WordPress Deployment in EC2

Creating a Community for Running Enthusiasts

Farouk Mamud

25th July,2024

Project Overview

Sweaty_Equity

- **WordPress Deployment in EC2**

- Objective:

- Creating an engaging platform for running enthusiasts to share reviews, discuss running events, and workout recommendations.

- Hosted on a Virtual Private Cloud (VPC) using WordPress for its user-friendly interface and robust blogging and forum capabilities.

Plan and Process

- **Planning**:

- Identify the requirements and objectives for the website.

- Choose the appropriate AWS services to meet the needs (e.g., EC2, RDS, S3).

- Design the architecture for scalability and security.

- **Process**:

- Setup VPC: Configure a VPC with public and private subnets.

- Provision EC2: Launch an EC2 instance to host the WordPress application.

- Configure RDS: Set up an RDS instance for the WordPress database.

- Setup S3: Use S3 for storing website assets.

- Monitoring: Implement CloudWatch for monitoring and logging.

- Load Balancing and Scaling: Use ALB and Autoscaling groups for load distribution and scalability.

Setup Architecture
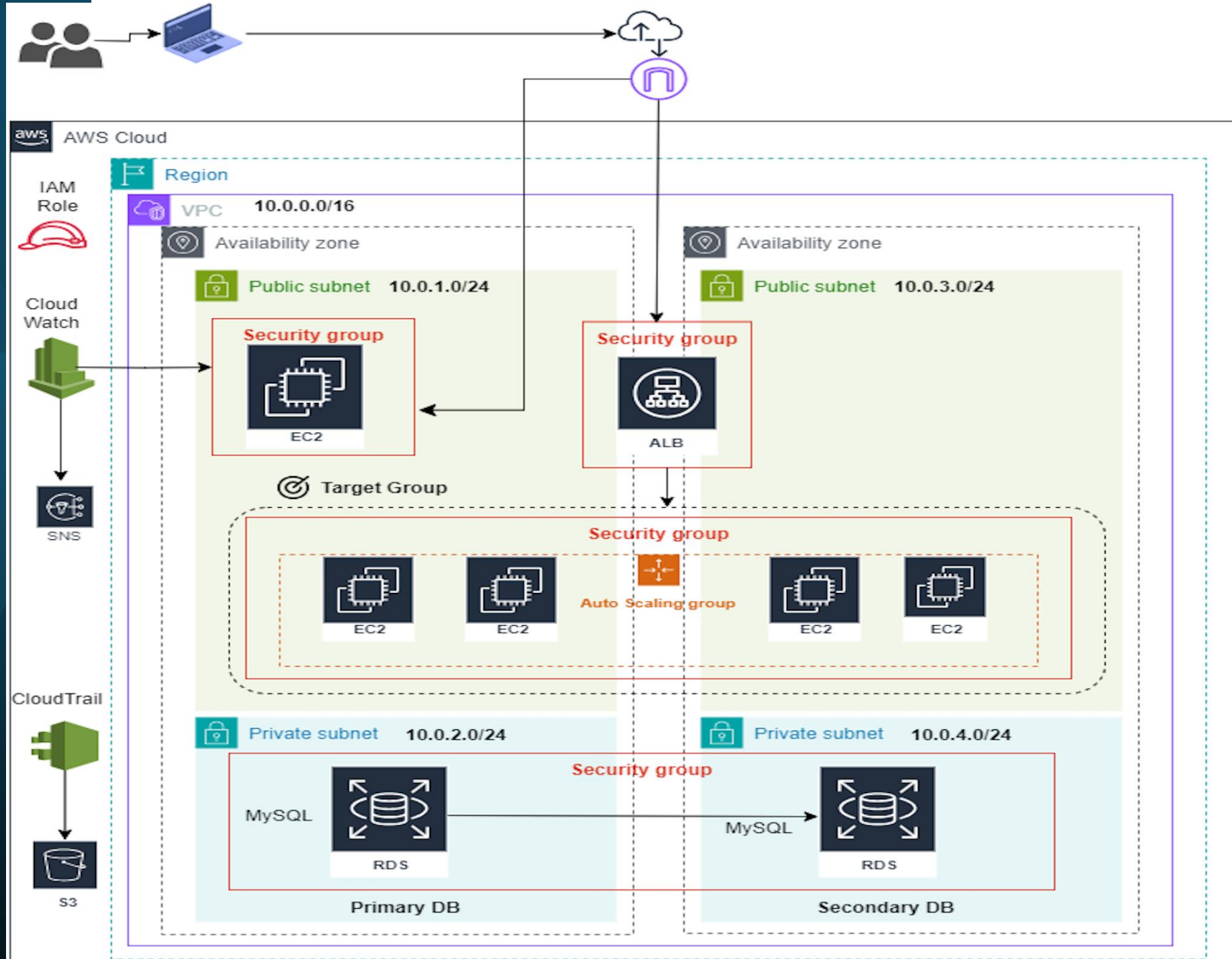
Hosting and Infrastructure Overview

