PROFESSIONAL TRAINING REPORT

entitled

GATEWAY LOAD BALANCER

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering degree in Computer Science and Engineering .

by

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SCHOOL OF COMPUTING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Professional Training is the bonafide work of **Mr.D.vishal** who carried out the project entitled "**Gateway Load Balancer**" under my supervision from June 2023 to October 2023.

Internal Guide
M.S.Roobini

Head of the Department

Dr . L. LAKSHMANAN, M.E., Ph.D.

Submitted for Viva voice Examination held on _____

Internal Examiner   **External Examiner**

DECLARATION

I,**D.vishal, (Reg.No: 41110344),** hereby declare that the Professional Training Report-I entitled **Gateway Load Balancer** done by me under theguidance of **M.S.Roobini** submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Computer Science and Engineering .

DATE:

PLACE: **SIGNATURE OF THE CANDIDATE**

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to **Board of Management** of **SATHYABAMA** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. T.Sasikala M.E., Ph.D.**, **Dean**, School of Computing, **Dr. L. Lakshmanan M.E., Ph.D., Head of the Department of Computer Science and Engineering** for providing me necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to my Internal Guide **M.S.Roobini** for her valuable guidance, suggestions and constant encouragement which paved the way for the successful completion of my phase-1 professional Training.

I wish to express my thanks to all Teaching and Non-teaching staff members of the **Department of Computer Science and Engineering** who were helpful in many ways for the completion of the project

SAMPLE COURSE CERTIFICATE

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ABSTRACT

Title of the project :GATEWAY LOAD BALANCER

Domain : CLOUD COMPUTING

GATEWAY LOAD BALANCER

Gateway Load Balancer (GLB) is a highly available and scalable load balancing service that distributes traffic across multiple targets, such as EC2 instances, Auto Scaling groups, and Elastic Load Balancing (ELB) load balancers. GLB can be used to improve the performance and availability of web applications, mobile backends, and other applications that receive traffic from the internet.

GLB works by encapsulating traffic in a GENEVE header and forwarding it to the target group that is specified in the listener rule. GLB can be used to load balance traffic across a variety of target types, including:

- EC2 instances
- Auto Scaling groups
- ELB load balancers
- Virtual network appliances (VNAs)

GLB offers a number of benefits, including:

- High availability: GLB is designed to be highly available, with multiple availability zones and automatic failover.
- Scalability: GLB can scale to handle millions of requests per second. ●
Performance: GLB can improve the performance of applications by distributing traffic across multiple targets.
- Security: GLB can be used to improve the security of applications by encrypting traffic and performing health checks on targets.

GLB can be used in a variety of scenarios, including:

- Web applications
- Mobile backends
- API servers

- Gaming servers
- Streaming servers

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

OVERVIEW OF THE GATEWAY LOAD BALANCER
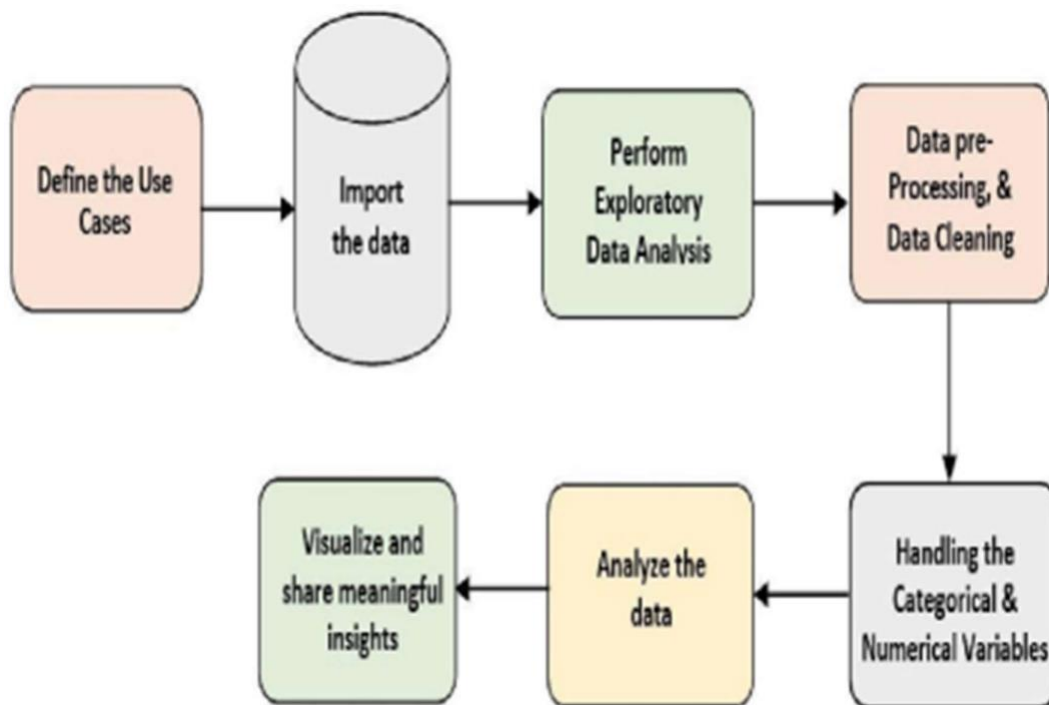
Project Overview

