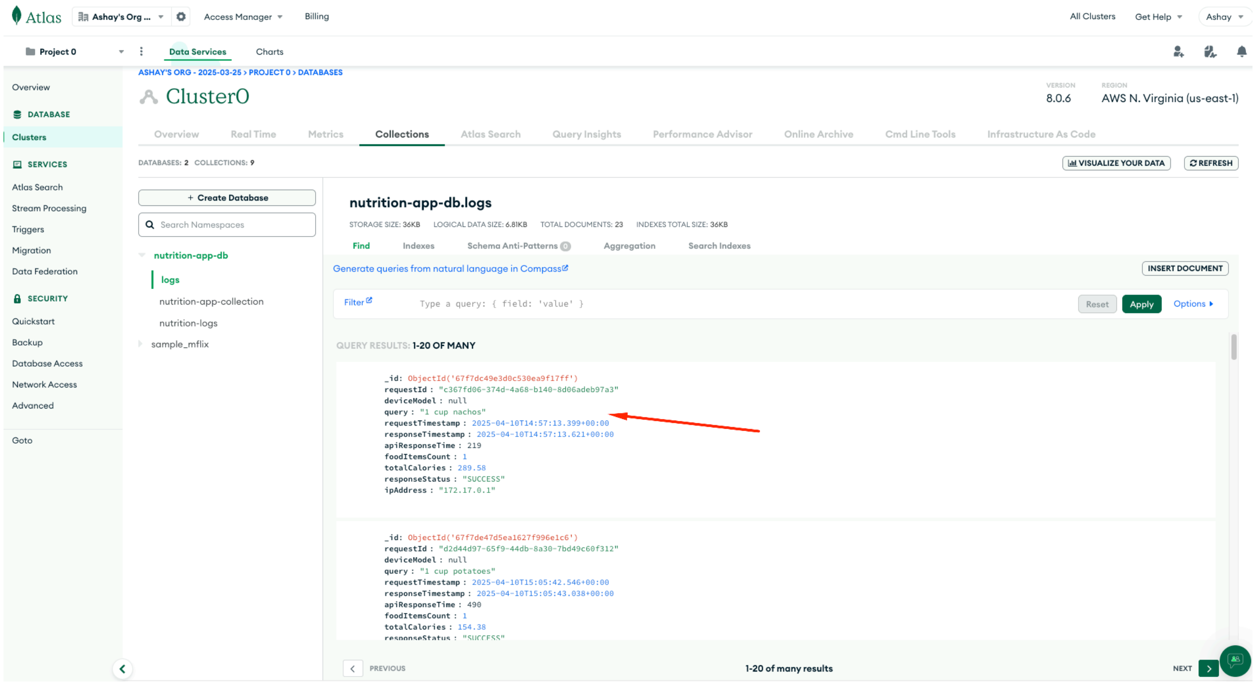
```
Food: nachos
 Calories: 289.58
 Total Fat: 22.57
 Carbohydrates: 6.21
 Protein: 15.75
--------------------------
Food: salsa
 Calories: 150.51
 Total Fat: 0.88
 Carbohydrates: 34.46
 Protein: 7.89
--------------------------
TOTAL INTAKE:
 Calories: 440.09
 Total Fat: 23.45
 Carbohydrates: 40.67
 Protein: 23.64
```

2. MongoDB Atlas Demonstration

a. MongoDB Atlas Setup

- Created a free shared cluster on MongoDB Atlas
- Whitelisted all IPs (0.0.0.0/0)
- Created a user with basic credentials

Screenshot of MongoDB output:



ASHAY'S ORG - 2025-03-25 > PROJECT 0 > DATABASES

Cluster0

VERSION 8.0.6

REGION AWS N. Virginia (us-east-1)