Associated Resources:

- VPC (Two AZ: 2 public subnets & 2 private subnet)
- EC2 Instance
- CloudWatch
- CloudTrail
- Application Load Balancer
- Autoscaling Group
- Database (RDS)
- S3 Bucket
- Simple Notification Service (SNS)
- Security Group (Virtual Firewall)

Tools and Resources Used

- **Visual Studio Code**: For code editing and management.

- **Terraform**: For infrastructure as code to provision and manage AWS resources.

- **Amazon Web Services (AWS)**: Utilized various AWS services such as EC2, RDS, S3, and Route 53.

- **Git/GitHub**: For version control and collaboration.

- **Amazon Q**

- **WordPress**
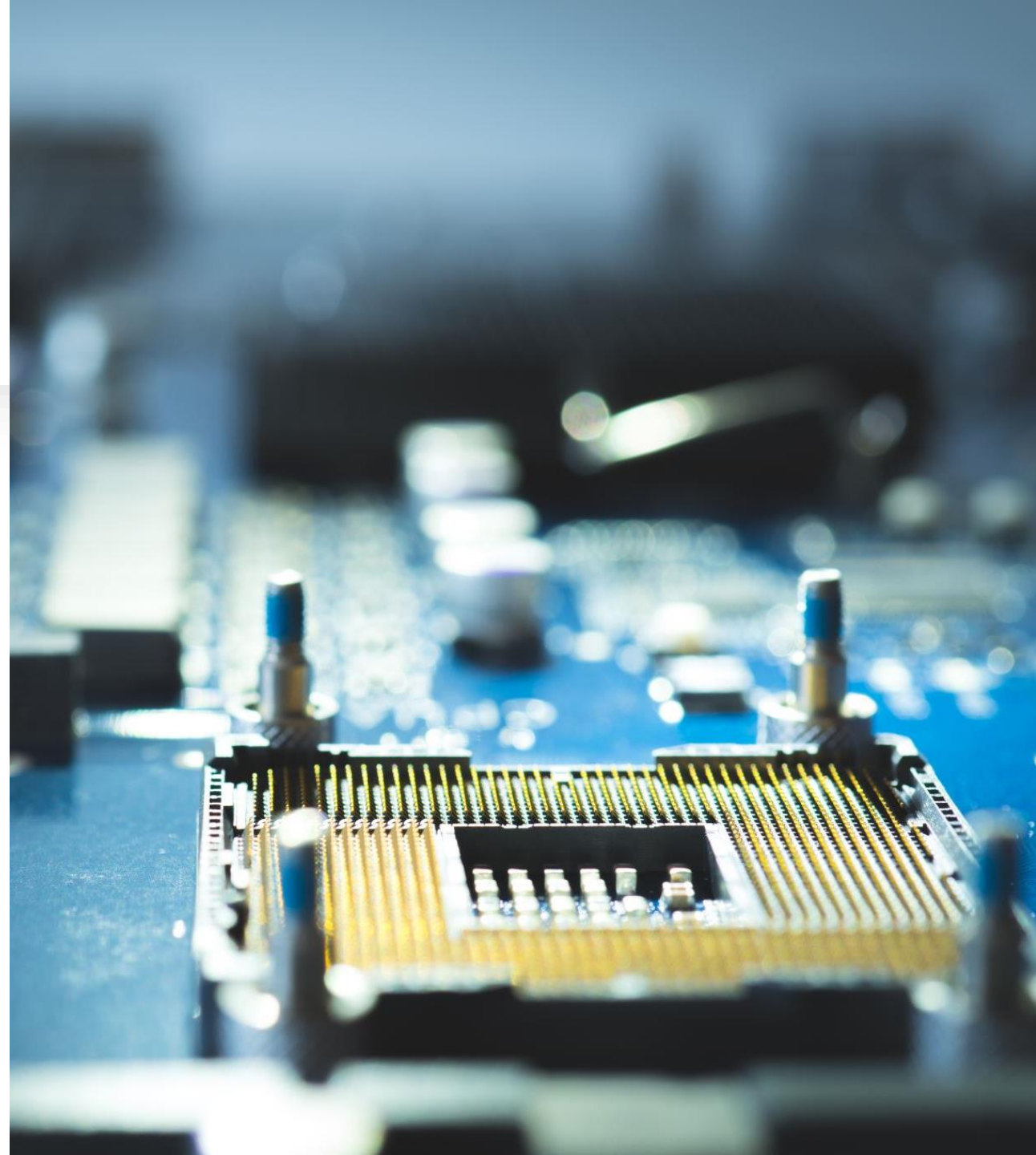
Integrated Development Environment

