

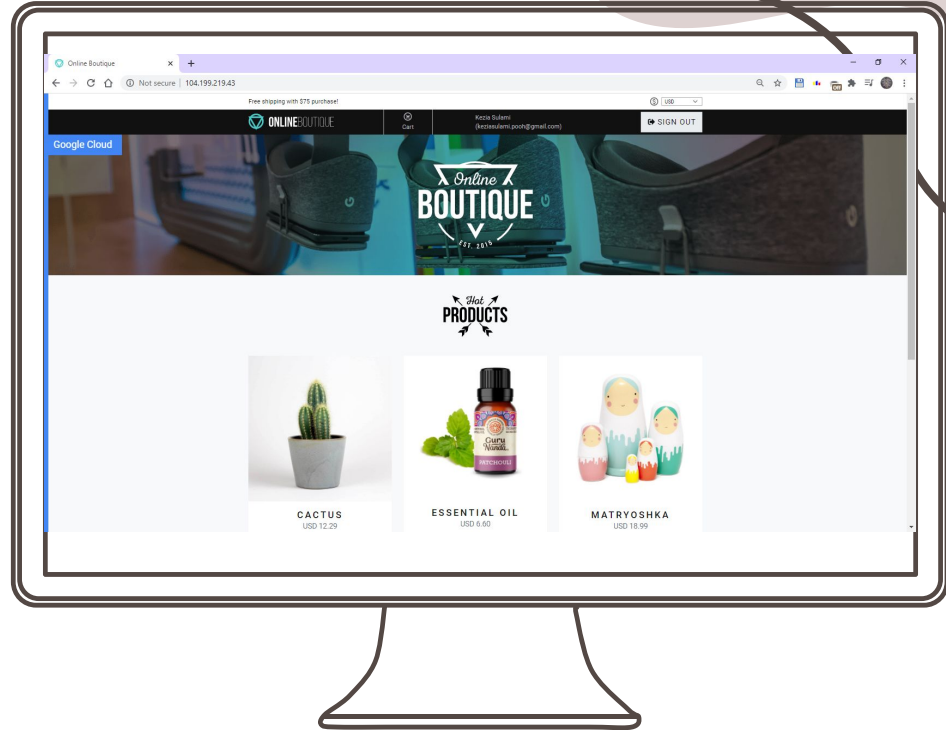


# Cloud Engineer Intern

**Kezia Sulami**  
Friday, August 28<sup>th</sup> 2020

# Project: Online Boutique

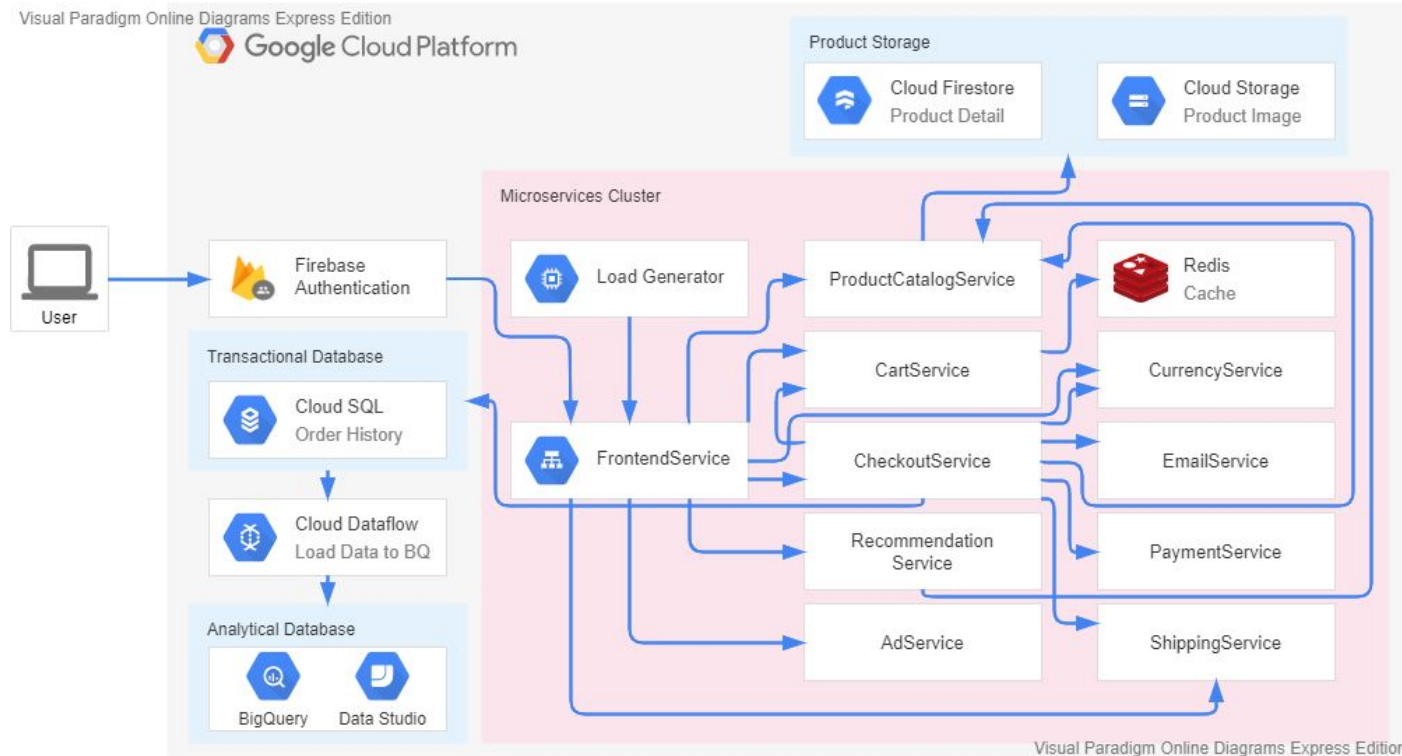
a.k.a. Hipster Shop



# Microservices

Visual Paradigm Online Diagrams Express Edition

Google Cloud Platform



Visual Paradigm Online Diagrams Express Edition



**01**

User Authentication

**02**

Product Storage

**03**

Order History

