

Cloud Resources Document

S6 Software Engineering

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1. Introduction

This document serves as an insightful guide detailing all the cloud services from Google Cloud Platform(GCP) that are utilized in the project. It is designed to offer a view of how these services are used and their configuration specifics.

Included in this document, you will find an overview of each service, its purpose in the project, the configuration details and notable nuances that are unique to the project YouSound. This document is invaluable for transferability purposes.

2. Cloud Services

GCP Virtual Machines

Ubuntu 20.4 LTS VM

Usage

The Ubuntu 20.4 LTS VPS serves as a testing environment in which the application is deployed via the pipeline on the testing branch.

Configuration

- Docker is installed, along with Docker-Compose
- A directory called dc is called at the path /etc/dc
- A docker-compose.yml file is created that contains the services needed for deployment
- Allows only certain IPv4 addresses to ensure security
- Allows HTTP insecure connections

VM instances

Filter Enter property name or value							
<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP
<input type="checkbox"/>	✓	ubuntu-vm	europa-west1-c			10.132.0.4 (nic0)	34.79.250.45 (nic0)
<input type="checkbox"/>	✓	yousound-vm	europa-west1-d			10.132.0.5 (nic0)	34.78.227.34 (nic0)

MariaDB VM

Usage

The MariaDB VM acts as a virtual environment for the deployment of a MariaDB server the contains the music database.

Configuration

- MariaDB is installed on the Linux Debian VM
- A root user with a secure password is generated
- Allows only certain IPv4 addresses to ensure security
- Allows HTTP insecure connections
- Created Music database with Like, Song, Playlist and Album tables

VM instances							
CREATE INSTANCE IMPORT VM REFRESH							
INSTANCES							
OBSERVABILITY							
INSTANCE SCHEDULES							
VM instances							
Filter Enter property name or value							
<input type="checkbox"/>	Status	Name ↑	Zone	Recommendations	In use by	Internal IP	External IP
<input type="checkbox"/>	✓	mariadb-yousound-mariadb-vm-0	europa-west12-c			10.210.0.2 (nic0)	34.17.29.119 (nic0)

GCP Storage Bucket

Usage

There is a Google Cloud Storage Bucket that is responsible for storing the pictures and mp3 files of music-related content like songs, playlists, and albums.

Configuration

- The bucket is private so only authorized users can access the URL's
- Uniform access control
- No object versioning

yousound-bucket						
Location	Storage class	Public access	Protection			
eu (multiple regions in European Union)	Standard	Private	None			
OBJECTS	CONFIGURATION	PERMISSIONS	PROTECTION	LIFECYCLE	OBSERVABILITY NEW	INVENTORY REPORTS NEW
Buckets > yousound-bucket						
UPLOAD FILES	UPLOAD FOLDER	CREATE FOLDER	TRANSFER DATA	MANAGE HOLDS	DOWNLOAD	DELETE
Filter by name prefix only Filter objects and folders						
<input type="checkbox"/>	Name	Size	Type	Created	Storage class	Last modified
<input type="checkbox"/>	1-lan_THF_Lil_Law_-_Ciumaflex-mp3	7.9 MB	audio/mpeg	May 18, 2023, 10:58:39 AM	Standard	May 18, 2023, 10:58:39 AM
<input type="checkbox"/>	1-The_Weeknd_Blinding_Lights.mp3	3.1 MB	audio/mpeg	Jun 6, 2023, 11:26:22 AM	Standard	Jun 6, 2023, 11:26:22 AM
<input type="checkbox"/>	1-picture-blinded.jfif	103.3 KB	image/jpeg	Jun 6, 2023, 11:26:21 AM	Standard	Jun 6, 2023, 11:26:21 AM
<input type="checkbox"/>	1-picture-ciumaflex.png	488.7 KB	image/jpeg	May 18, 2023, 10:58:38 AM	Standard	May 18, 2023, 10:58:38 AM
<input type="checkbox"/>	10-The_Chainsmokers_Closer_Official_Video_ft_Hal.m...	5.7 MB	audio/mpeg	Jun 6, 2023, 11:46:41 AM	Standard	Jun 6, 2023, 11:46:41 AM
<input type="checkbox"/>	10-picture-closer-halsey.png	111.2 KB	image/jpeg	Jun 6, 2023, 11:46:39 AM	Standard	Jun 6, 2023, 11:46:39 AM
<input type="checkbox"/>	11-Sting_Shape_Of_My_Heart.mp3	4.3 MB	audio/mpeg	Jun 6, 2023, 11:47:02 AM	Standard	Jun 6, 2023, 11:47:02 AM
<input type="checkbox"/>	11-picture-girlslikeyour-cardib.png	233.9 KB	image/jpeg	Jun 6, 2023, 11:47:00 AM	Standard	Jun 6, 2023, 11:47:00 AM
<input type="checkbox"/>	12-Sting_Shape_Of_My_Heart.mp3	4.3 MB	audio/mpeg	Jun 6, 2023, 11:47:10 AM	Standard	Jun 6, 2023, 11:47:10 AM

Cloud Functions

Music Analytics Function

Usage

The use of this function is to get the total playtime of a song in order to provide analytics about the song. The total playtime is calculated by multiplying the duration of the song with the plays.