- Integrated Development Environment (IDE) Features

- Extensions and Plugins

- Version Control Integration

- Terminal and Debugging Tools

EXPLORER ···   🔶 RDS.tf   🔶 S3.tf   🔶 SG.tf   🔶 SNS.tf $ Stress.sh   🔶 Vars.tf   🔶 VPC.tf ✕

∨ CAPSTONE_PROJECT

Capstone_task > 🔶 VPC.tf > 🔩 resource "aws_route_table_association" "private_assoc"

∨ Capstone_task   M

> .terraform

≡ .terraform.lock.hcl

🔶 ALB.tf

🔶 AutoScaling.tf

🔶 CloudTrail.tf

🔶 CloudWatch.tf

🔶 EC2.tf

≡ plan.out

🔶 Provider.tf

🔶 RDS.tf

ⓘ README.md

🔶 S3.tf

🔶 SG.tf

🔶 SNS.tf

$ Stress.sh

{} terraform.tfstate

≡ terraform.tfstate.backup

$ UserDataEC2.sh

🔶 Vars.tf

🔶 VPC.tf

```
12    resource "aws_internet_gateway" "igw" {
18    }
19
20    # Create Public Subnets
21    resource "aws_subnet" "public" {
22      count                    = length(var.public_subnet_cidr_blocks)
23      vpc_id                   = aws_vpc.vpc.id
24      cidr_block               = var.public_subnet_cidr_blocks[count.index]
25      availability_zone        = var.availability_zones[count.index]
26      map_public_ip_on_launch  = true
27
28      tags = {
29        Name = "Public_Subnet ${var.tagNameDate}_${count.index + 1}"
30      }
31
32    }
33
```

Search: lock   Aa ab .* ? of 11   ↑ ↓ ≡ ✕

> OUTLINE

> TIMELINE

PROBLEMS   OUTPUT   DEBUG CONSOLE   TERMINAL   PORTS   CODE REFERENCE LOG   SQL CONSOLE

```
+ resource "aws_cloudtrail" "trail" {
+   arn                          = (known after apply)
+   enable_log_file_validation   = true
+   enable_logging               = true
+   home_region                  = (known after apply)
+   id                           = (known after apply)
+   include_global_service_events = true
+   is_multi_region_trail        = false
+   is_organization_trail        = false
+   name                         = "cloudtrail"
+   s3_bucket_name               = "s3-bucket-2024-04-12-2973"
```

⚡ powershell

⚡ bash Capstone_t...

master* ↓0↑1   ⊗0 △0   🔊0   ⬡ Connect   ▷ Amazon Q   Ln 81, Col 2   Spaces: 2   UTF-8   CRLF   {} Terraform

22° 🌧   1:59 PM 7/16/2024

VPC Setup

- Configured with public and private subnets for a more secure website access, ensuring controlled and secure access to web resources.

- Spans across two availability zones

- Enhances fault tolerance and availability

vpc-03b9b146ae56c88a3 / vpc 16-7-24

Details | **Resource map** | CIDRs | Flow logs | Tags | Integrations

Resource map Info

VPC Show details
Your AWS virtual network

vpc 16-7-24

Subnets (4)
Subnets within this VPC

us-west-2a

🅐 Public_Subnet 16-7-24_1

🅐 Private_Subnet 16-7-24_1

us-west-2b

🅑 Public_Subnet 16-7-24_2

🅑 Private_Subnet 16-7-24_2

Route tables (4)
Route network traffic to resources

Private_Route_Table 16-7-24_2

Public_Route_Table 16-7-24

Private_Route_Table 16-7-24_1

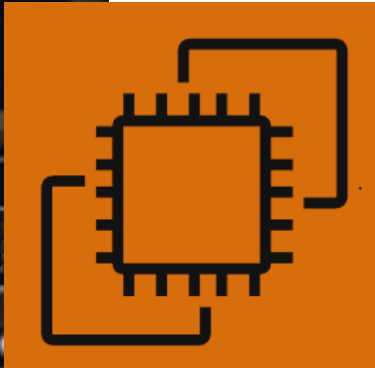rtb-0ae9faffe44fba69e

Network connections (1)
Connections to other networks

igw 16-7-24

EC2 Instance

- EC2 Instance: Amazon EC2 hosts the WordPress application for reliable scalability.

