

Design and Deployment of a Scalable and Secure E-commerce Platform on AWS

Project Overview

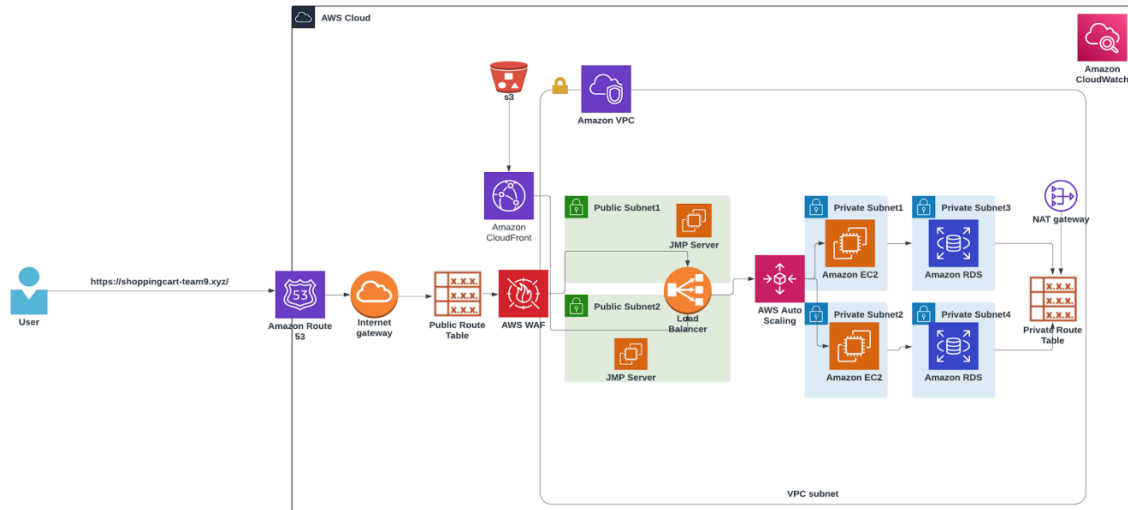
The platform's architecture leverages key AWS services:

- **Auto Scaling and EC2** for scalable compute resources,
- **RDS (Relational Database Service)** for secure, reliable database management,
- **WAF (Web Application Firewall)** to guard against security threats,
- **CloudFront CDN** for efficient content delivery, reducing latency for global users.

Key Phases of Implementation

1. **Infrastructure Setup:** This phase involved setting up the foundational network and compute infrastructure using CloudFormation. Key components include Virtual Private Cloud (VPC) with public and private subnets, Internet Gateways, and Security Groups. EC2 instances and an Application Load Balancer (ALB) were configured to handle traffic and secure data transmission through HTTPS.
2. **Application Security:** To safeguard against threats like SQL Injection and Cross-Site Scripting (XSS), the project implemented **AWS WAF** along with custom rules for additional security. The domain was managed with Route 53 for DNS routing and SSL certificates via AWS Certificate Manager to secure client-server communications.
3. **Content Delivery and Performance Optimization:** Using **CloudFront CDN** to cache static assets and dynamic content, the platform ensures quick response times for global users. Performance was further enhanced with **GZIP Compression** and tailored cache configurations to reduce load times.
4. **Testing and Monitoring:** Load testing with JMeter simulated high traffic, and AWS CloudWatch was utilized to monitor application metrics like CPU usage and HTTP request latency. Alerts were configured for proactive responses to unusual activity.

Architecture Design



The e-commerce platform architecture is built around a VPC for secure isolation, with resources distributed across multiple Availability Zones to ensure high availability and fault tolerance. Auto Scaling dynamically adjusts EC2 instances based on traffic demand. RDS provides database management with encryption for security.

Conclusion and Improvements

The project effectively demonstrates AWS's managed services for building a scalable and secure e-commerce platform. Proposed future improvements include reducing Auto Scaling cooldown periods, introducing **Predictive Scaling** for proactive resource allocation, and adding **ElastiCache** for additional performance optimization.

For a more detailed understanding, including specific figures and configuration steps, refer to the original document sections on infrastructure setup, security configurations, and performance metrics.