**04**

Terraform Infrastructure



**05**

**Load Generator**

**06**

**Dataflow Pipeline**

**07**

**BigQuery Analytics**

**08**

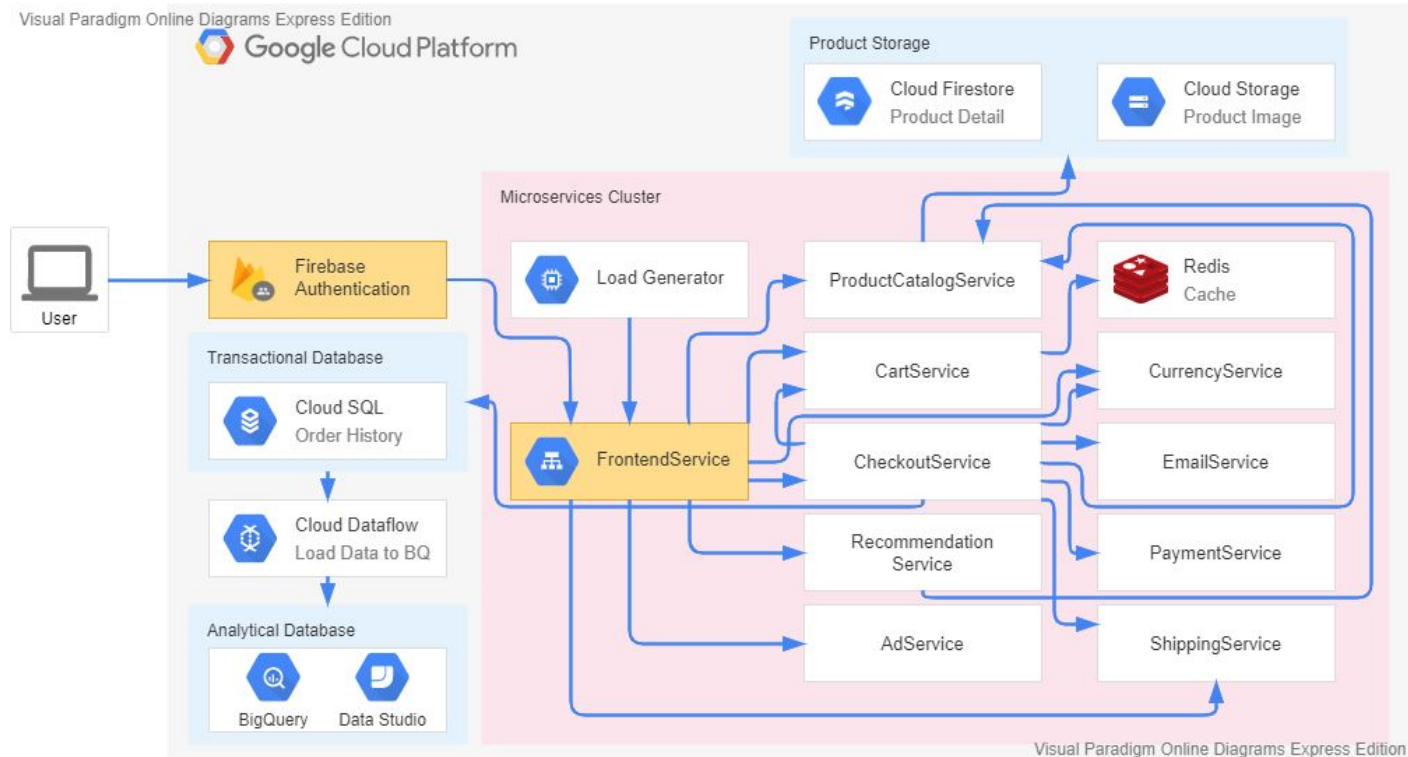
**Data Studio Dashboard**



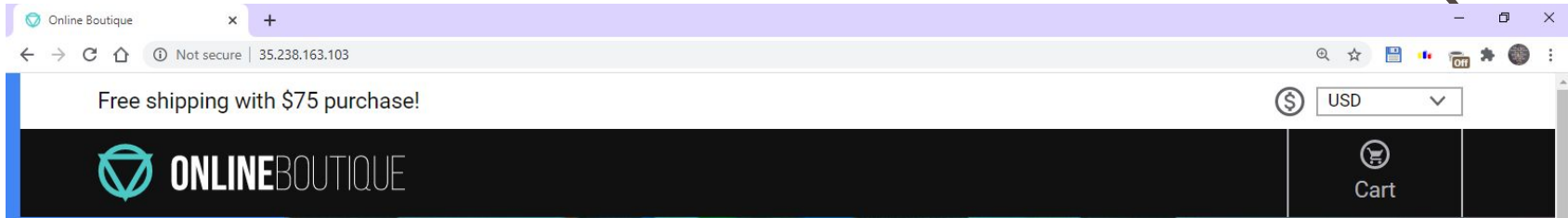


**01**

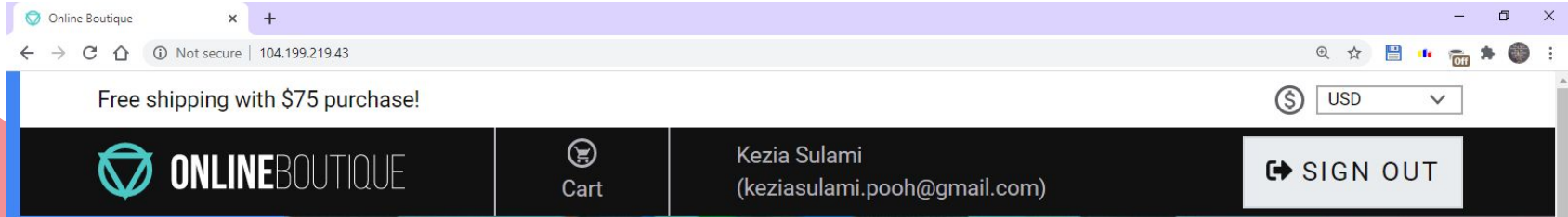
**User  
Authentication**



# Before



# After





Free shipping with \$75 purchase!

\$ USD

Kezia Sulami  
(keziasulami.pooh@gmail.com)