- Scalable compute capacity

- Flexible configuration

- Cost effective

- Integrated security

- Latest Amazon Linux AMI

- UserDataEC2.sh for configuration

- Variables: Includes RDS endpoint, username, password, and database name

CloudWatch

monitoring and logging for maintaining website performance.

Metric: CPU utilization of an EC2 instance

Condition: Trigger if average CPU utilization ≥ 80% over 10 minutes

Action:

-Notifies the configured email address (via SNS)

-Trigger Auto-Scaling Policy

CloudTrail

- Comprehensive Logging
- Security and Compliance
- Integration with Other AWS Services
- Cost-Effective

- visibility into user activity and API usage
- S3 bucket for log storage to ensure secure and accessible log management
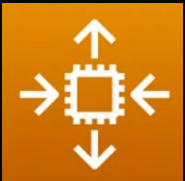- global service events

Application Load Balancer

Benefits of using ALB for load distribution and improved user experience.

- Subnet: public subnet

- Type of traffic allowed: uses http on port 80

- Enhanced Security

- High Availability and Scalability

Autoscaling Group

Ensures scalability to handle varying traffic loads.
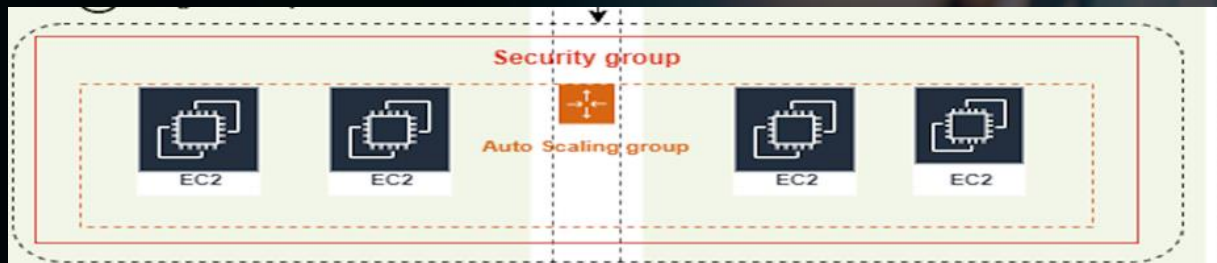
Scale Out Policy:
Triggered by a CloudWatch alarm when CPU utilization is high (≥ 80%).
Increases the number of instances by 1.
Scale In Policy:

Triggered by a CloudWatch alarm when CPU utilization is low (≤ 20%).
Decreases the number of instances by 1.

Database (RDS)

Manages database operations efficiently.

Managed Database Service

High Availability and Reliability

Scalability

- Associates with a specified security group and subnet group.

- Allocates 10 GB storage.

- Deploys as db.t3.micro instance type.

S3 Bucket and SNS

- S3 Bucket: Secure storage for website assets, no need for capacity planning or upfront investment.

- SNS (Simple Notification Service): Sends notifications for various events.

  - Stores WordPress files
  - Versioning **e**nabled
  - Grants CloudTrail access to the S3 bucket.

AWS Notification - Subscription Confirmation Inbox ×

AWS Notifications   Tue, Jul 16, 12:10 PM (5 days ago) ☆

You have chosen to subscribe to the topic: arn:aws:sns:us-west-2:992382653845:sns_topic To confirm this subscription, click or visit the link below (...

AWS Notifications   Tue, Jul 16, 10:40 PM (5 days ago) ☆

You have chosen to subscribe to the topic: arn:aws:sns:us-west-2:992382653845:sns_topic To confirm this subscription, click or visit the link below (...

AWS Notifications <no-reply@sns.amazonaws.com>   Wed, Jul 17, 9:42 AM (4 days ago) ☆

to me ▾

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AWS Notifications <no-reply@sns.amazonaws.com>   Wed, Jul 17, 1:03 PM (4 days ago) ☆