DATABASES: 2 COLLECTIONS: 9

nutrition-app-db.logs

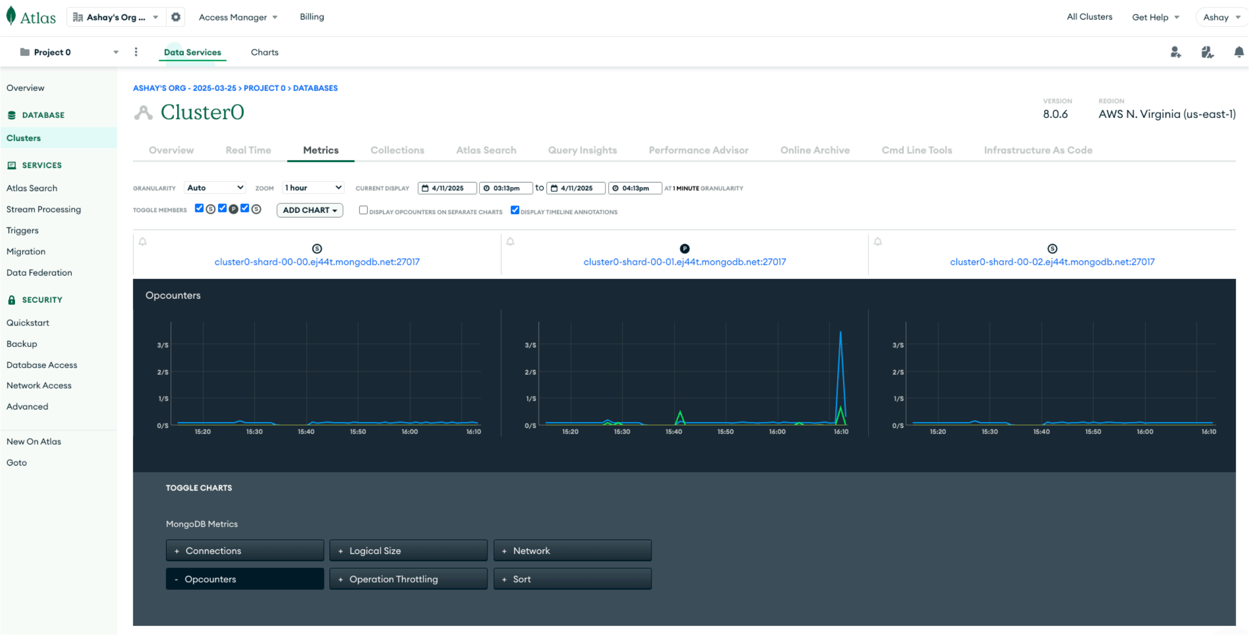
STORAGE SIZE: 36KB LOGICAL DATA SIZE: 6.81KB TOTAL DOCUMENTS: 23 INDEXES TOTAL SIZE: 36KB

QUERY RESULTS: 1-20 OF MANY

```
_id: ObjectId('67f7dc49e3d0c530ea9f17ff')
requestId : "c367fd06-374d-4a68-b140-8d06adeb97a3"
deviceModel : null
query : "1 cup nachos"
requestTimestamp : 2025-04-10T14:57:13.399+00:00
responseTimestamp : 2025-04-10T14:57:13.621+00:00
apiResponseTime : 219
foodItemsCount : 1
totalCalories : 289.58
responseStatus : "SUCCESS"
ipAddress : "172.17.0.1"
```

```
_id: ObjectId('67f7de47d5ea1627f996e1c6')
requestId : "d2d44d97-65f9-44db-8a30-7bd49c60f312"
deviceModel : null
query : "1 cup potatoes"
requestTimestamp : 2025-04-10T15:05:42.546+00:00
responseTimestamp : 2025-04-10T15:05:43.038+00:00
apiResponseTime : 490
foodItemsCount : 1
totalCalories : 154.38
responseStatus : "SUCCESS"
```

1-20 of many results



ASHAY'S ORG - 2025-03-25 > PROJECT 0 > DATABASES

Cluster0

VERSION 8.0.6

REGION AWS N. Virginia (us-east-1)

GRANULARITY Auto ZOOM 1 hour CURRENT DISPLAY 4/11/2025 03:13pm to 4/11/2025 04:13pm AT 1 MINUTE GRANULARITY