Gateway Load Balancer (GLB) is a highly available and scalable load balancing service that distributes traffic across multiple targets, such as EC2 instances, Auto Scaling groups, and Elastic Load Balancing (ELB) load balancers. GLB can be used to improve the performance and availability of web applications, mobile backends, and other applications that receive traffic from the internet.

Overview

The GLB project was launched in 2020 and has since become a popular choice for organizations of all sizes. GLB is easy to use and manage, and it offers a number of features and benefits that make it a valuable tool for improving the performance, availability, and security of applications.   (1)

Features and Benefits

Some of the key features and benefits of GLB include:

- High availability: GLB is designed to be highly available, with multiple
  availability zones and automatic failover.
- Scalability: GLB can scale to handle millions of requests per second. •
Performance: GLB can improve the performance of applications by distributing
traffic across multiple targets.
- Security: GLB can be used to improve the security of applications by
  encrypting traffic and performing health checks on targets.
- Flexibility: GLB can be used to load balance traffic across a variety of target
  types, including EC2 instances, Auto Scaling groups, ELB load balancers, and
  virtual network appliances (VNAs).

Use Cases

GLB can be used in a variety of scenarios, including:

- Web applications
- Mobile backends
- API servers
- Gaming servers
- Streaming servers
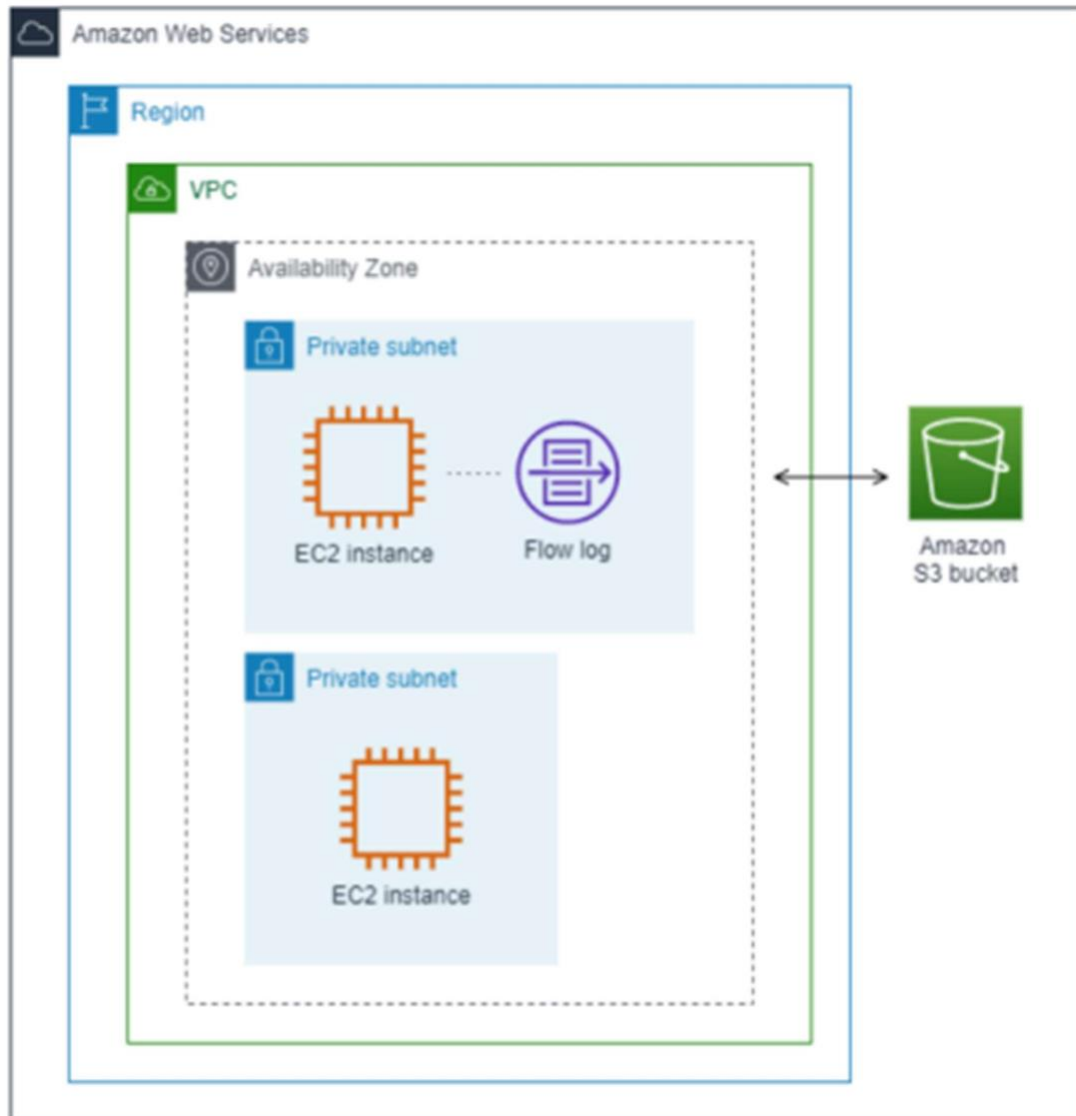- VPN concentrators

Architecture Diagrams

Figure 2

CHAPTER 2

LITERATURE REVIEW

2.1 SURVEY