to me ▾

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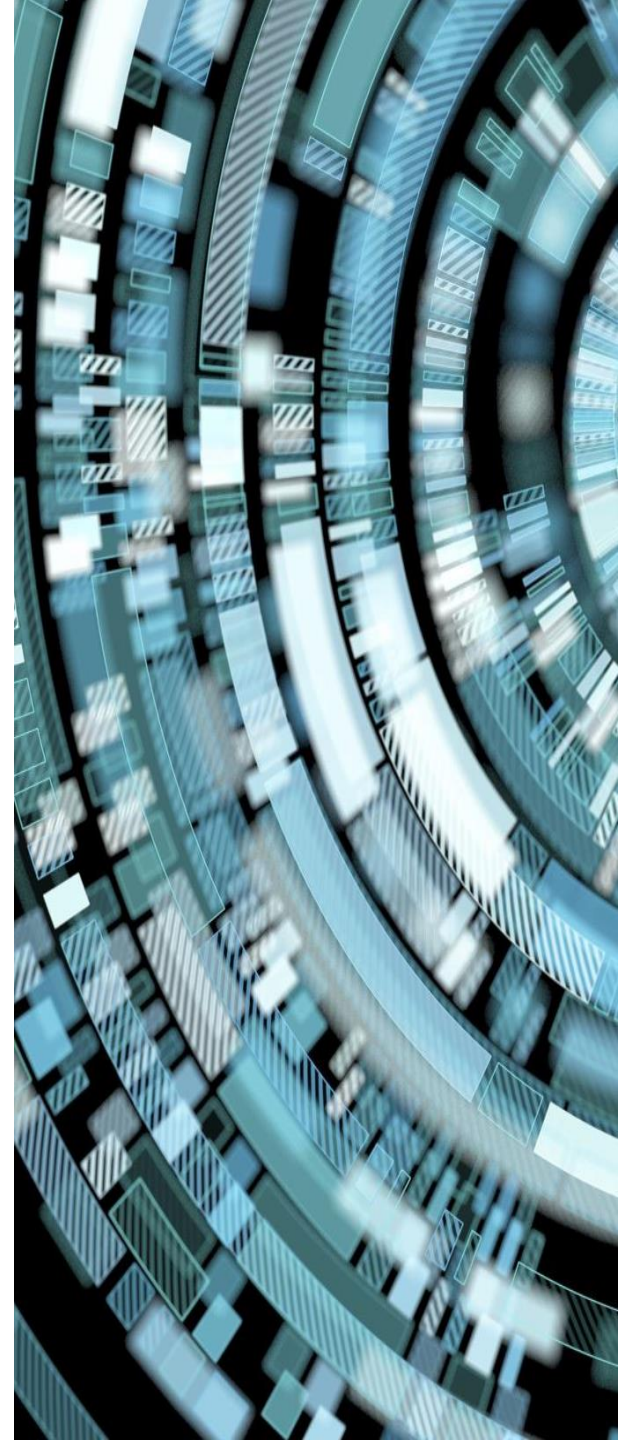1,580

15

937

1,470

2,255

Security Groups

- Virtual Firewall

- Stateful Traffic Management

- Granular Access Control

- Integration with Other AWS Services

RDS MySQL database:
TCP traffic on port 3306 (MySQL)