TOGGLE MEMBERS ☑ S ☑ P ☑ S

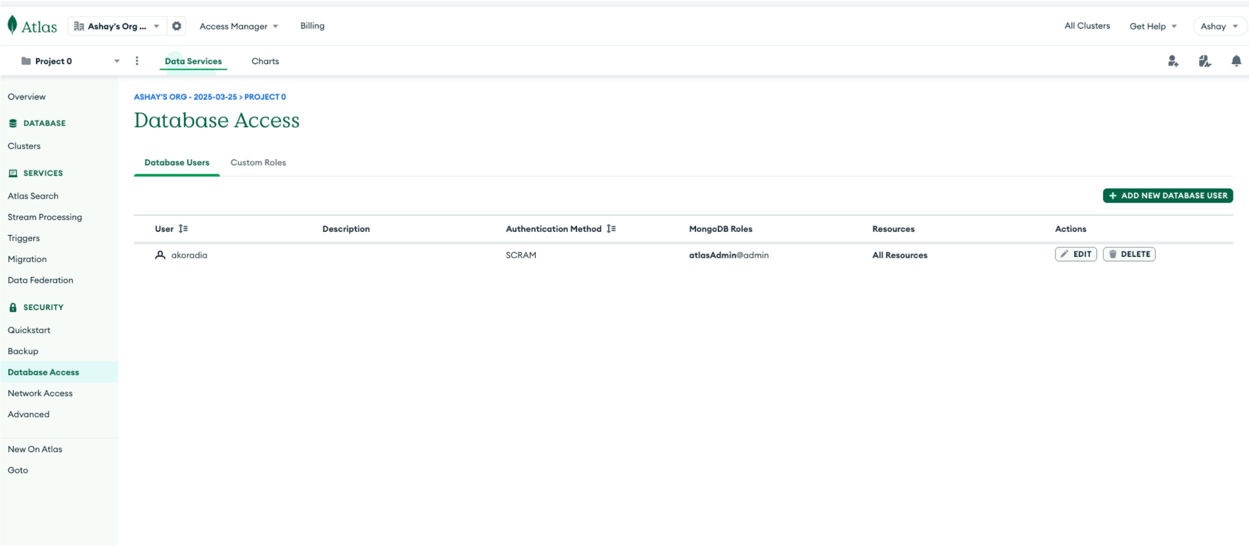
□ DISPLAY OPCOUNTERS ON SEPARATE CHARTS ☑ DISPLAY TIMELINE ANNOTATIONS

S cluster0-shard-00-00.ej44t.mongodb.net:27017

P cluster0-shard-00-01.ej44t.mongodb.net:27017

S cluster0-shard-00-02.ej44t.mongodb.net:27017

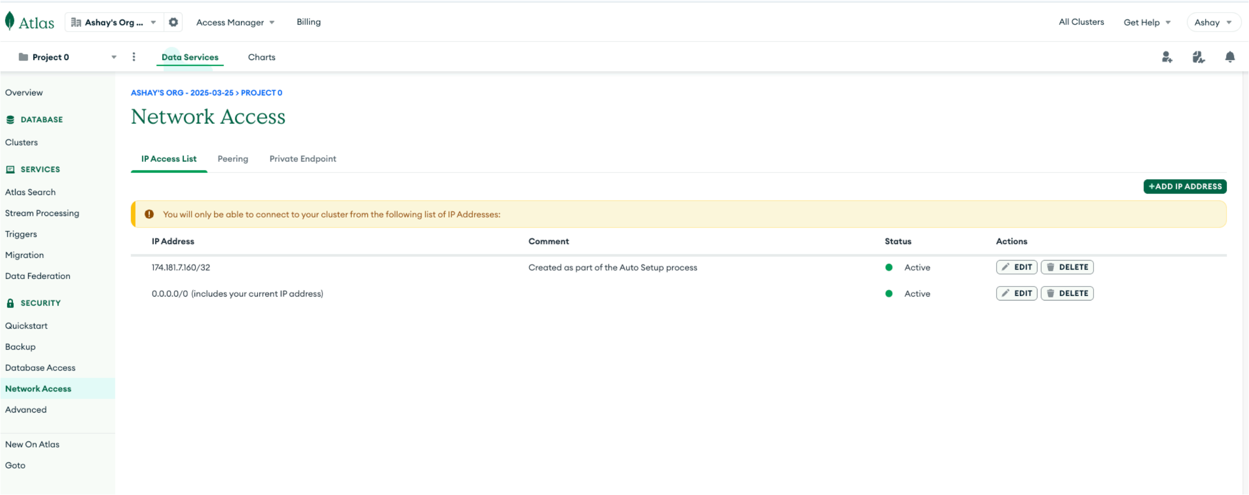
Opcounters



ASHAY'S ORG - 2025-03-25 > PROJECT 0

Database Access

User	Description	Authentication Method	MongoDB Roles	Resources	Actions
akoradia		SCRAM	**atlasAdmin**@admin	**All Resources**	EDIT DELETE