SIGN OUT

Google Cloud

1 item in your cart

EMPTY CART

KEEP BROWSING

**Matryoshka**

SKU: #matryoshka

Quantity: 1

**USD 18.99**Shipping Cost: **USD 4.72****Total Cost: USD 23.72**

## Checkout

E-mail Address

keziasulami.pooh@gmail.com

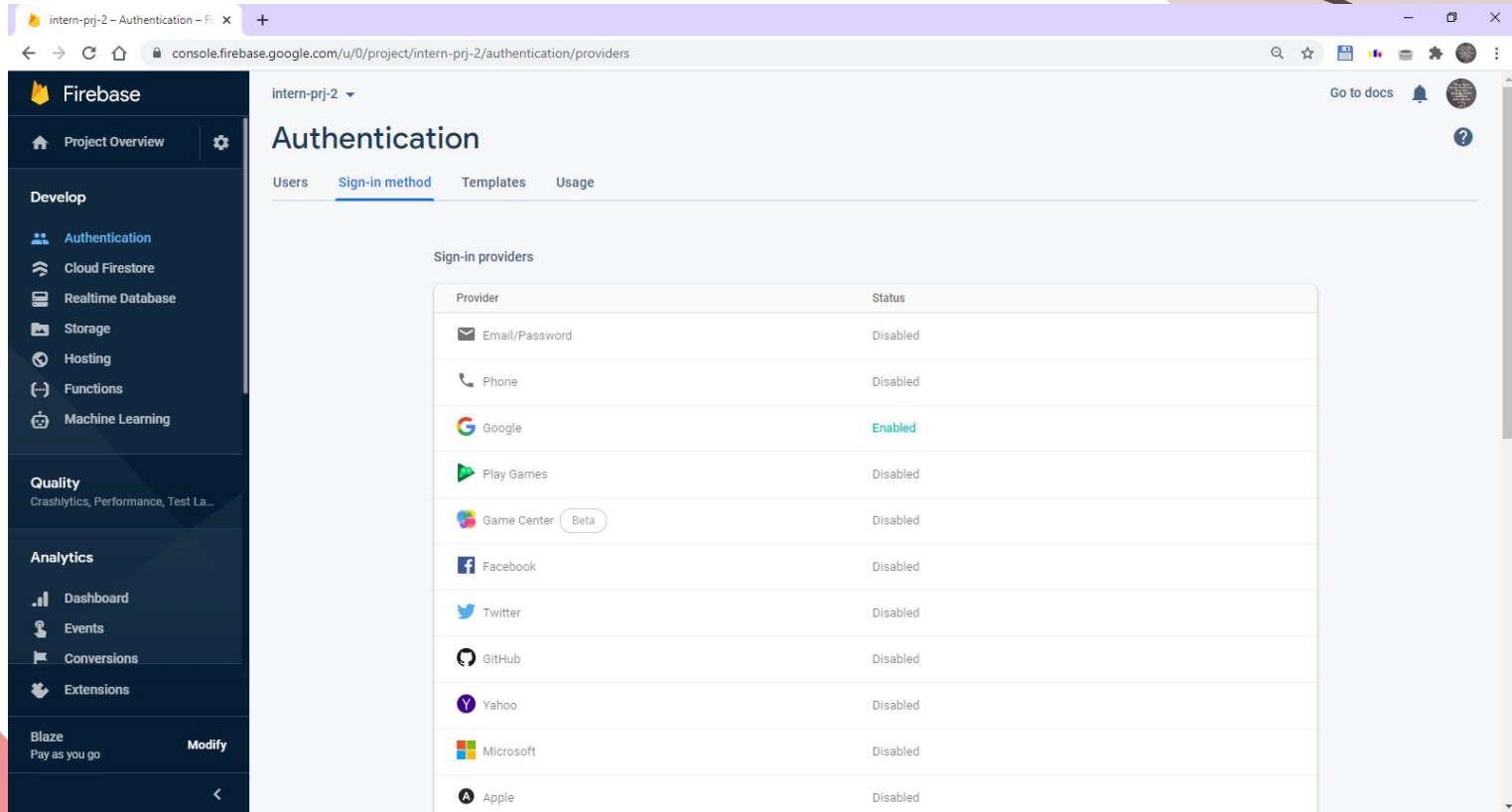
Street Address

1600 Amphitheatre Parkway

Zip Code

94043

# Providers



The screenshot shows the Firebase Authentication Providers page in a web browser. The browser's address bar displays the URL: `console.firebase.google.com/u/0/project/intern-prj-2/authentication/providers`. The page title is "Authentication" and the sub-header is "Sign-in providers".

The left sidebar contains the following navigation items:

- Project Overview
- Develop
  - Authentication
  - Cloud Firestore
  - Realtime Database
  - Storage
  - Hosting
  - Functions
  - Machine Learning
- Quality
  - Crashlytics, Performance, Test La...
- Analytics
  - Dashboard
  - Events
  - Conversions
  - Extensions
- Blaze
  - Pay as you go

The main content area displays a table of sign-in providers:

Provider	Status
Email/Password	Disabled
Phone	Disabled
Google	Enabled
Play Games	Disabled
Game Center (Beta)	Disabled
Facebook	Disabled
Twitter	Disabled
GitHub	Disabled
Yahoo	Disabled
Microsoft	Disabled
Apple	Disabled

# Technologies Used



**Firebase  
Authentication**

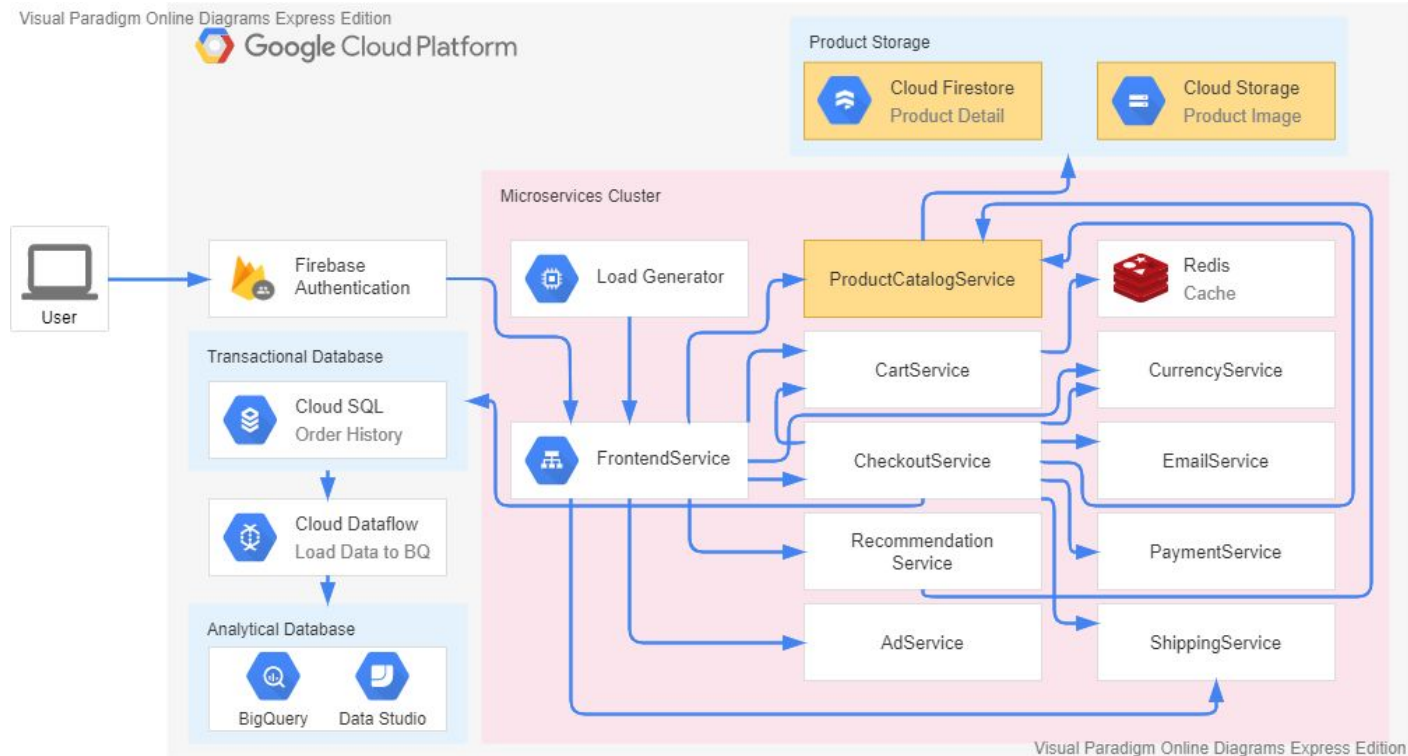


**Bootstrap**



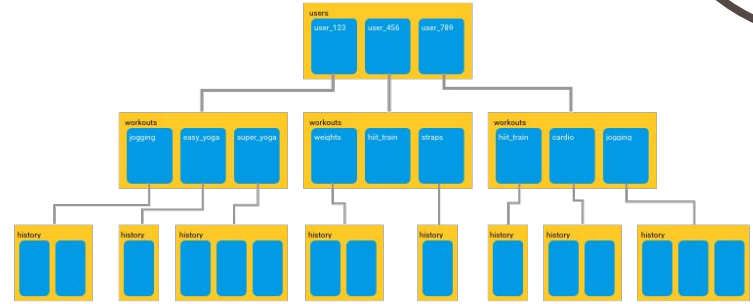
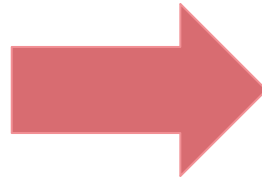
**02**