WordPress Instance
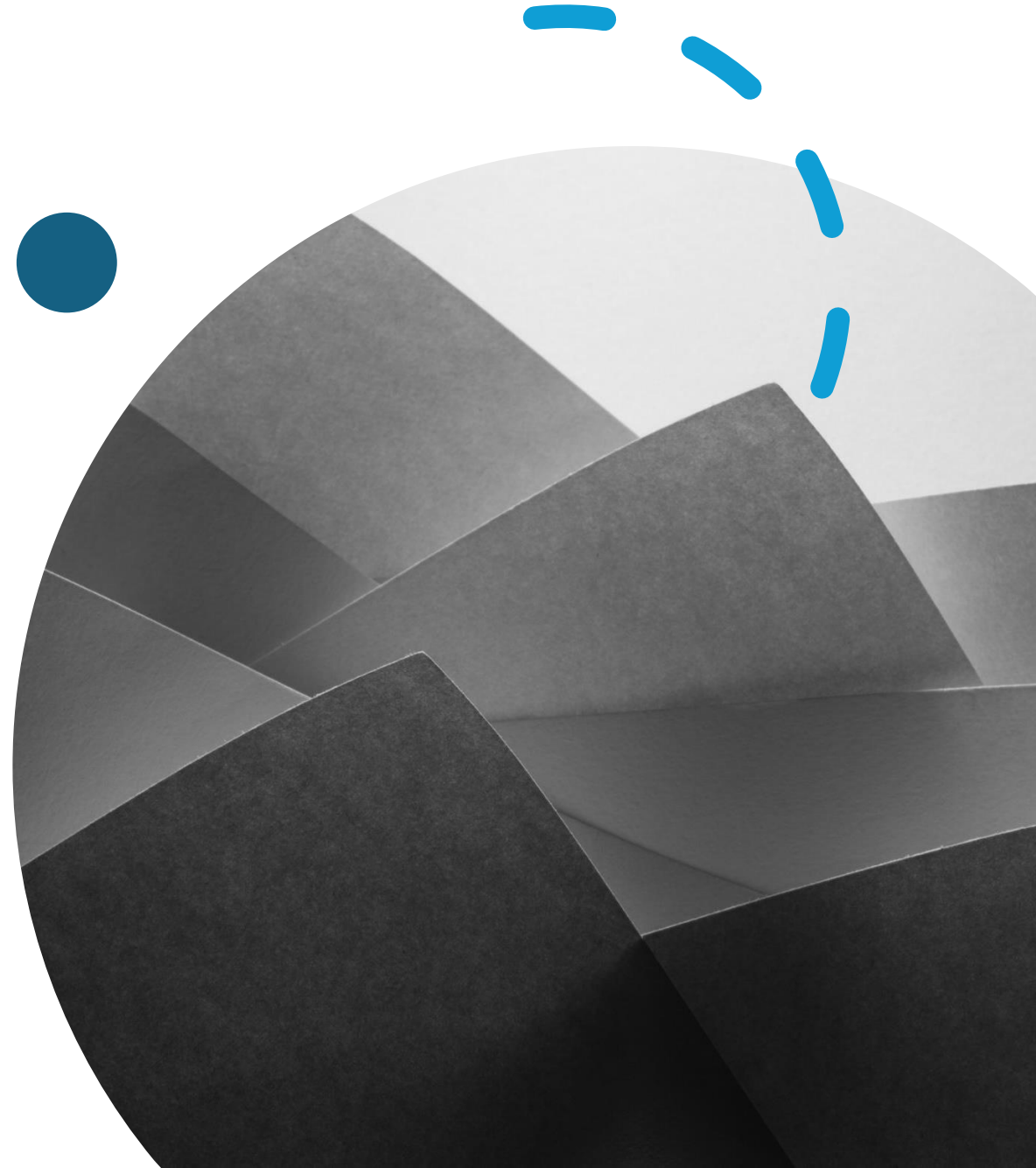- SSH (Port 22)
- HTTP (Port 80)

WordPress Setup

WordPress Setup:

Theme: Responsive and visually appealing theme.(Astra)

Plugins: quick and easy setup, compatibility with popular themes

Website Description

Static Website Pages:

