

Server-Side Specifications

Technical Document

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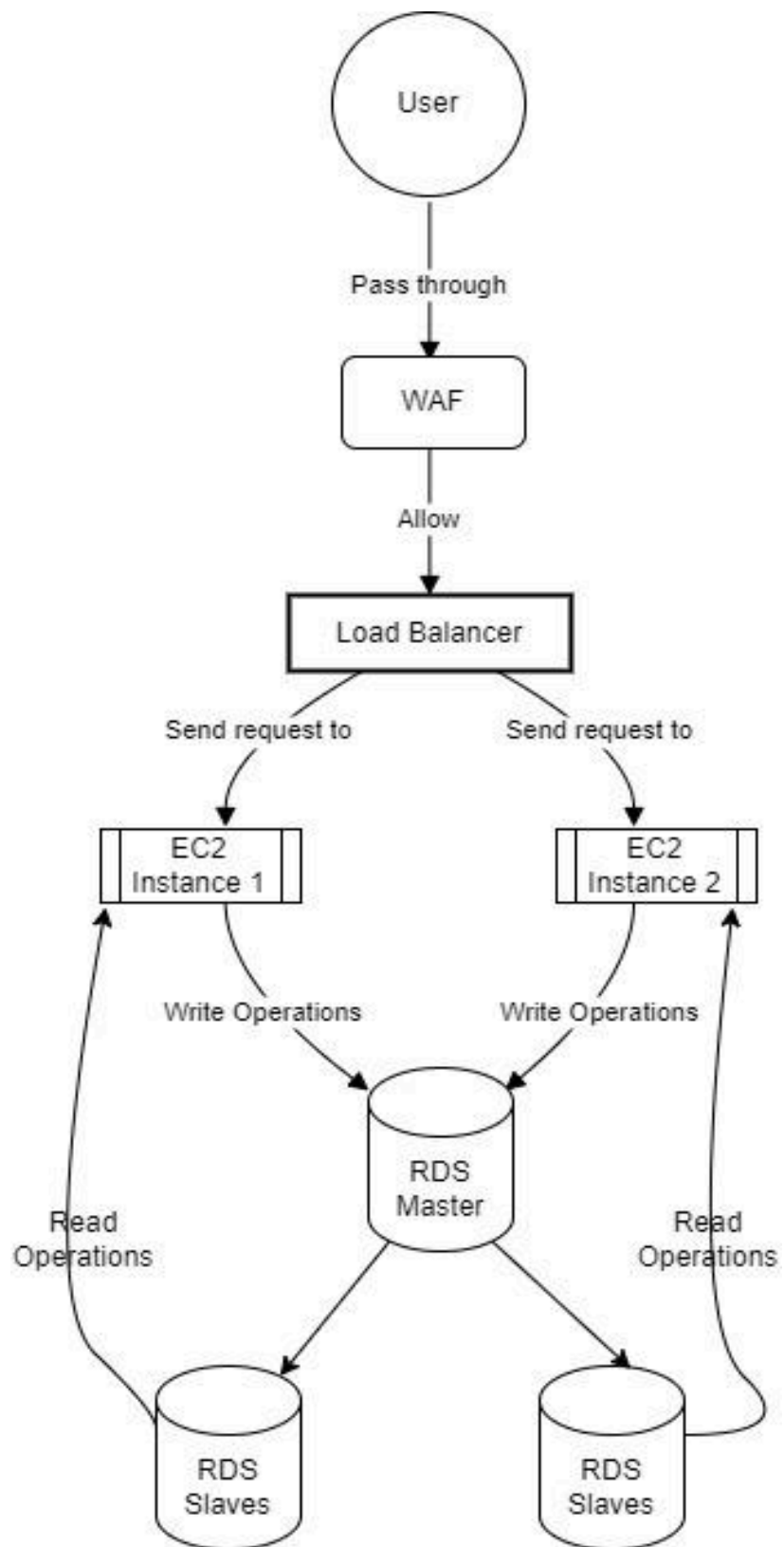
AWS Database Configuration

- **Amazon RDS Setup:** Utilize Amazon RDS to create a database cluster that includes one master database and two read replicas. This configuration ensures high availability and scalability for read operations.
- **Database Design:** Follow the Boyce-Codd Normal Form (BCNF) to design the database schema. This normalisation form reduces redundancy and avoids update anomalies, ensuring the database remains efficient and consistent.
- **Replication:** Write operations are directed to the master database, while read operations are distributed across the two read replicas. This setup optimises the database performance by balancing the load.

Technology	Version	Comment
PostgreSQL	16.2	
RDS		
AWS EC2		RAM: 4GB Storage: 10GB SSD vCPUs: 2 Region: Asia Pacific (Singapore) ap-southeast-1
Ubuntu	22.04.4	

AWS Infrastructure

- **Web Application Firewall (WAF):** Deploy an open-source WAF in front of the ALB to protect the application from common web exploits and vulnerabilities.
- **Application Load Balancer (ALB):** Deploy an ALB to distribute incoming application traffic across two EC2 instances. This ensures high availability and fault tolerance.
- **EC2 Instances:** Use two EC2 instances behind the ALB to host the Laravel application, providing scalability and redundancy.



AWS Server Architecture Diagram

Azure Database Configuration

General Configuration

- Service Type: Choose the appropriate Azure database service (e.g., Azure SQL Database, Azure Cosmos DB, Azure Database for MySQL, Azure Database for PostgreSQL).
- Deployment Options: Single database, elastic pool, or managed instance for Azure SQL Database.

