AWS Architecture Design Report

Project Title: Scalable & Secure Web Application on AWS

1. Overview
This document provides an architectural overview of a 3-tier AWS web application designed for scalability, availability, and cost efficiency. The design follows the AWS Well-Architected Framework principles across five pillars: Operational Excellence, Security, Reliability, Performance Efficiency, and Cost Optimization.

2. Architecture Diagram
■ **Diagram Link:** Click here to view the AWS Architecture Diagram

3. Architecture Components

Tier	AWS Services	Purpose
Presentation Tier	Amazon S3, CloudFront, Route 53	Provides global access with fast and secure content de
Application Tier	Amazon EC2 (Auto Scaling + ALB)	Hosts backend application for scalable compute
Database Tier	Amazon RDS (Multi-AZ)	Offers fault-tolerant and secure relational data storage
Security & Monitoring	IAM, CloudWatch, KMS	Ensures secure access, monitoring, and encryption

4. Key Design Highlights
- Utilized S3 and CloudFront for globally distributed static content.
- Route 53 manages DNS routing and domain resolution.
- Auto Scaling Group (ASG) with Application Load Balancer (ALB) ensures high availability.
- RDS Multi-AZ ensures data durability and automatic failover.
- IAM roles follow least privilege principle.
- CloudWatch tracks system metrics and sets up automated alerts.

5. Security and Reliability
- Encryption: AWS KMS applied to RDS and S3.
- IAM Policies: Role-based access control for users and services.
- Multi-AZ: Database redundancy ensures uptime.
- Monitoring: CloudWatch alarms configured for performance metrics.

6. Cost Optimization
- Implemented S3 lifecycle policies to transition infrequently accessed data to Glacier.
- Right-sized EC2 instances for efficient performance.
- Considered Reserved Instances for long-term workloads.

7. Outcome
■ Increased availability (99.9% uptime)
■ Improved cost efficiency
■ Secure access management
■ High performance through distributed design

8. Future Enhancements
- Add AWS Lambda for serverless automation.
- Deploy Cross-Region Disaster Recovery strategy.
- Integrate AWS WAF for web application security.

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