AWS Architecture Detailed Explanation

Introduction

This document provides a comprehensive explanation of the AWS architecture designed for hosting a highly available and secure application. The architecture consists of multiple AWS services integrated to ensure performance, security, scalability, and monitoring.

Architecture Overview

The architecture is designed with high availability, fault tolerance, and security in mind. The system spans across two Availability Zones (AZs) and is divided into three tiers:
1. **Web Tier**
2. **Application Tier**
3. **Database Tier**

Network Layer

- **VPC (Virtual Private Cloud):** The entire architecture is hosted within a VPC, which logically isolates the network from other AWS customers.
- **Internet Gateway:** Allows communication between the VPC and the internet.
- **Route 53:** Manages domain name resolution and routes traffic to the appropriate resources.
- **CloudFront:** Content Delivery Network (CDN) to serve content globally with low latency.
- **WAF (Web Application Firewall):** Protects the application from common web exploits like SQL injection and cross-site scripting.

Web Tier

- **ALB (Application Load Balancer):** Distributes incoming traffic across EC2 instances in two public subnets.
- **Public Subnets:** Host the EC2 instances that serve the frontend of the application.
- **Security Groups:** Control inbound and outbound traffic to the instances.

Application Tier

- **Private Subnets:** Host the backend application instances.

- **Auto Scaling Group (ASG):** Automatically scales the number of EC2 instances based on demand.
- **Security Groups:** Ensure only necessary traffic is allowed between the web tier and application tier.

Database Tier

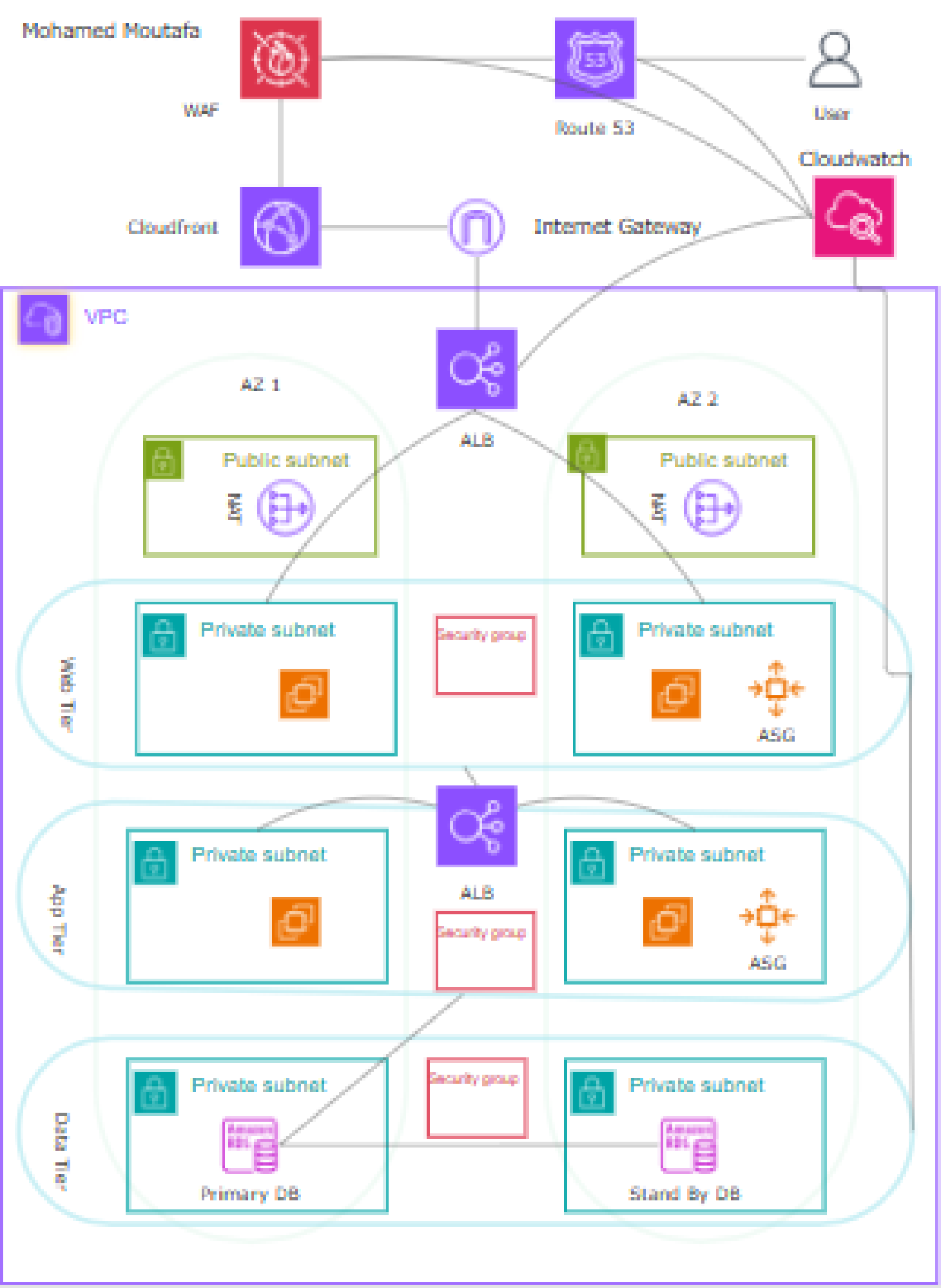
- **Primary DB (Amazon RDS):** Stores application data with automatic failover to a standby instance.
- **Standby DB:** Synchronous replication ensures high availability.
- **Private Subnets:** Secure the database instances from direct internet access.
- **Security Groups:** Allow traffic only from the application tier.

Monitoring and Security

- **CloudWatch:** Monitors system performance and logs.
- **WAF:** Protects the application from attacks.
- **IAM Roles:** Grant permissions to various AWS services.
- **Encryption:** Data is encrypted at rest and in transit.

Conclusion

This architecture ensures a highly available, secure, and scalable environment for the application. It leverages AWS best practices and services to meet the business requirements efficiently.


Mohamed Moutafa
WAF
Route 53
User
Cloudwatch
Cloudfront
Internet Gateway
VPC
AZ 1
AZ 2
ALB
Public subnet
NAT
Public subnet
NAT
Private subnet
Security group
Private subnet
ASG
Web Tier
Private subnet
ALB
Security group
Private subnet
ASG
App Tier
Private subnet
Security group
Private subnet
Primary DB
Stand By DB
Data Tier