



42904 Cloud Computing and Software as a Service- Autumn 2024
Assessment Task 3

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Assumption

Based on the scenario, where a small startup company needs some assistance of its operations which is currently run on their LAMP stack on a single desktop PC, anticipates significant, rapid growth. They want to increase their efficiency during peak hours and ability to handle sudden traffic and increase in data. The company's requirement is of an application that can scale up based on the demand for the resources. The aim is to ensure high performance, grow as per the forecast by the company's management team and focusing on cloud hosting of the application instead of on-premised infrastructure. Additionally, implementing disaster recovery and resource scalability as per requirements.

- Pay-as-you-go price model is preferred by the company for cloud infrastructure resources. As the company was using a LAMP architecture (Linux, Apache, MySQL, PHP) they are willing to move forward with AWS (Amazon Web Services) Infrastructure.
- The Company's management want to outsource the cloud infrastructure and do not want an on-premises infrastructure which requires set up.
- As the company scales up, there will be increase of load. They do not want to commit to resources upfront and would like to procure as per requirements.
- Integrating the application's functionality with cloud services can be carried out by the developers.
- Smooth Transition of application from existing on-premise infrastructure to AWS.
- Support required for cloud services will be chargeable to the company and access of the cloud resources will be provided by the vendor.
- Application will be run based on the demanding tasks and the performance of it will be overviewed based on the workload handled . This will help the company to understand the need for resources.
- Security of cloud services will be handled by the vendor and the important data will be stored in servers not in company's premises.
- Essential training for configuration and troubleshooting of AWS services will be provided by the company to its staff members.
- Web server environment can be required in initial stages of cloud services implementation.
- All the Subnets used currently are set on Public IP Address.

- The application will be implemented in EC2 Instances with security group that is customised and has auto scaling network output traffic with 60% upper threshold and 30% lower threshold.

Architecture Diagram

The migration of application to AWS cloud services is showed in this architecture diagram along with various services which will be used to host application servers and Database. To manage incoming traffic through SSH and HTTP load balancer is used which ensures efficient utilization of resources. To prevent external attacks VPC(Virtual Private Cloud) is used to ensure high security. AWS infrastructure is designed to provide high availability, reduce downtime and provide with robust security measures. Application is deployed in multiple locations to handle fault tolerance and manage disaster recovery. Infrastructure will be cost-effective by optimizing the performance and monitoring the resources.