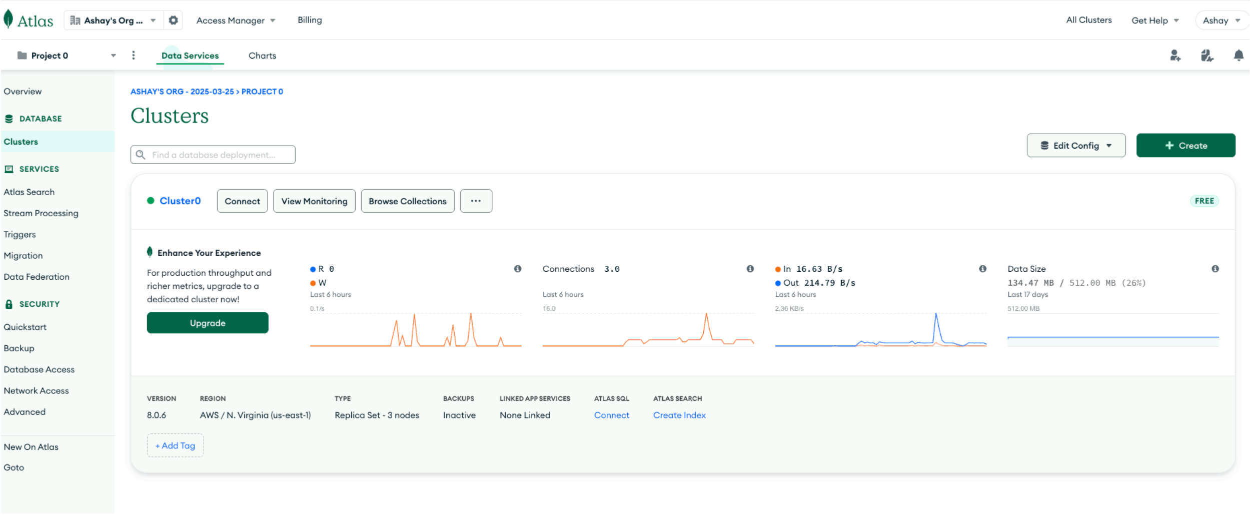


ASHAY'S ORG - 2025-03-25 > PROJECT 0

Network Access

You will only be able to connect to your cluster from the following list of IP Addresses:

IP Address	Comment	Status	Actions
174.181.7.160/32	Created as part of the Auto Setup process	● Active	EDIT DELETE
0.0.0.0/0 (includes your current IP address)		● Active	EDIT DELETE



ASHAY'S ORG - 2025-03-25 > PROJECT 0

Clusters

● Cluster0

Enhance Your Experience

For production throughput and richer metrics, upgrade to a dedicated cluster now!

● R 0
● W
Last 6 hours

Connections 3.0
Last 6 hours

● In 16.63 B/s
● Out 214.79 B/s
Last 6 hours

Data Size
134.47 MB / 512.00 MB (26%)
Last 17 days

VERSION	REGION	TYPE	BACKUPS	LINKED APP SERVICES	ATLAS SQL	ATLAS SEARCH
8.0.6	AWS / N. Virginia (us-east-1)	Replica Set - 3 nodes	Inactive	None Linked	Connect	Create Index

b. Java MongoDB App

The URL of my web service deployed to codespaces: https://super-waffle-g5rpgvqqrgjh66q-8080.app.github.dev/

URL for the dashboard: https://super-waffle-g5rpgvqqrgjh66q-8080.app.github.dev/dashboard

a. Using an HttpServlet to implement a simple (can be a single path) API

Yes. I implemented an HTTP servlet class named NutritionServlet.java which is annotated with @WebServlet. It handles all nutrition-related API requests through a single endpoint:

`/Project-4-mongo-nutrition-web-app/api/nutrition`

This servlet extends HttpServlet and overrides the doPost() method to process POST requests.

