# PlayPal

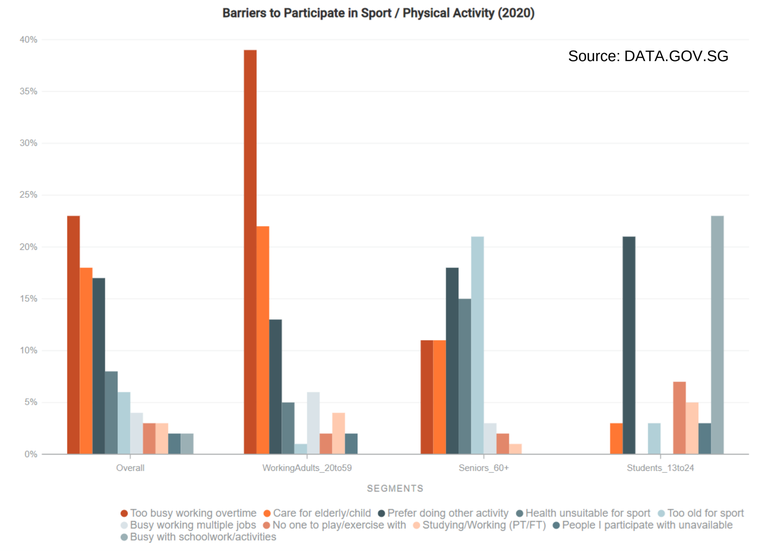
Shaunn Tan De Hui (A0087785H)
Zhao Yuxiong (A0236001B)
Ong Jian Ying Gary(A0155664X)
Nichamon Han-Idhikul (A0236060R)
**CS5224 Cloud Computing**
**AY2021/22 Semester 2**
**Department of Computer Science**
**National University of Singapore**

## Motivation

Conventionally, for someone to arrange a group for sports activity, there is a need to perform outreach via word-of-mouth, then hosting and inviting acquaintances to an activity. There is limited information about the availability of other sports activities happening in their proximity that also matches their availability and interests.

## Objective

PlayPal strives to connect sports lovers and like-minded people who have the same interests, together. With a profile set up with a user's interests, experience level, preferred timing and location, PlayPal can recommend suitable activities to the use. National Sports Participation Survey collected various reasons for individuals not participating in sports activities. PlayPal also serves to bring these people into the sporting scene.




## Approach

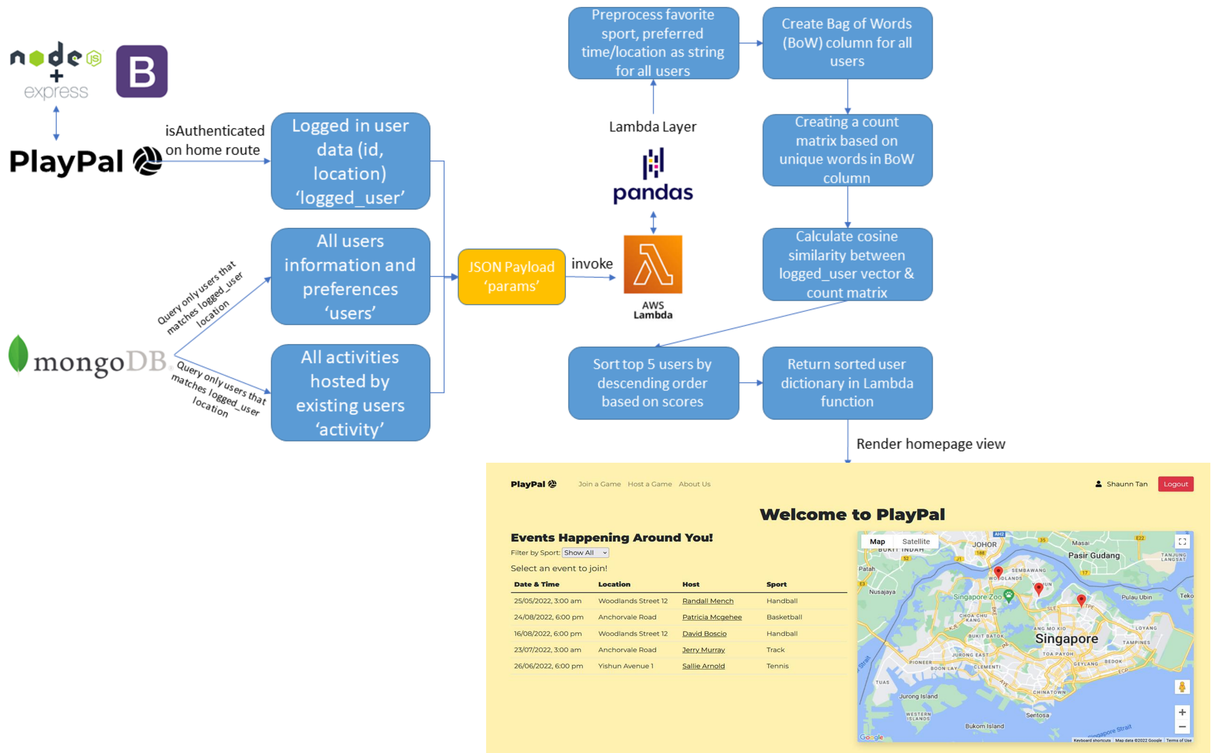
PlayPal is a responsive design website, enabling users to access it via either web or mobile browsers. The current version provides the web pages as follows:

**1. Registration Page** - Allow users to create accounts by fulfilling their preferences and uploading profile pictures. Once an account is created, users can log in to the website.