Configuration

- Allows HTTP
- Allows unauthorized invocations
- Runtime: Node.js 18

```
1 exports.songAnalytics = async (req, res) => {
2   // Extract song data from request
3   const song = req.body;
4
5   // Check if all required data is present
6   if (!song.duration) {
7     res.status(400).send('Missing song data');
8     return;
9   }
10
11  // Calculate total play time and like-to-play ratio
12  const totalPlayTime = song.duration * song.plays;
13
14  // Return analytics data
15  res.status(200).send({
16    totalPlayTime: totalPlayTime
17  });
18 };
```

Token Validator Function

Usage

The use of this function is to validate a JWT token provided in the body of the request. It is used via a circuit breaker that in the api gateway when the security service is down and the endpoint to validate the token is not available, the request is sent to this serverless function, therefore ensuring availability.

Configuration

- Allows HTTP
- Allows unauthorized invocations
- Runtime: Node.js 18
- Dependencies:
 - express: “^4.17.1”
 - cors: “^2.8.5”
 - jsonwebtoken: “^8.5.1”

```
1  const express = require('express');
2  const cors = require('cors');
3  const jwt = require('jsonwebtoken');
4  const app = express();
5
6  app.use(cors());
7
8  app.post('/api/auth/validate', async (req, res) => {
9    const token = req.body.token;
10
11    // Validate your token here.
12    try {
13      const publicKey = `-----BEGIN PUBLIC KEY-----
14  MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAmJrc23M49AOWJwEL+445
15  LLiLje+825mpcF4g4A8++KikDCauGKp1pAIXgffnAceyCTVhtCCeegFEZ+38b+bq
16  fdSmGI2BSXhs1uMXrksj365MoLTQCP8pQ0KM+CQZvNRDte5XjK41Ny7vp624WjoB
17  WU+01X7eFGnJnKuCc3+pItD+TippGS1Z1lusUNWsqYhxDM2PGMKgb8X0c1bvFtru
18  RcMvD02GwaNfyT+2zLndcA4B4nxXF1002dB78H+wIKDLRIgf3bHw6gLLN1ChPxHL
19  TFGbZabsXKD72wLMMJLJcqJ5p9/yjE2e1R16YBIME45KY104AVmBcfc5wNBu8ruc
20  eQIDAQAB
21  -----END PUBLIC KEY-----`;
22
23      const decodedToken = jwt.verify(token, publicKey, { algorithms: ['RS256'] });
24
25      // Check if the token is expired.
26      const currentTimeStamp = Math.floor(new Date().getTime() / 1000);
27      if (decodedToken.exp < currentTimeStamp) {
28        res.status(401).send({ message: "Unauthorized: Token expired" });
29      } else {
30        // Return a default user if the token is valid
31        res.send(true);
32      }
33    } catch (err) {
34      res.status(401).send({ message: "Unauthorized: Invalid token", error: err });
35    }
36  });
37
38  exports.app = app;
```

Google Kubernetes Engine

Usage

Google Kubernetes Engine (GKE) provides a managed environment for deploying, scaling, and managing containerized applications. It offers automated scaling and rolling updates reducing time spent on infrastructure management. Plus, it seamlessly integrates with other Google Cloud services.

Configuration

- Cloud Monitoring
- Cluster Location: europe-west4
- Service Address Range: /22
- Cluster default Pod Address Range: /17
- Public Cluster

Kubernetes clusters [+ CREATE](#) [+ DEPLOY](#) [REFRESH](#)

OVERVIEW

OBSERVABILITY

COST OPTIMIZATION

Filter

Enter property name or value

<input type="checkbox"/>	Status	Name ↑	Location	Mode	Number of nodes	Total vCPUs	Total memory
<input type="checkbox"/>	✓	yousound	europe-west4	Autopilot		2.75	5.5 GB

Services & Ingress [REFRESH](#) [+ CREATE INGRESS](#) [DELETE](#)

Cluster ▼

Namespace ▼

RESET

SAVE

SERVICES

INGRESS

Services are sets of Pods with a network endpoint that can be used for discovery and load balancing. Ingresses are collections of rules for routing external HTTP(S) traffic to Services.

Filter

Is system object : False ✕

Filter services and ingresses

<input type="checkbox"/>	Name ↑	Status	Type	Endpoints	Pods	Namespace	Clusters
<input type="checkbox"/>	api-gateway	✓ OK	External load balancer	34.147.65.137:80 🔗	1/1	default	yousound
<input type="checkbox"/>	music-service	✓ OK	Cluster IP	10.30.2.18	1/1	default	yousound
<input type="checkbox"/>	rabbitmq-service	✓ OK	Cluster IP	10.30.0.176	1/1	default	yousound
<input type="checkbox"/>	security-service	✓ OK	Cluster IP	10.30.2.133	1/1	default	yousound
<input type="checkbox"/>	social-service	✓ OK	Cluster IP	10.30.2.3	1/1	default	yousound
<input type="checkbox"/>	user-service	✓ OK	Cluster IP	10.30.0.252	1/1	default	yousound
<input type="checkbox"/>	zipkin	✓ OK	Cluster IP	10.30.3.35	1/1	default	yousound

Notable Google APIs

Cloud Logging API

Used for the monitoring of all the cloud services described.

Cloud Monitoring API

Used for the monitoring of all the cloud services described.

Cloud Natural Language API

Used for evaluating if the field “content” of entities in the social service are harmful or spam.