b. Receives an HTTP request from the native Android application

Yes. The Android app makes a **POST** request to the above endpoint with a JSON body that contains a natural language string describing food (e.g., "1 cup nachos and 1 cup salsa").

```
{
  "query": "1 cup nachos and 1 cup salsa"
}
```

The servlet reads this input using a BufferedReader, parses it into a NutritionRequest object, and forwards it for processing.

c. Executes business logic appropriate to your application

Yes. The servlet performs the following business logic:

- Parses and validates the incoming request.
- Uses the NutritionixApiClient class to forward the input to the **Nutritionix Track API**.
- Parses the JSON response from Nutritionix to extract relevant nutrition data.
- Logs useful metadata (e.g., timestamps, phone model, query) to MongoDB Atlas using LogRepository.

d. Replies to the Android application with an XML or JSON formatted response.

Yes. The servlet serializes the nutrition result into a custom **JSON** format using **Gson** and sends it back via the servlet’s HttpServletResponse output stream.

The response includes:

- Calories
- Macronutrients (protein, fat, carbs)
- Original query
- Metadata like request ID and processing time

3. Handle error conditions - Does not need to be documented.

4. Log useful information - Itemize what information you log and why you chose it.

The web service uses a LogEntry object to log each request from the Android app.

These parameters were selected to offer usage insights (most frequently asked questions, phone types) as well as operational visibility (timestamps, latency).

For every request, the six essential pieces of information listed below are recorded and saved:

1. Timestamp: Indicates the moment the request was fulfilled. beneficial for debugging and analytics.

2. Request ID (UUID): This allows you to track particular interactions by uniquely identifying each request.

3. User Query: The user-submitted natural language food input.

4. Device Model: This allows use tracking by device by identifying which phone model is making requests.

5. API Response Time: This metric tracks the delay of Nutritionix API requests in order to keep an eye on performance.

6. Calories Returned: This is the primary result metric that the API returns; it's helpful for understanding things like the average number of calories per request.

5. Store the log information in a database - Give your Atlas connection string with the three shards

All logs are persistently stored in a **MongoDB Atlas** database.

Here is the format of the connection string used in the project

---

```
String connectionString = "mongodb://akoradia:ashay1234@cluster0-shard-00-00.ej44t.mongodb.net:27017,cluster0-shard-00-01.ej44t.mongodb.net:27017,cluster0-shard-00-02.ej44t.mongodb.net:27017/nutrition-app-db?w=majority&retryWrites=true&tls=true&authMechanism=SCRAM-SHA-1";
```

6. Display operations analytics and full logs on a web-based dashboard - Provide a screen shot.

The dashboard is a **JSP-based web interface** accessible from any browser (desktop/laptop). It retrieves log data from MongoDB and displays:

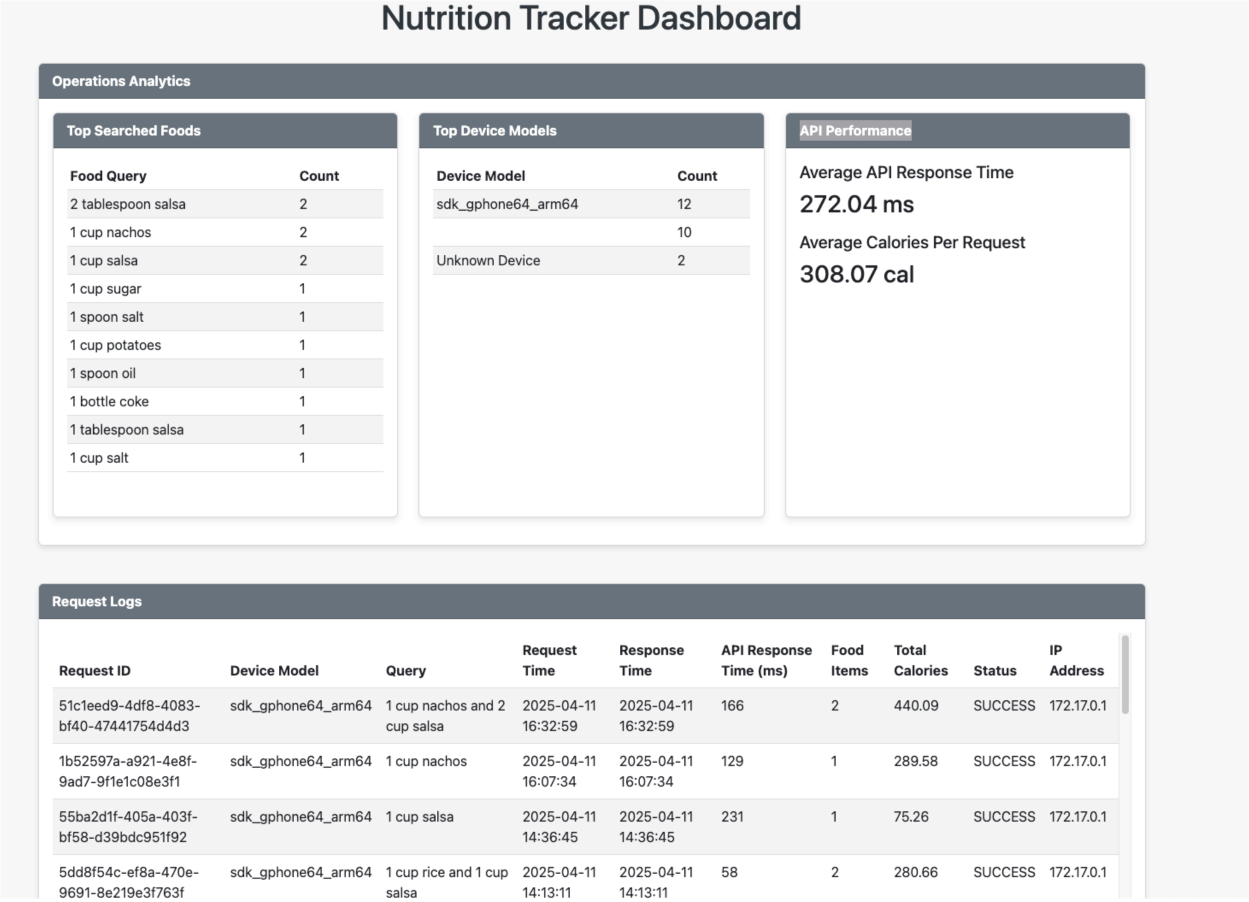
Operations Analytics:

- Top Searched Foods: Total number of queries for each food item, showing top 10
- API Performance: Response time metrics and performance analysis
- Top Device Models: Distribution of user device types

Request Log Table:

Each user interaction is displayed in a readable HTML table, not raw JSON/XML. Columns include:

- Request ID
- Device Model
- Query
- Request Time
- Response Time
- API Response Time (ms)
- Food Items
- Total Calories
- Status
- IP Address



Nutrition Tracker Dashboard

Operations Analytics

Top Searched Foods

Food Query	Count
2 tablespoon salsa	2
1 cup nachos	2
1 cup salsa	2
1 cup sugar	1
1 spoon salt	1
1 cup potatoes	1
1 spoon oil	1
1 bottle coke	1
1 tablespoon salsa	1
1 cup salt	1

Top Device Models

Device Model	Count
sdk_gphone64_arm64	12
	10
Unknown Device	2

API Performance

Average API Response Time

272.04 ms

Average Calories Per Request

308.07 cal

Request Logs

Request ID	Device Model	Query	Request Time	Response Time	API Response Time (ms)	Food Items	Total Calories	Status	IP Address
51c1eed9-4df8-4083-bf40-47441754d4d3	sdk_gphone64_arm64	1 cup nachos and 2 cup salsa	2025-04-11 16:32:59	2025-04-11 16:32:59	166	2	440.09	SUCCESS	172.17.0.1
1b52597a-a921-4e8f-9ad7-9f1e1c08e3f1	sdk_gphone64_arm64	1 cup nachos	2025-04-11 16:07:34	2025-04-11 16:07:34	129	1	289.58	SUCCESS	172.17.0.1
55ba2d1f-405a-403f-bf58-d39bdc951f92	sdk_gphone64_arm64	1 cup salsa	2025-04-11 14:36:45	2025-04-11 14:36:45	231	1	75.26	SUCCESS	172.17.0.1
5dd8f54c-ef8a-470e-9691-8e219e3f763f	sdk_gphone64_arm64	1 cup rice and 1 cup salsa	2025-04-11 14:13:11	2025-04-11 14:13:11	58	2	280.66	SUCCESS	172.17.0.1