Resource Configuration

- Compute Tier: Select the service tier (Basic, Standard, Premium, General Purpose, Business Critical, Hyperscale).
- Compute Size: Configure vCores and DTUs based on workload requirements.
- Storage Size: Allocate the necessary storage capacity in GB or TB.

Security Configuration

- Firewall Rules: Set IP firewall rules to allow access from specific IP addresses.
- VNet Integration: Enable Virtual Network (VNet) service endpoints for secure access.
- Authentication: Choose authentication methods (SQL authentication, Azure AD authentication).
- Encryption: Enable Transparent Data Encryption (TDE) for data-at-rest protection.
- Threat Detection: Activate Advanced Threat Protection for proactive security alerts.

Performance Configuration

- Indexing: Configure automatic or manual indexing strategies.
- Query Performance: Utilize Query Performance Insight and Query Store for monitoring and optimizing queries.
- Scaling: Set up auto-scaling or manual scaling based on workload patterns.

Backup and Recovery

- Backup Policies: Configure automated backup schedules and retention policies.
- Point-in-Time Restore: Enable point-in-time restore capabilities for recovering databases to a specific time.
- Geo-Replication: Set up active geo-replication for disaster recovery and high availability.

Monitoring and Diagnostics

- Performance Monitoring: Use Azure Monitor, Azure SQL Analytics, or built-in performance metrics.
- Diagnostic Logs: Enable and configure diagnostic logging for auditing and troubleshooting.
- Alerts: Set up alerts for performance, security, and availability issues.

High Availability and Disaster Recovery

- Failover Groups: Configure auto-failover groups for high availability across regions.
- Zone Redundant Configuration: Enable zone redundancy for increased resilience within a region.

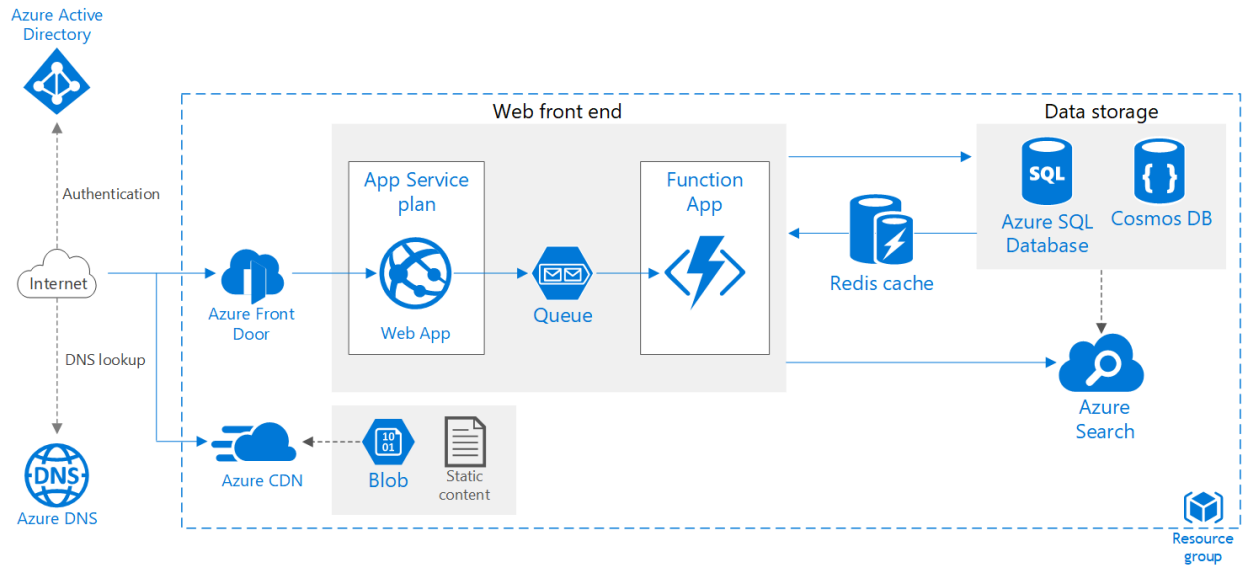
Technology	Version	Comment
Azure SQL	Varies by tier	Managed relational database service based on SQL Server. Supports different service tiers.
Azure CDN		
Azure DNS		

Azure Infrastructure

- **Azure Active Directory:**
 - Provides authentication services for the web application. Ensures secure access for users.
- **Azure Front Door:**
 - Acts as a global load balancer for web traffic.
 - Directs incoming internet traffic to the appropriate web application backend.
- **Web Front End:**
 - App Service Plan and Web App: Hosts the web application, providing a scalable and managed environment.
 - Queue: Used for message queuing to decouple and scale components.
 - Function App: Executes code in response to queued messages, handling background tasks and events.
- **Data Storage:**
 - Azure SQL Database: Relational database service for structured data.
 - Cosmos DB: Globally distributed, multi-model database for unstructured data.
 - Redis Cache: In-memory data store for fast data retrieval and improved application performance.
- **Azure Search:**
 - Provides search capabilities over the data stored in Azure SQL Database and Cosmos DB.
 - Enhances the search functionality of the web application.

- **Azure DNS and Azure CDN:**

- Azure DNS: Domain Name System service for DNS lookup and resolution.
- Azure CDN: Content Delivery Network for delivering static content with high availability and performance.



Azure Architecture Diagram