

AWS Architecture Design - Assignment #2

1. Background and Assumption of the Case

A typical server structure normally includes three layers: web service layer, application layer, and database layer. Considering that the startup customer's current LAMP architecture and business volume, this scenario is based on the following assumptions and conditions:

- Combine the web service layer and the application layer(PHP) into one layer.
- Traditional web business, temporarily not involving big data and machine learning, when needed, can choose Amazon Machine Learning product.
- No need of querying and concurrent accessing to massive data, or NOSQL can be used such as Amazon DynamoDB.
- There are no tasks that require long time running, or Amazon SQS message queues, Amazon SNS notification services can be used.

2. Executive Summary

2.1 Requirements Analysis

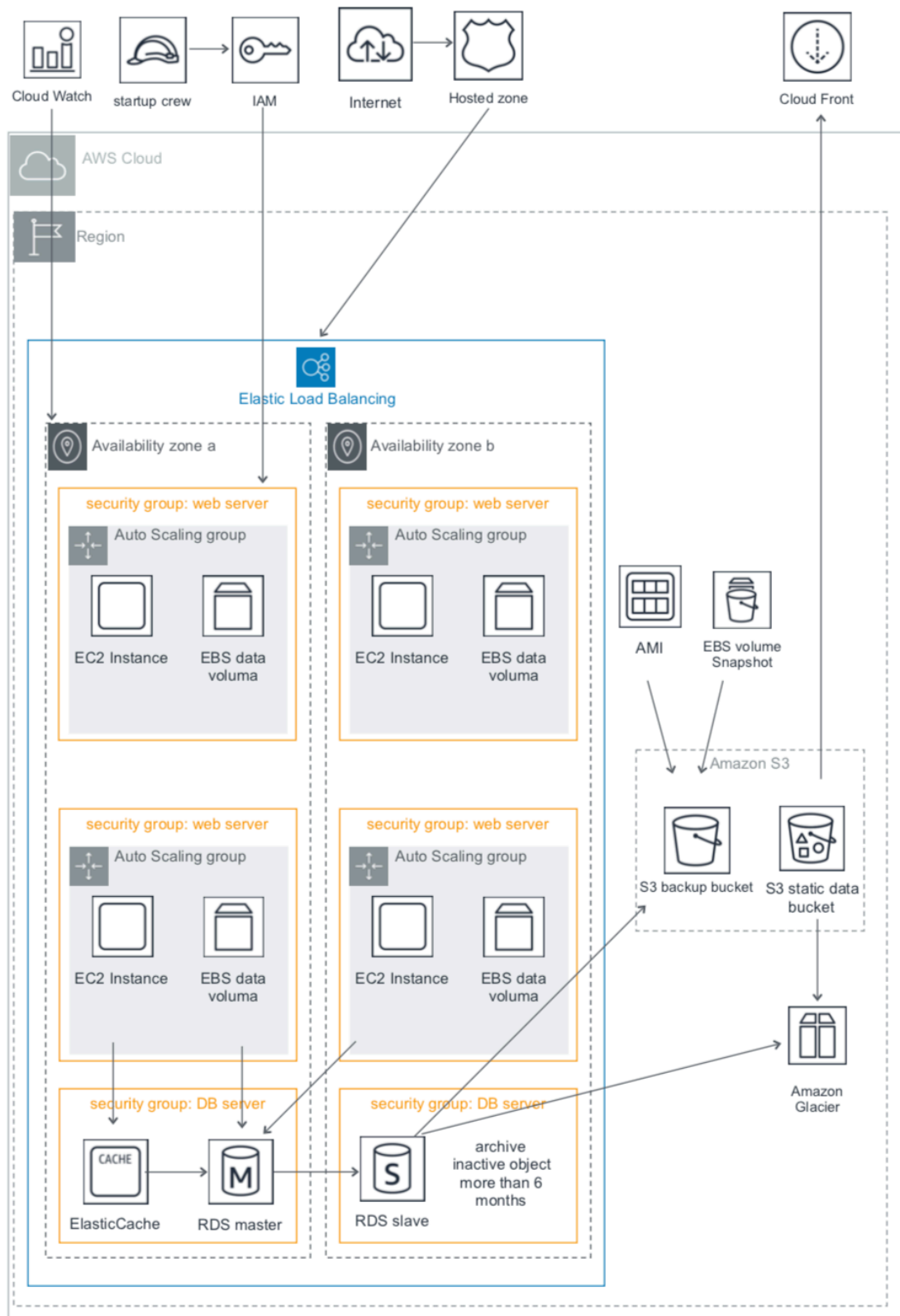
- Scaling to meet the demand
- Their lack of provision for Disaster Recovery
- Their ability to configure their database and data access layer for high performance and throughput