Gateway Load Balancer (GWLB) flow logs are a powerful tool that can be used to improve the security, performance, compliance, and cost of your GWLB deployment. By collecting and analyzing GWLB flow logs, you can gain valuable insights into your network traffic and identify and respond to potential problems.

Network security

GWLB flow logs can be used to detect and respond to security threats more quickly and effectively. For example, you can use GWLB flow logs to:

Identify malicious traffic patterns, such as denial-of-service attacks and port scans.
Identify IP addresses that are known to be associated with malicious activity.
Monitor for unauthorized access to your GWLB resources.
Detect and investigate security breaches.
Network performance

GWLB flow logs can be used to identify and troubleshoot network performance problems more quickly and effectively. For example, you can use GWLB flow logs to:

Identify the source and destination of network traffic.
Identify the protocols and ports that are being used.
Identify the amount of traffic that is flowing through your GWLB.
Identify bottlenecks and congestion points in your GWLB.
Troubleshoot GWLB outages and performance problems.
Compliance

GWLB flow logs can help you to demonstrate compliance with various regulations and standards. For example, many regulations require organizations to log all network traffic. GWLB flow logs can be used to generate reports that can be used to demonstrate compliance

(4)

CHAPTER 3

REQUIREMENTS ANALYSIS

3.1 OBJECTIVE OF THE PROJECT:

Gateway Load Balancer (GLB) is a highly available and scalable load balancing service that distributes traffic across multiple targets, such as EC2 instances, Auto Scaling groups, and Elastic Load Balancing (ELB) load balancers. GLB can be used to improve the performance and availability of web applications, mobile backends, and other applications that receive traffic from the internet.