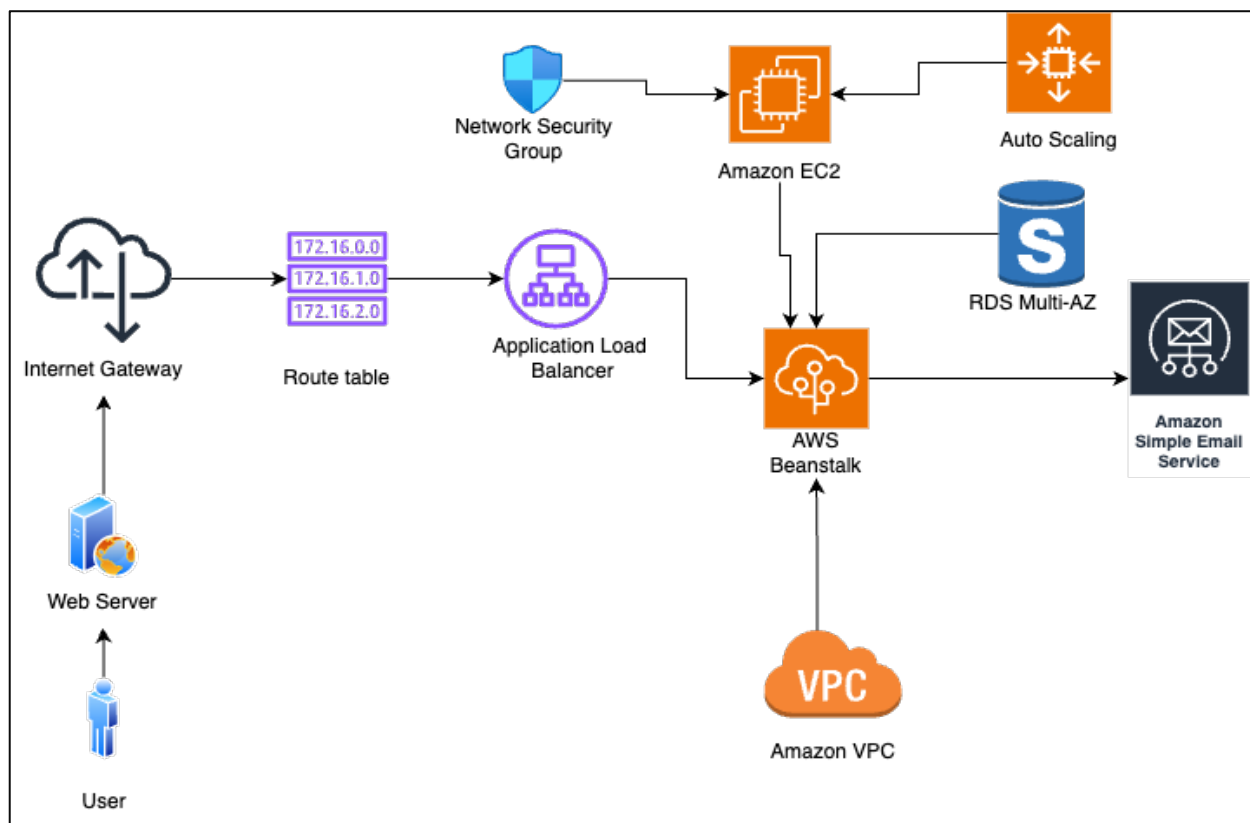


Figure 1 AWS Infrastructure architecture

AWS Services in Developing Solution

The infrastructure includes essential services for migrating the application to AWS. These services set up the essential resources to run multiple applications. Brief description of the AWS services used are mentioned below:

AWS Beanstalk: This service is used to configure the server-side of the application, ensure the database of the host are in high availability mode. The service also manages traffic on the server, includes load balancing, autoscaling and database settings. It includes service that helps in creating web application environment and can upgrade according to workload.

Amazon EC2: This Service executes the application's instances and configures network security groups which helps in applying restriction to accessing the application. Application server is hosted on virtual server such as Linux (in this case). Instances are created with different zones and a custom key-pair is created. All the instances (in this case, the instances start with 'FINAL') have same custom key-pair and security group. Custom Amazon Machine Image is used to define instances, it contains software configurations of the instances and is created along with instances.

Load Balancer: Balancing the consumption, workload and redirecting of a resource is handled through this service. Handling the traffic equally on to the instances created to provide high availability is ensured by Load balancer.

Auto Scaling: Based on the requirement of resources auto scaling is enabled through this service. Auto scaling is configured to minimum of 2 instances and maximum of 8 instances with a Scaling triggers on Network output traffic with an Upper threshold of 60% lower threshold of 30%.

RDS: The service of distributed relational database allows to set up the database on the cloud to provides efficient operational and scaling features, it is set as 'HIGH AVAILABILITY' based on the conditions. Multi- Availability zones creates availability zone of database to handle an unpleasant downtime.

Custom Virtual Private Cloud(VPC): This service helps in creating virtual private network by isolating a part of Amazon cloud services. This eliminates the need to setup a datacentre and VPN reducing the cost for the organization. The architecture includes three subnets which are attached to VPC(VPC name starts with 'FINAL') has route table to handle traffic and all subnets are public.

Email Notification: This service notify the admin of any incident regarding the health of their resources in infrastructure.

In Conclusion, The architecture of the cloud services that will be implemented for the company will have high availability, scalability and reliable environment. With the help of AWS which has high coverage around globally aids the availability zones and resilient to fault tolerance. Through various APIs and developing environment, AWS provides extensive information and support for all the services provided.

Appendix:

Email Notification Screenshot:

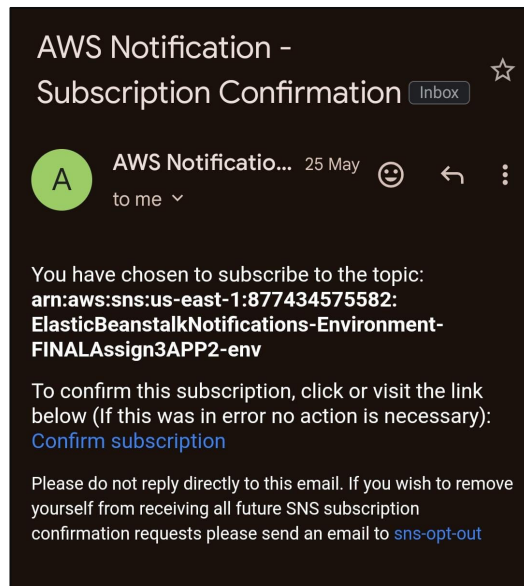


Figure 2 Screenshot of Email Notification.