## **Product Storage**



# Product Storage

{JSON}



Cloud Firestore

# Firestore Interface

The screenshot displays the Google Cloud Platform console for a Firestore database. The breadcrumb navigation shows the path: / > products > cactus. The interface is divided into three main sections: Root, products, and cactus.

Root	products	cactus
<a href="#">+ START COLLECTION</a>	<a href="#">+ ADD DOCUMENT</a>	<a href="#">+ START COLLECTION</a>
<a href="#">products</a>	<a href="#">cactus</a>	priceUsd
	essential-oil	<a href="#">+ ADD FIELD</a>
	matryoshka	description: "Cute little cactus."
	pink-polaroid	name: "Cactus"
	stojo-cup	picture: "https://storage.googleapis.com/intern-prj-2-produ..."
	walkman	

# Cloud Storage for Product Images

Bucket details – Storage – intern-prj-2

console.cloud.google.com/storage/browser/intern-prj-2-product-image:tab=objects?forceOnBucketsSortingFiltering=false&cloudshell=false&project=intern-prj-2&prefix=

Your free trial is waiting: activate now to get \$300 credit to explore Google Cloud products. [Learn more](#)

DISMISS ACTIVATE

Google Cloud Platform intern-prj-2 Search products and resources

Storage Bucket details

intern-prj-2-product-image

OBJECTS CONFIGURATION PERMISSIONS RETENTION LIFECYCLE

Buckets > intern-prj-2-product-image

UPLOAD FILES UPLOAD FOLDER CREATE FOLDER MANAGE HOLDS DELETE

Filter by object or folder name prefix

<input type="checkbox"/>	Name	Size	Type	Created time	Storage class	Last modified	Public access	
<input type="checkbox"/>	1568042845-Cactus_mix_yellow_2048x.jpg	44.9 KB	image/jpeg	Aug 13, 2020, ...	Standard	Aug 13, 20...	Public to internet	Copy URL
<input type="checkbox"/>	7829154_060156d0-abe3-4a06-9f73-a0f3e1b0d9e0_2048_0.	52 KB	image/jpeg	Aug 13, 2020, ...	Standard	Aug 13, 20...	Public to internet	Copy URL
<input type="checkbox"/>	Petit_Monkey_Set_Of_5_Nesting_Dolls_Dripped2_900x900.jpg	37.5 KB	image/jpeg	Aug 13, 2020, ...	Standard	Aug 13, 20...	Public to internet	Copy URL
<input type="checkbox"/>	STOJO-pocket-cup-12-oz2.jpg	54.1 KB	image/jpeg	Aug 13, 2020, ...	Standard	Aug 13, 20...	Public to internet	Copy URL
<input type="checkbox"/>	ed0e62b4-89a0-4c81-b53c-8b14db5dca7f_1.eb653d835bb5f	58.1 KB	image/jpeg	Aug 13, 2020, ...	Standard	Aug 13, 20...	Public to internet	Copy URL
<input type="checkbox"/>	sony-walkman-40-anniversary-3.jpeg	20.7 KB	image/jpeg	Aug 13, 2020, ...	Standard	Aug 13, 20...	Public to internet	Copy URL



# Technologies Used



Cloud Firestore



Cloud Storage

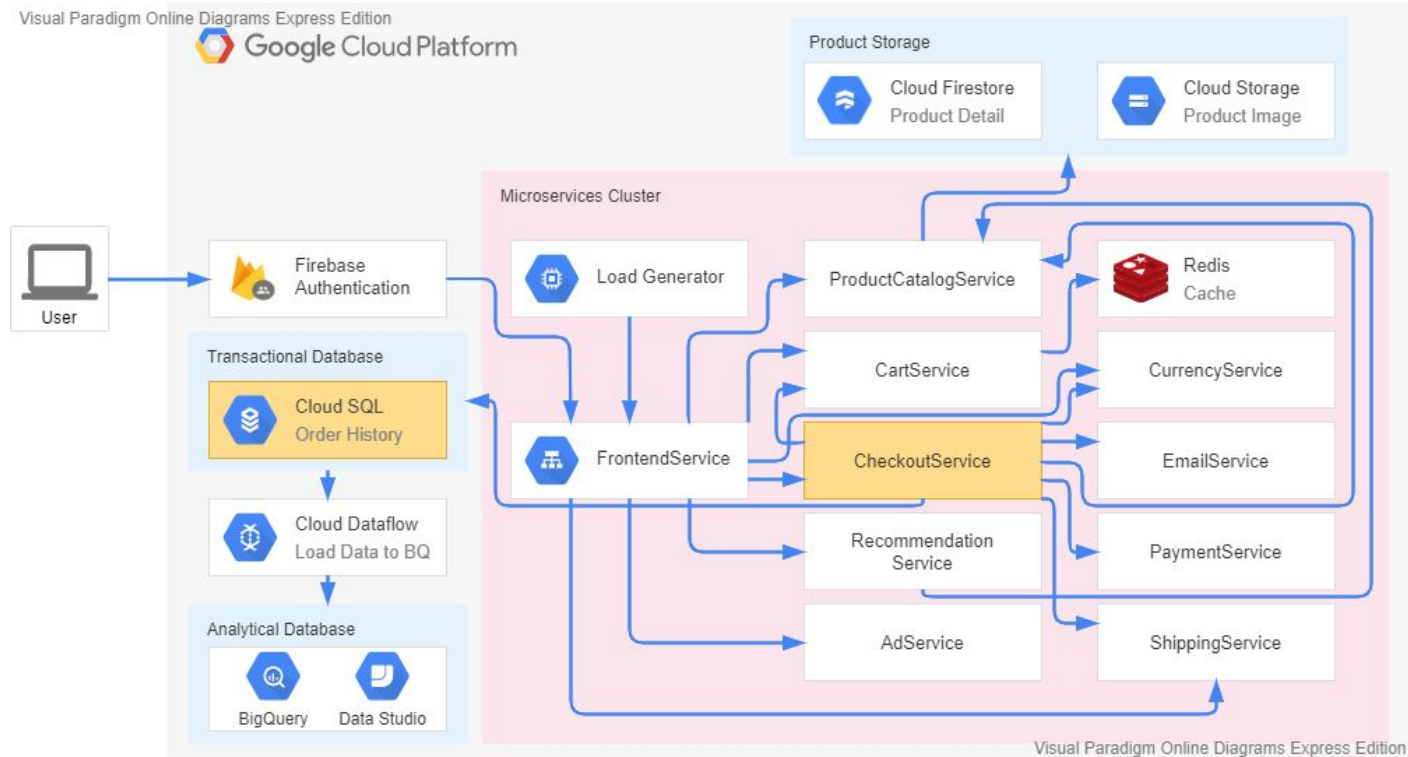


Golang



**03**

**Order History**



# Database Schema

Order		OrderedProduct
OrderId	CurrencyCode	OrderId
Email	RateUsd	ProductId
Time	Address	Quantity
ShippingCost	Latitude	UnitCost
ShoppingCost	Longitude	SubTotalCost
TotalCost	-	-