- Home

- About

- Program

- Blog

- Contact

01 **Group Runs**

OUR PROGRAMS

What We Offer

Explore our range of running events and group workouts

READ MORE

02 **Workout Sessions**

03 **Community Events**
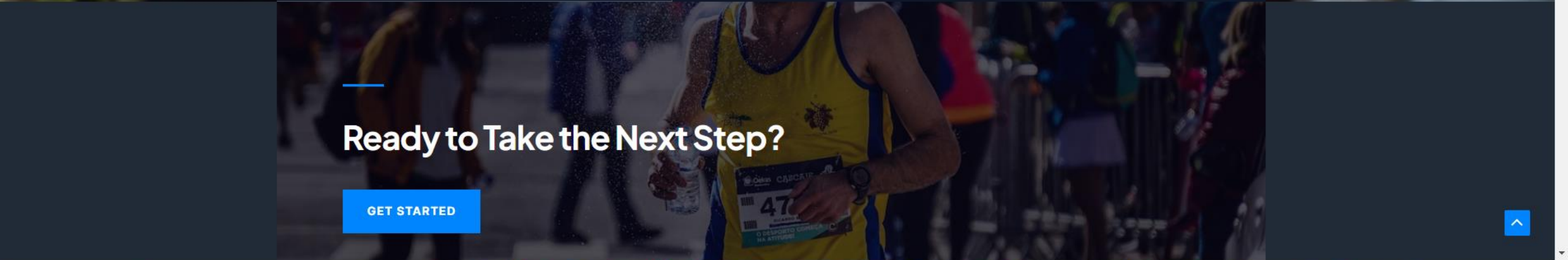
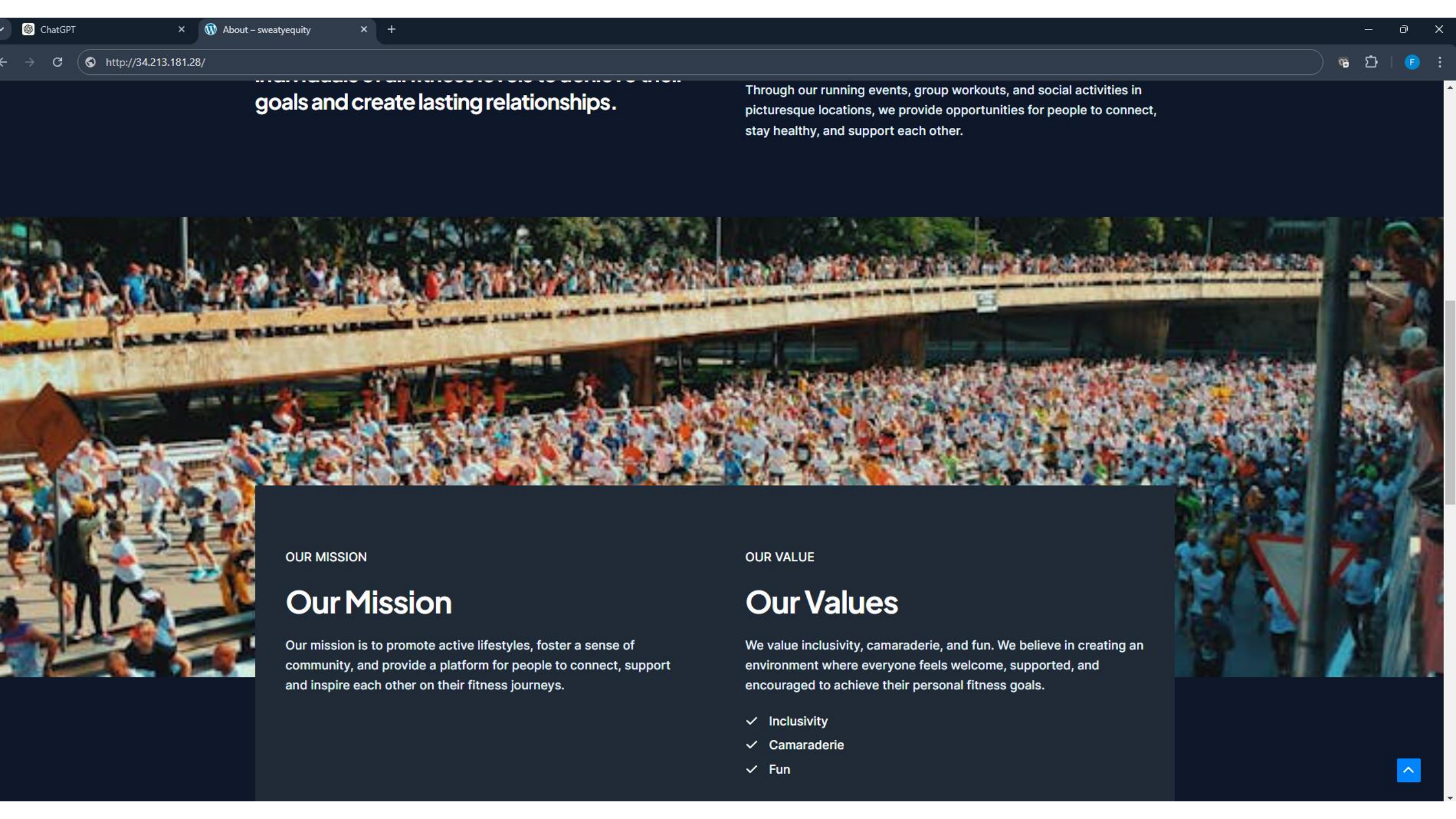## Ready to Take the Next Step?

GET STARTED

goals and create lasting relationships.

Through our running events, group workouts, and social activities in picturesque locations, we provide opportunities for people to connect, stay healthy, and support each other.

OUR MISSION

Our Mission

Our mission is to promote active lifestyles, foster a sense of community, and provide a platform for people to connect, support and inspire each other on their fitness journeys.

OUR VALUE

Our Values

We value inclusivity, camaraderie, and fun. We believe in creating an environment where everyone feels welcome, supported, and encouraged to achieve their personal fitness goals.

- ✓ Inclusivity
- ✓ Camaraderie
- ✓ Fun

OUR HISTORY

A Journey of Empowerment

Sweatyequity was founded with a vision to combine the benefits of an active lifestyle and a supportive community. Since our establishment, we have organized numerous running events, group workouts, and social activities that have brought individuals from all walks of life together. Our dedication to inclusivity, camaraderie, and fun has transformed Sweatyequity into a go-to platform for people seeking to stay active while building meaningful relationships.