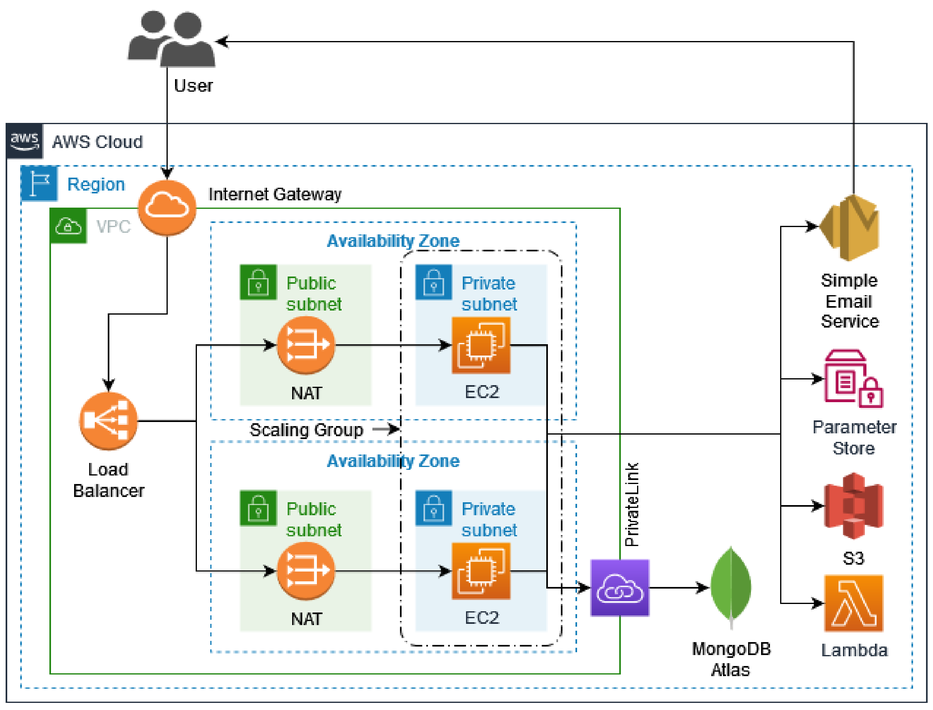
**2. Home Page** - Display all activities happening in Singapore. Once logged in, the page shows a list of recommended events based on user location and interests, the results are from the AWS Lambda function.

**3. Event Page -** By clicking activity on the list of the home page, the map zooms in and shows more details about the event. Users can view the host's profile and click 'Join Team' to participate.

**4. Review Page** - After joining, users can rate the event and leave reviews to the host so that others can read the shared experience.




## Implementation




### Web App Server

*AWS EC2* - PlayPal was developed using Node.js and hosted on AWS EC2 instances in private subnets. The instances run behind a load balancer in two separate Availability Zones, to ensure availability and fault tolerance. Auto Scaling Groups are configured and ready to scale out the service to meet the increase in demand, and scale back to two instances when the demand subsides.

*AWS Lambda* - The Lambda function recommends nearby events to users. It retrieves information of activities and location of users. Then, it calculates the distances based on the cosine similarity measure and illustrates the most relevant activities on Google Maps.

*AWS Systems Manager Parameter Store* - Environment variables will be stored in AWS Systems Manager Parameter Store

### Database

*MongoDB Atlas* - PlayPal utilizes MongoDB Atlas hosted in the same AWS region as the EC2 instances as a NoSQL database management system. It enables greater flexibility for developers to quickly implement the application compared to traditional relational database implementation (e.g. MySQL). It automatically creates replica sets to ensure high availability and an option to scale up/down the demand. With the lower cost compared to DocumentDB on AWS, MongoDB Atlas is justified for the early stage of development.

### Object Storage

*AWS S3* - PlayPal utilizes AWS S3 to store objects such as user profile pictures in the same region as the EC2 instances.

*AWS Simple Email Service* - The service is used for service-to-user communication such as user registration emails. This notifies new users to verify various account details when they have signed up with PlayPal, allowing for better security of account.

### Data Source

We collect raw sports-related data from the SportSG Sport Facilities and SportsFields@SG on https://data.gov.sg/. The dataset contains basic information about sports facilities such as name, location and type. By accessing the Google Maps JavaScript API, we can integrate the data to Google Maps and visualize it by building an interactive and customized map to locate existing event sites.

## Revenue Model

**Expected generated net income/month: USD209.42**

### Revenue Streams

- Google Adsense (USD426/5,000 views monthly)
- Affiliate - Sports partners products advertised during event booking (commissions)
- Boosting - package to boost events to fulfil sports event for player requirements
- Commercial Listings - commissions from tickets

### Cost Structures

- Cloud Infrastructure (MongoDB, AWS EC2, AWS S3, AWS SES, NAT Gateways, AWS PrivateLink, Elastic Load Balancer, AWS Lambda)
- Possible advertisement of PlayPal platform through social media platforms

### Cost Breakdown

- NAT Gateway – USD92.04/month
- MongoDB (M10) – USD57.60/month
- AWS EC2 – USD22.94/month
- AWS Elastic Load Balancer – USD21.24/month
- AWS S3 (100 GB/month) - USD12.27 / month