# Order History

Home - intern-prj-2 - Google Cloud Shell

console.cloud.google.com/home/dashboard?project=intern-prj-2&cloudshell=true

Your free trial is waiting: activate now to get \$300 credit to explore Google Cloud products. [Learn more](#)

DISMISS ACTIVATE

Google Cloud Platform intern-prj-2

Search products and resources

Open Editor

CLOUD SHELL Terminal (intern-prj-2) x +

```
mysql> SELECT * FROM `order` LIMIT 5;
```

orderId	email	latitude	longitude	time	shippingCost	shoppingCost	totalCost	currencyCode	rateUsd	address
001a88a3-e13a-11ea-8154-3ae8e3f291a2	gerald.brown@example.com	39.1063109	-94.44393649999999	2020-08-18 17:03:01	15.223352499	243.432109688	258.655462187	EUR	1.1305	64054 Cassandra Plains
00706308-e143-11ea-b111-3ae8e3f291a2	sheri.snyder@example.com	33.39	-110.79	2020-08-18 18:07:27	6.329539141	8.831915082	15.161454223	CAD	0.747289793	USS Mathews FPO AE 85502
00a6a39a-e139-11ea-8154-3ae8e3f291a2	sharon.webster@example.com	44.5588028	-72.57784149999999	2020-08-18 16:55:53	12.383900929	107.60725343	119.991154359	EUR	1.1305	475 Michael Lakes
00d85d4d-e133-11ea-a80c-3ae8e3f291a2	jody.mills.dds@example.com	0	0	2020-08-18 16:12:56	743.529411742	4248.739495778	4992.26890752	JPY	0.008943828	3927 Joshua Ports Apt. 376
0112a9b8-e132-11ea-a80c-3ae8e3f291a2	donald.mueller@example.com	0	0	2020-08-18 16:05:47	189.349845201	748.031844319	937.38168952	EUR	1.1305	679 Gillespie Spring Apt. 179

5 rows in set (0.05 sec)

```
mysql> SELECT * FROM `orderedProduct` LIMIT 5;
```

orderId	productId	quantity	unitCost	subTotalCost
001a88a3-e13a-11ea-8154-3ae8e3f291a2	essential-oil	2	5.838124724	11.676249448
001a88a3-e13a-11ea-8154-3ae8e3f291a2	walkman	4	57.93896506	231.75586024
00706308-e143-11ea-b111-3ae8e3f291a2	essential-oil	1	8.831915082	8.831915082
00a6a39a-e139-11ea-8154-3ae8e3f291a2	stojo-cup	5	21.52145066	107.60725343
00d85d4d-e133-11ea-a80c-3ae8e3f291a2	matryoshka	2	2124.369747889	4248.739495778

5 rows in set (0.06 sec)

```
mysql>
```

# Cloud SQL Proxy

<https://cloud.google.com/sql/docs/mysql/connect-kubernetes-engine>

- Enable workload identity for the GKE cluster
- Create Kubernetes service account (KSA)
- Bind & annotate with the KSA with GCP service account
- Create sidecar container for the Cloud SQL Proxy that shares the same pod with checkout service

# Technologies Used



Cloud SQL for MySQL



Golang



**04**

**Terraform  
Infrastructure**



# Resources

Resources	Explanation
GKE cluster	For deployment
Cloud Storage Buckets	Product images, Firestore backup
Cloud Storage Objects	Product images
Cloud SQL Instance	Store Order information
Service Accounts	For Firestore, Cloud SQL

# Code Sample: Cloud SQL



The image shows a web browser window displaying a GitHub repository file. The browser's address bar shows the URL `github.com/kezasulami/microservices-demo/blob/master/terraform/cloudsql.tf`. The code is a Terraform configuration for Google Cloud SQL, consisting of three resource blocks: `random_id`, `google_sql_database`, and `google_sql_database_instance`. The `random_id` block generates a suffix for the database name. The `google_sql_database` block creates a database named "order" on the instance. The `google_sql_database_instance` block creates a database instance named "order-`{random_id.db_name_suffix.hex}`" in the specified region, with a tier of "db-f1-micro". A `google_sql_user` block is also present, creating a user named "root" with a password based on the project name.

```
17 resource "random_id" "db_name_suffix" {
18     byte_length = 4
19 }
20
21 resource "google_sql_database" "database" {
22     name      = "order"
23     instance = google_sql_database_instance.instance.name
24 }
25
26 resource "google_sql_database_instance" "instance" {
27     name      = "order-${random_id.db_name_suffix.hex}"
28     region   = var.region
29     settings {
30         tier = "db-f1-micro"
31     }
32 }
33
34 resource "google_sql_user" "root" {
35     name      = "root"
36     instance = google_sql_database_instance.instance.name
37     password  = var.project
38 }
```