JOIN US TODAY

Start Your Fitness Journey Now

Sign up for a membership and become a part of the Sweatyequity community

GET STARTED

Future Enhancements

WORDPRESS SITE

- Social Media Integration

- User Registration

- Forum

VPC SETUP
- Multi-AZ Deployment (fault tolerance & high Availability)
- DNS and Route 53 (for failover)
- CloudWatch Alarms
- S3 bucket notification for relevant events

- Switch to serverless service (Reduced Operational Overhead)
    - lamda/ fargate to replace EC2
    - Amazon RDS Aurora Serverless
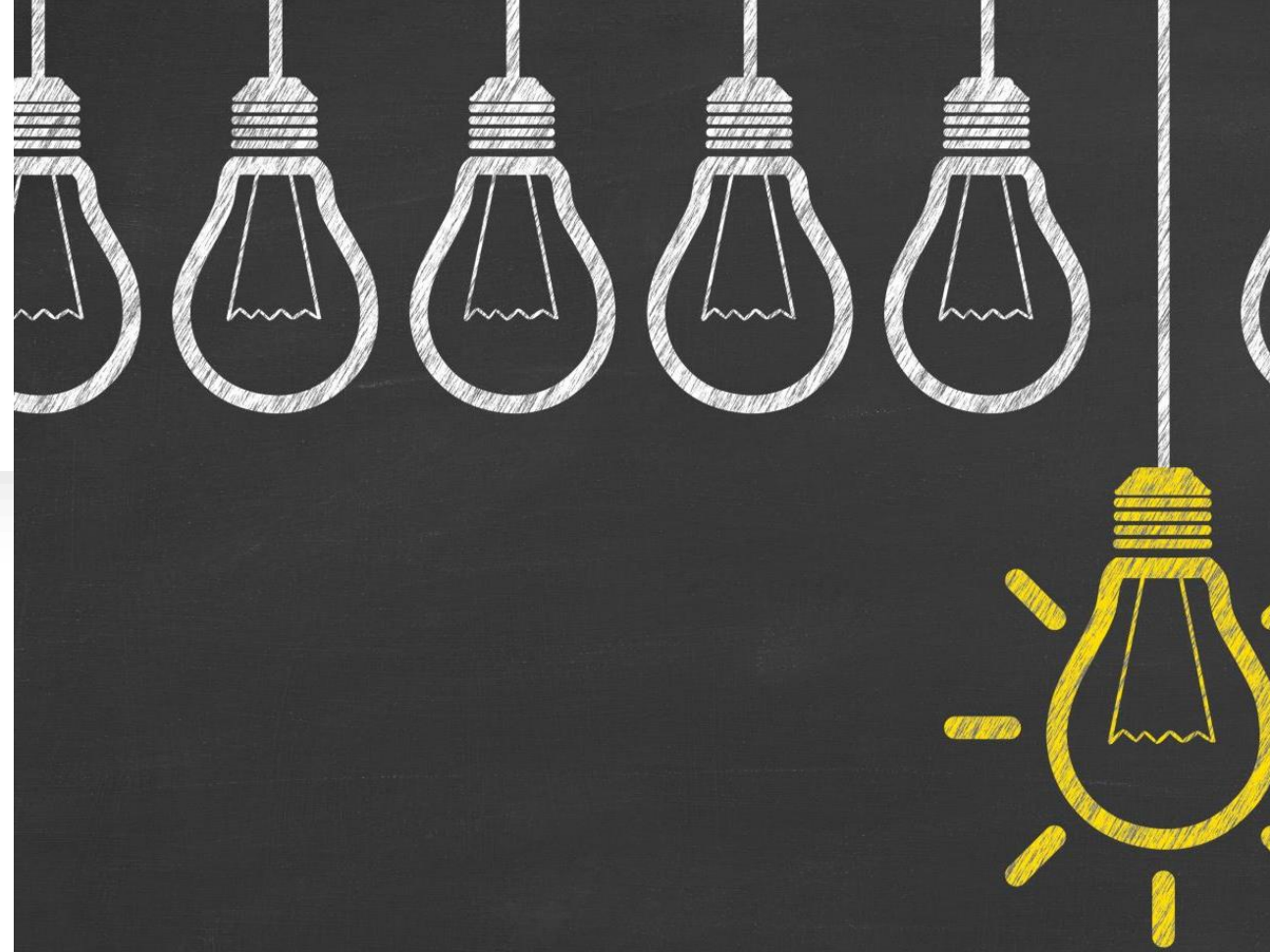
Conclusion

- **High Availability**: Achieved through the use of ALB, Auto Scaling, and RDS with multi-AZ deployment.

- **Security**: Managed through VPC, subnets, and security groups.

- **Scalability**: Auto Scaling ensures the application can handle varying loads.

- **Monitoring and Logging**: CloudWatch, CloudTrail, and SNS ensure the infrastructure is monitored and any issues are promptly reported.

thank you

for your attention