

# Cloud Project 1

## Tune World - Tunes of the World

### **Idea behind the project:**

- For most of us music is an indispensable part of our daily lives and at one point in life or other every one of us has dreamed of learning to sing or play an instrument. A lot of us have some musical instrument at home which we want to learn to play but cannot spare enough time to join a class.
- Tune world is a one stop common platform for all levels of musicians - be it beginner trying to learn or an expert creating new tunes – to access all the information about any song they want to learn and share or secure access to the new secret song they want to play at some concert at any random location or country.
- Global and reliable access to a variety of files separated by language and genre and complete song tutorials all in one place without the pain of searching all over the internet for that right tune (like me).
- Choose to share your content when you are ready and help others out.

### **Technologies Used:**

- Amazon Web Services (AWS Components)
- ASP.Net
- Web API
- JavaScript, JQuery, CSS
- Bootstrap
- AJAX
- MS SQL
- IIS (Internet Information Server) to host
- Visual Studio 2017

### **Feature list of the application:**

- **Search** – A search panel allowing search based on filename, genre, language and song name to display details of the files matching search filters and a link to download them.

**Note:** This search is only for files that are made publically accessible by the owner. No need to be a registered user to browse through them.

- **Signup** – Register as a user and then sign in securely with session management and receive a mail on successful registration. Validity checks on client side JavaScript and checks for unique Email ID and password encryption for privacy.

**Note:** Password needs to be at least 12 characters with number, small and caps letters and symbols.

- **Login** – Login to your account to view, add, update and delete your personal files.
- **Add/Update Files** – Add your files by providing details like description, language, genre, song name and whether or not you want to make your file public. Files with same filename will update the existing files and overwrite the previous entries. Choose what you share. Limit of 10MB file size.
- **Delete** – Delete your files which cannot be later retrieved.
- **Download** – Download private and public files. Private files will have a Pre-Signed Link which will be valid only for a limited period of time before expiration.

#### **Solution for each requirement present in the problem statement:**

- EC2 (Elastic Compute) – For hosting the webserver on which the application is deployed. A t2.micro instance with Windows Server 2016 and IIS 10 installed running in the N. Virginia region. It has an alarm to reboot the instance whenever status and fail.
- ELB (Elastic Load Balancer) – To balance the load between multiple instances of the webserver and redirect traffic for efficient and fast use of resources. EC2 instances are spread between AZs and are spun up automatically when required.
- Lambda – Serverless compute running functions and only charging for the time it runs. Can have a variety of triggers and can be integrated with multiple components. Lambda is used to copy particular type of files here (images) to another folder. Purpose is to check content for authenticity. Still under constructions some issue with code.
- AutoScaling Group – Scaling configurations to scale up to 4 instances (currently) in multiple AZs and balance the oncoming load. Average Metrics are monitored every 5 minutes with set thresholds. Time based scaling is also provisioned to add another instance on the 1<sup>st</sup> of every month at 9:00 am.
- Single AZ RDS (Relational Database System) – A MS SQL db.t2.micro SSD instance (SQL Server Express) with 20GB of data (currently) with 1 day automated backup is used to store the object and user information. To convert it into a Multi AZ enabled RDS:
  - Go into the RDS instance details and select modify.
  - Choose Yes for Multi-AZ Deployment.
  - If you want immediate change select it otherwise modifications done over next maintenance cycle. Although RDS is available during modification latency may increase.
  - This creates backup of data in another AZ.
- CloudFront – It is a Content Delivery Network which has the ability to link either to an S3 bucket or Webserver to increase speed of delivery of data by using edge

locations. Authorization headers and query parameters may need to be whitelisted and origin source must be supplied to configure it. This links to the Route53 to deliver content.

- S3 (Simple Storage Service) – This is a location to store all the files uploaded by the users and made available for download. It is currently deployed in one region with backup in another region to ensure durability. Versioning and transfer acceleration features are turned on. It is a private bucket with public access to only a few objects as specified by the users using ACL. Replication is set up only for objects inside the ‘TuneWorldFolder’ folder to another bucket. It has a lifecycle policy to move files from S3 to S3-IA after 75 days and to Glacier after 1 year. These are current settings that will be changed in the future.
- S3 Transfer Acceleration – Ensures faster transfer of files from client to the bucket. It can be enabled while creating the S3 bucket.
- Route53 – Domain Name System where we registered our domain and it points to either the CloudFront or the ELB according to the application. Provides a way to redirect traffic from a public facing link to the servers. Health checks to move to static S3 website in case EC2 fails. Notification also sent by email.
- ElastiCache – Used to manage and scale in memory cache environments in cloud. A cluster can be created and attached to a Beanstalk environment along with its security group.
- CloudWatch – Monitoring services to measure cloud resources, track and collect log files. Currently we are using alarm to monitor EC2 instance health and take appropriate actions; we also have an alarm to monitor cost of resources set a threshold to send notifications.
- SNS (Simple Notification Service) – A pub/sub and mobile notification service to send notifications. Currently in the project it is configured to subscribe and publish an email to newly registered user.

**Public URL to application:**

<http://tune-world.sourabhnamilikonda.com/Index.html>

**Test Account Credentials:**

Username: [sourabh.namilikonda@sjsu.edu](mailto:sourabh.namilikonda@sjsu.edu)

Password: test@123#USER

**URL to GitHub:** <https://github.com/sourabhnamilikonda/CloudProject>

**Architecture Diagram:**