# Technology Used

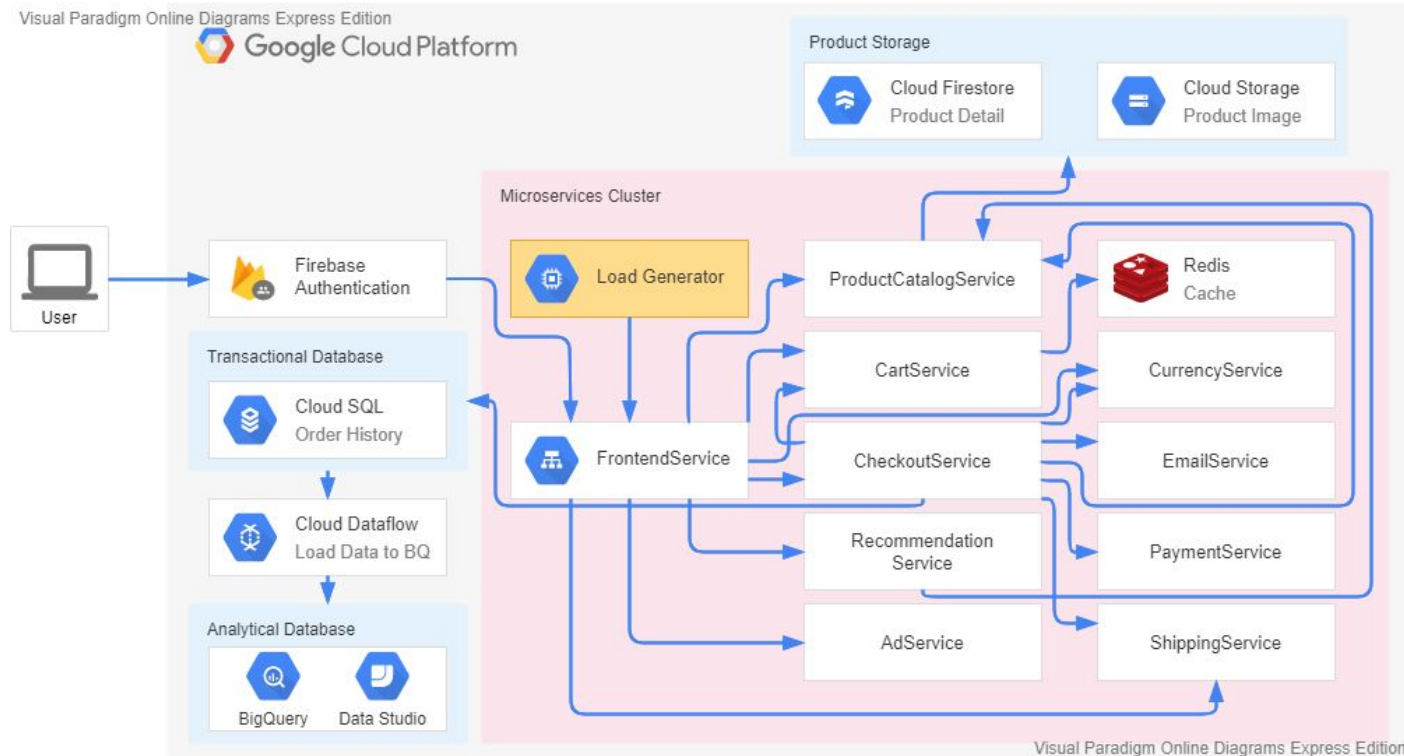


**Terraform**



**05**

**Load Generator**



# Requests

Request URL	Purpose	HTTP Method
/	Visit homepage	GET
/setCurrency	Set user currency	POST
/product/<productID>	Get a product	GET
/cart	View cart	GET
/cart	Add to cart	POST
/cart/checkout	Checkout	POST

# Random email & street address

```
mysql> SELECT `email`, REPLACE(REPLACE(`address`, CHAR(13), ' '), CHAR(10), ' ') AS `address`, `latitude`, `longitude` from `order` LIMIT 5;
```

email	address	latitude	longitude
gerald.brown@example.com	64054 Cassandra Plains New Michael, MT 73715	39.1063109	-94.44393649999999
sheri.snyder@example.com	USS Mathews FPO AE 85502	33.39	-110.79
sharon.webster@example.com	475 Michael Lakes Luishaven, VT 84236	44.5588028	-72.57784149999999
jody.mills.dds@example.com	3927 Joshua Ports Apt. 376 West Derek, AL 11269	0	0
donald.mueller@example.com	679 Gillespie Spring Apt. 179 South Derrickhaven, SD 57600	43.9695148	-99.9018131

```
5 rows in set (0.05 sec)
```

```
mysql> █
```

```
"formatted_address" : "1600 Amphitheatre Pkwy, Mountain View, CA 94043, USA",
```

```
  "geometry" : {
    "location" : {
      "lat" : 37.4220656,
      "lng" : -122.0840897
    },
    "location_type" : "ROOFTOP",
    "viewport" : {
      "northeast" : {
        "lat" : 37.4234145802915,
        "lng" : -122.0827407197085
      },
      "southwest" : {
        "lat" : 37.4207166197085,
        "lng" : -122.0854386802915
      }
    }
  },
  "place_id" : "ChIJVYBZP-Oxj4ARls-qJ_G3tgM",
  "plus_code" : {
    "compound_code" : "CWC8+R9 Mountain View, CA, USA",
    "global_code" : "849VCWC8+R9"
  },
  "types" : [ "street_address" ]
}
```

```
],
"status" : "OK"
```

```
}
```

# Technologies Used



Locust (Python)