- Making the user experience in the browser very low latency even though a large portion of their user base will be from far away
- Effective distribution of load
- A self-healing infrastructure that recovers from failed service instances
- Security of data at rest and in transit
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- An archival strategy for inactive objects greater than 6 months
- Ability to easily manage and replicate multiple environments based on their blueprint architecture

2.2 Solution Abstract and Benefits

- Use AWS EC2 Elastic Cloud Computing Server, startup company purchase computing power based on business needs. AWS's innovative business model frees start-ups, allows them to scale quickly, get products to market faster, while controlling costs and keeping the company thin and streamlined.
- AWS's scalable architecture meets peak business needs by automatically adding computing resources. After the peak of the business, you can release redundant computing resources.
- AWS allows customers to focus on business design and development without the hassle of time-consuming and cost-effective consideration of server selection, procurement, deployment, networking, firewalls, security, and more, do not worry about IT equipment repair, maintenance, and monitoring.

3. Solution Design



3.1 Architecture Overview

According to customer current and future development needs, the architecture designed for it is shown above

3.2 Design Details

3.2.1 Amazon VPC, Security Groups, AWS Route 53, CloudFront and ELB

Amazon VPC Isolate internal resources from external networks. Create a public subnet for a Web server that can access the Internet, but Back-end systems such as Database Server and AppServer are placed in private subnets that do not have access to the Internet.

Control access to Amazon EC2 instances in individual subnets with multiple security layers, use Security Groups and network access control lists system.

For customers with web access, an external DNS service is provided by AWS Route 53. For company employees, through Direct Connect, VPN, IAM Certified access to AWS, CloudTrail is available for security auditing.

CloudFront distributes content to CDNs, caching commonly used static and dynamic files for low latency, high speed data transfer.

Elastic Load Balancer (ELB for short) automatically distributes application access traffic across multiple Amazon EC2 instances in the cloud. It allows you to achieve a higher level of application fault tolerance and distribute business requests to multiple Availability Zone (AZ) Web Servers.

3.2.2 EC2, AMI, EBS

EC2 provides scalable computing resources for Web Server, App Server, and DB Server. For different application servers, you can customize the AMI image to achieve rapid installation and deployment of the server.

Auto Scaling automates the scaling of EC2. An Auto Scaling group can contain EC2 instances from one or more EC2 Availability Zones in the same region.

With Amazon CloudWatch, you get a complete picture of resource usage, application performance, and health across your entire system. Using these analysis results, you can react in time to keep your application running smoothly.

Elastic Block Store (EBS) provides data persistence storage for EC2.

Security policies designed by Security Groups ensure that network access is allowed.

3.2.3 ElasticCache, RDS

Use ElastiCache as a cache to provide faster web application response.

The MySQL database uses the RDS service (MySQL or Aurora) and the data files are stored on EBS. The database is deployed to different AZs for master and slave replication to achieve high availability and read and write separation.

EBS volume Snapshot, AMI backup, can be stored on S3. S3 also stores static data and objects. Backups of databases, historical data, and archived data are done using Glacier.

Use CloudFormation to create templates for easy deployment of AWS resources and applications.

The AWS OpsWorks application management service makes it easy to deploy and manipulate applications of different forms and sizes, such as PHP applications.

3.3 summary

In summary, using AWS scalable products and services can help start-ups build a manageable, secure, highly available, scalable, and affordable IT infrastructure that gives customers peace of mind and meets the company's current and future growth needs.

4 References

1. Amazon DynamoDB: https://amazonaws-china.com/cn/dynamodb/?nc2=h_m1
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