Faker PyPI



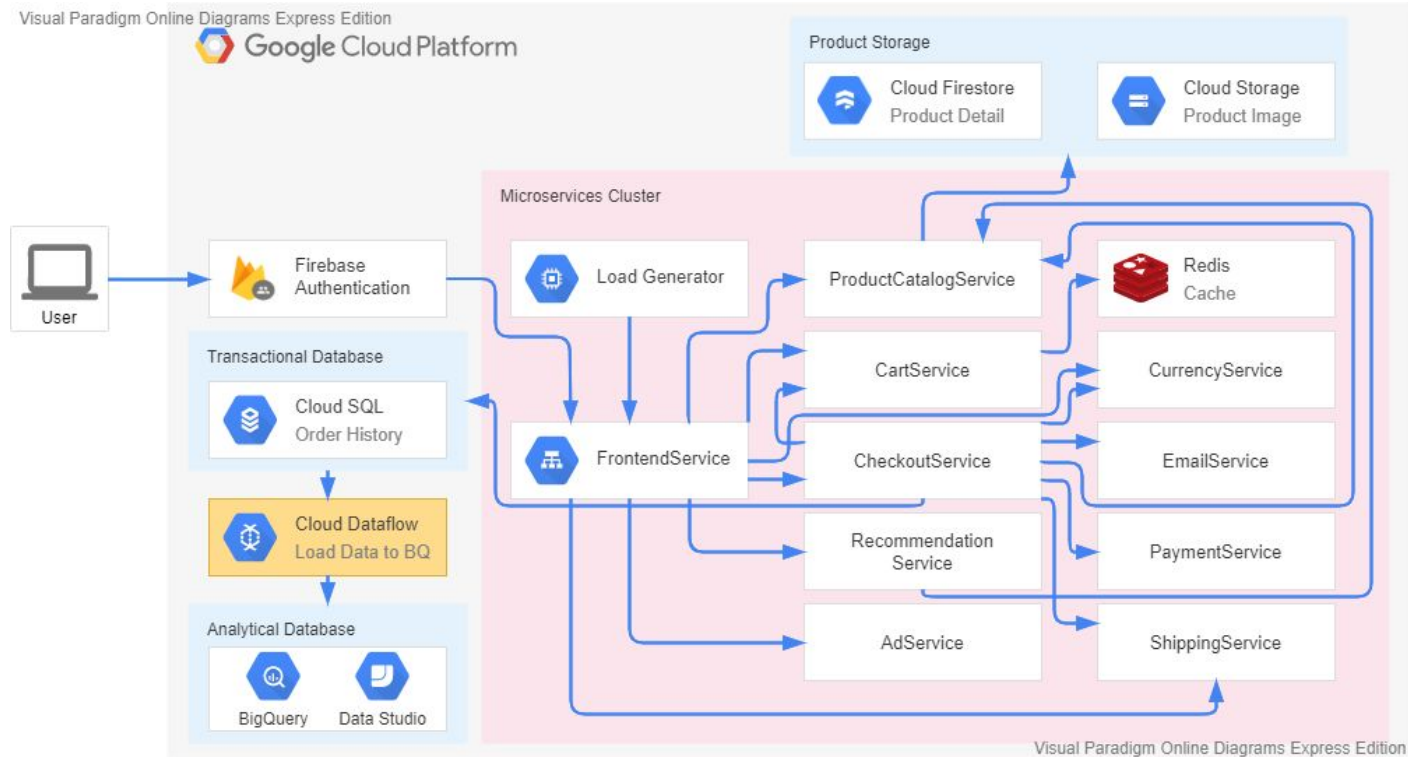
Google  
Geocoding API





**06**

**Dataflow  
Pipeline**



# Job (JDBC to BigQuery template)

The screenshot displays the Google Cloud Platform Dataflow console for a job named 'cloud\_sql\_to\_big\_query'. The job is in a 'Succeeded' state. The job graph shows three steps: 'Read from JdbcIO' (3 sec), 'Write to BigQuery' (11 sec), and 'DropInputs' (0 sec). The right sidebar provides detailed information about the job, including its ID, type, status, SDK version, region, location, and resource metrics.

**Job info**

Job name	cloud_sql_to_big_query
Job ID	2020-08-20_21_51_52-11881105908904480723
Job type	Batch
Job status	✓ Succeeded
SDK version	Apache Beam SDK for Java 2.20.0 <small>A newer version of the SDK family exists and updating is recommended. <a href="#">Learn more</a></small>
Job region	us-central1
Worker location	us-central1-c
Current workers	0
Latest worker status	Worker pool stopped.
Start time	August 21, 2020 at 11:51:53 AM GMT+7
Elapsed time	3 min 52 sec
Encryption type	Google-managed key

**Resource metrics**

Current vCPUs	1
---------------	---

# Job (JDBC to BigQuery template)

Create job from template - Dataflow

console.cloud.google.com/dataflow/createjob?project=intern-prj-2

DISMISS

ACTIVATE

LEARN Tutorial

Google Cloud Platform intern-prj-2 Search products and resources

Dataflow

Jobs

Notebooks

Create job from template

Jdbc connection URL string. Connection string can be passed in as plaintext or as a ...

Url connection string to connect to the Jdbc source. E.g. jdbc:mysql://some-host:3306/sampledb

Jdbc driver class name \*

Jdbc driver class name. E.g. com.mysql.jdbc.Driver

Jdbc source SQL query. \*

Query to be executed on the source to extract the data. E.g. select \* from sampledb.sample\_table

BigQuery output table \*

BigQuery table location to write the output to. The table's schema must match the source query schema. Ex: your-project:your-dataset.your-table-name

GCS paths for Jdbc drivers \*

Comma separate GCS paths for Jdbc drivers. E.g. gs://your-bucket/driver\_jar1.jar,gs://your-bucket/driver\_jar2.jar

Temporary directory for BigQuery loading process \*

Example: gs://your-bucket/your-files/temp\_dir

Temporary location \*

How to use this Dataflow template

Jdbc to BigQuery

This template stages a batch pipeline that reads from a Jdbc endpoint and writes to BigQuery.

More information

- Learn how to execute this template from the REST API
- Read full documentation
- View template's source code on GitHub

# Job (JDBC to BigQuery template)

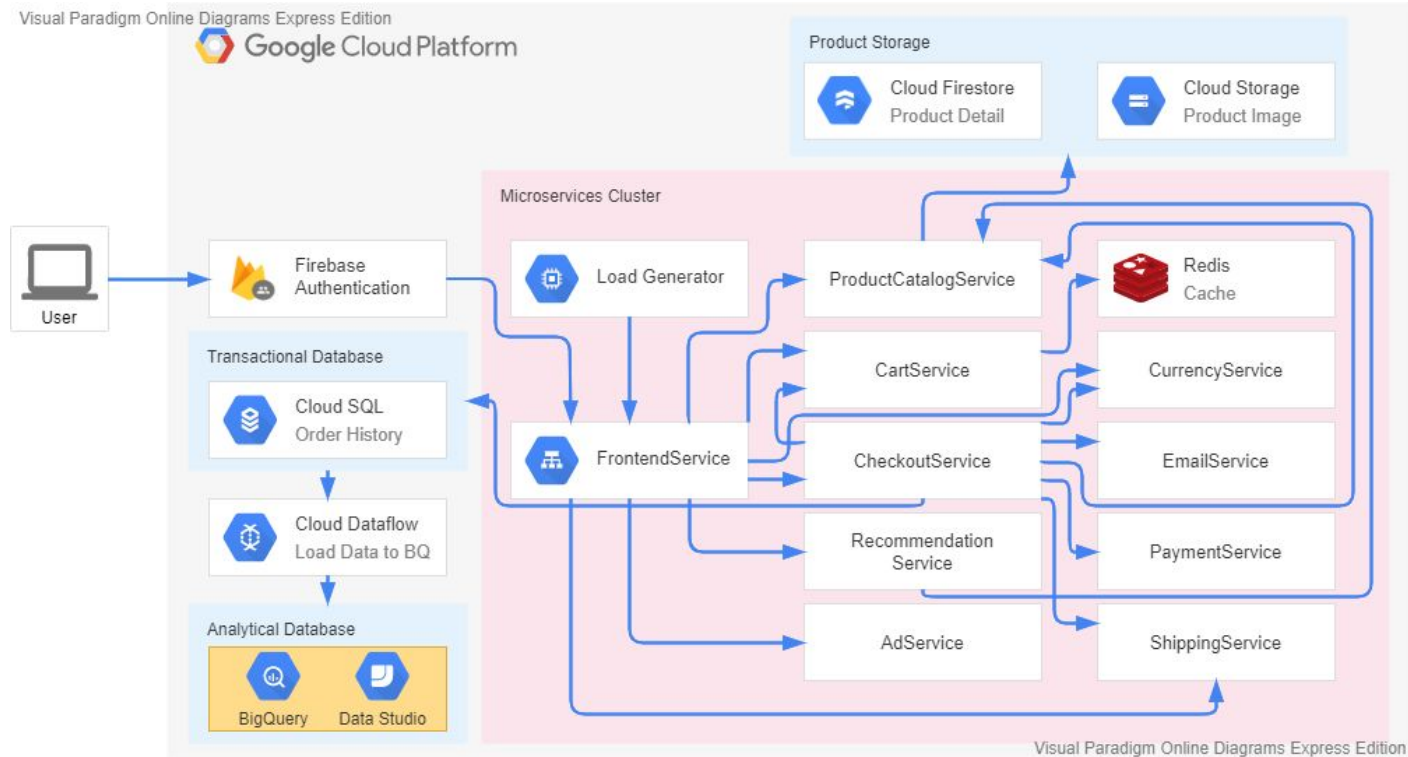
- For JDBC connection URL, use the Cloud SQL's public IP  
`jdbc:mysql://<public_IP>:3306/<DB>?user=...&password=...`
- Cloud Storage bucket with MySQL JDBC driver (.jar) inside  
(<https://dev.mysql.com/downloads/connector/j/>)  
Select OS: Platform Independent (.zip) with (.jar) inside
- Use the GCS path (`gs://<bucket>/.`jar) to fill template form





**07**

# **BigQuery Analytics**



# BigQuery Dataset

Order		OrderedProduct
OrderId	CurrencyCode	OrderId
Email	RateUsd	ProductId
Time	Address	Quantity
ShippingCost	Latitude	UnitCost
ShoppingCost	Longitude	SubTotalCost
TotalCost	-	-



# Query: Quantity on Locations

order  
orderedProduct  
view\_order\_2  
view\_product\_type\_2  
view\_total\_quantity\_2

## Query

Edit query

```
1 SELECT `order`.orderId, SUM(quantity) AS totalQuantity, CONCAT(latitude, ',', longitude) AS location
2 FROM `intern-prj-2.order.order` AS `order`
3 JOIN `intern-prj-2.order.orderedProduct` AS `orderedProduct`
4 ON `order`.orderId = `orderedProduct`.orderId
5 GROUP BY `order`.orderId, `order`.latitude, `order`.longitude
6 HAVING location <> '0,0';
```

Scheduled queries	Query results
Reservations	<a href="#">SAVE RESULTS</a> <a href="#">EXPLORE DATA</a>
BI Engine	Query complete (0.8 sec elapsed, 238.9 KB processed)
Resources <a href="#">+ ADD DATA</a>	Job information Results JSON Execution details
Search for your tables and datasets	
intern-prj-2	
External connections (1)	
order	
order	62 4bb383cc-e13f-11ea-8277-3ae8e3f291a2 13 41.6032207;73.087749
orderedProduct	63 d2fdaf86-e132-11ea-a80c-3ae8e3f291a2 13 39.666374;-106.7942405
view_order_2	64 59add1ad-e138-11ea-8154-3ae8e3f291a2 13 46.729553;-94.6858998
view_product_type_2	65 946bca0f-e13a-11ea-8154-3ae8e3f291a2 47 36.3371529;-104.3791912
view_total_quantity_2	66 cb4b7da7-e13b-11ea-adc3-3ae8e3f291a2 82 36.778261;-119.4179324
	67 5dc151d8-e13f-11ea-8277-3ae8e3f291a2 32 32.1656221;-82.9000751
	68 2965e770-e13b-11ea-8154-3ae8e3f291a2 32 34.2734798;-77.86384699999999
	69 e1f17a91-e132-11ea-a80c-3ae8e3f291a2 11 38.1892864;-85.8469167
	70 c6c5025e-e138-11ea-8154-3ae8e3f291a2 11 34.0489281;-111.0937311
	71 649fd058-e13f-11ea-8277-3ae8e3f291a2 11 33.8524477;-84.9456865
	Rows per page: 100 1 - 100 of 1159 First page < > >  Last page

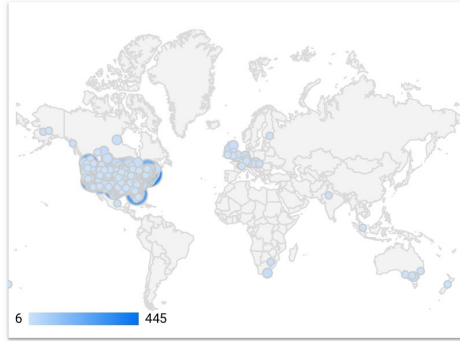


**08**

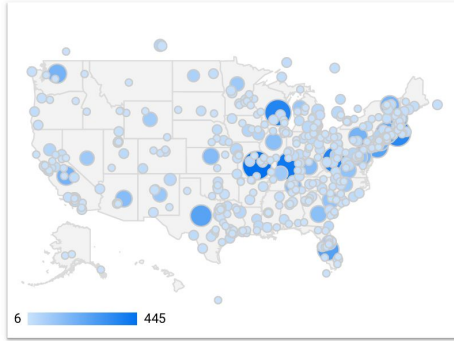
# **Data Studio Dashboard**

# Dashboard: Quantity

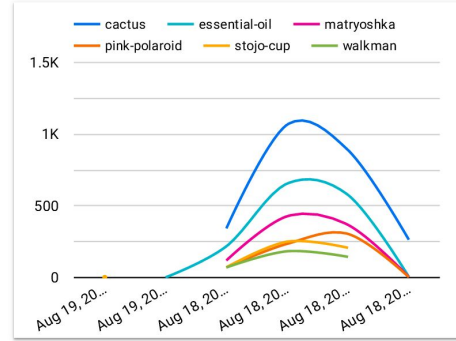
Zoom area = World



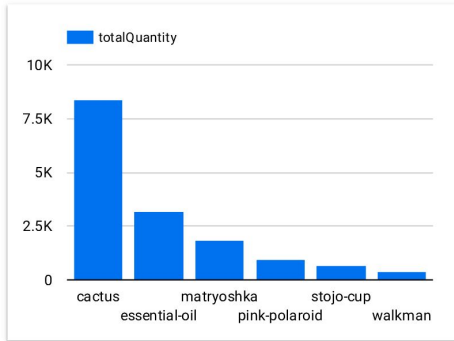
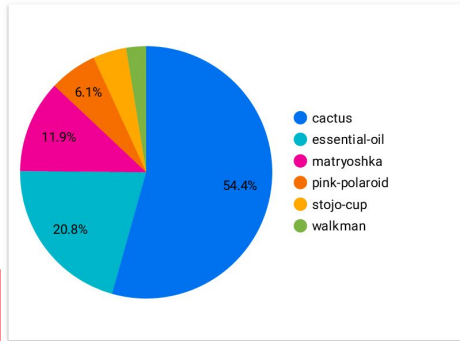
Zoom area = Country - United States



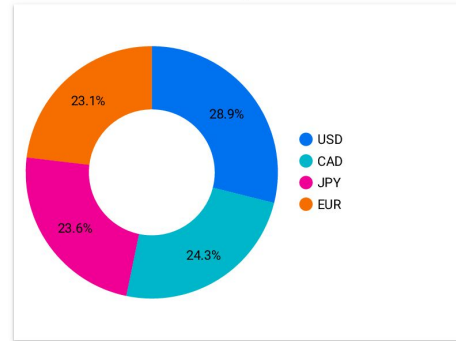
Smoothed Line Chart



Total Quantity



Currency Codes





# Final Remarks

# Final Remarks

- Working with Online Boutique has been a great experience.
- Online Boutique is a well-made microservice project that is ideal for learning purpose.
- Learned the logical reasoning to use a particular GCP service.
- This internship is recommended! You'll learn a lot.

# Thanks!

Do you have any questions?

**kezasulami.pooh@gmail.com**

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