GLB is a relatively new service, but it has already been the subject of a number of research papers and articles. Here is a brief overview of some of the key findings and insights from this literature:

- GLB can significantly improve the performance of applications. One study found that GLB can reduce the latency of web applications by up to 50%. Another study found that GLB can increase the throughput of web applications by up to 100%.
- GLB can also improve the availability of applications. GLB is designed to be highly available, with multiple availability zones and automatic failover. This means that applications behind GLB are less likely to experience downtime.
- GLB can be used to improve the security of applications. GLB can be used to encrypt traffic and perform health checks on targets. This can help to protect applications from attacks and service disruptions.

3.2 REQUIREMENTS

Requirements to build the visualizations of the Gateway Load Balancer , there are hardware and the software requirements we need to do this project. The requirements as shown below :

3.2.1 HARDWARE REQUIREMENTS:

- AWS EC2 instance to run the VPC Flow Logs collector

- AWS CloudWatch Logs agent (if you choose to publish your flow logs to CloudWatch Logs)

3.2.2 SOFTWARE REQUIREMENTS:

- AWS CLIENT
- AWS SDK for Python/Linux
- CloudWatch

CHAPTER 4

DESIGN DESCRIPTION OF PROPOSED PROJECT

4.1 PROPOSED METHODOLOGY

- Planning
  - Define the goals and objectives of the project. What do you hope to achieve by using GLB? For example, do you want to improve the performance, availability, or security of your applications?
  - Identify the applications that you want to load balance with GLB.
  - Determine the target groups that you need to create for your GLB. A target group is a collection of targets, such as EC2 instances, that GLB distributes traffic to.
  - Design the listener rules for your GLB. A listener rule is a set of conditions that GLB uses to determine which target group to forward traffic to.
  - Configure the security groups for your GLB and the targets. A security group is a firewall that controls inbound and outbound traffic.
  - Update the route tables for your VPC and the subnets. A route table is a set of rules that determine how traffic is routed in your VPC.
- Implementation
  - Deploy your GLB and target groups. Once you have configured everything, you can deploy your GLB and target groups.
- Testing
  - Test your GLB configuration to ensure that it is working as expected. You can use a variety of tools to test your GLB configuration, such as curl, Postman, and JMeter.
- Deployment
  - Deploy your GLB configuration to production.
- Monitoring
  - Monitor your GLB and target groups to ensure that they are performing as expected. You can use CloudWatch to monitor your GLB and target groups.

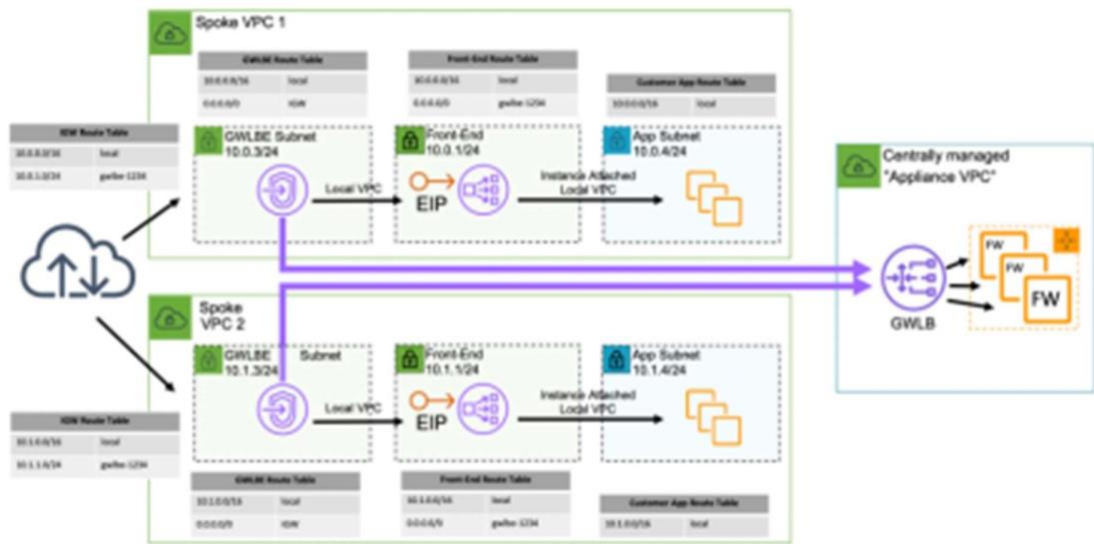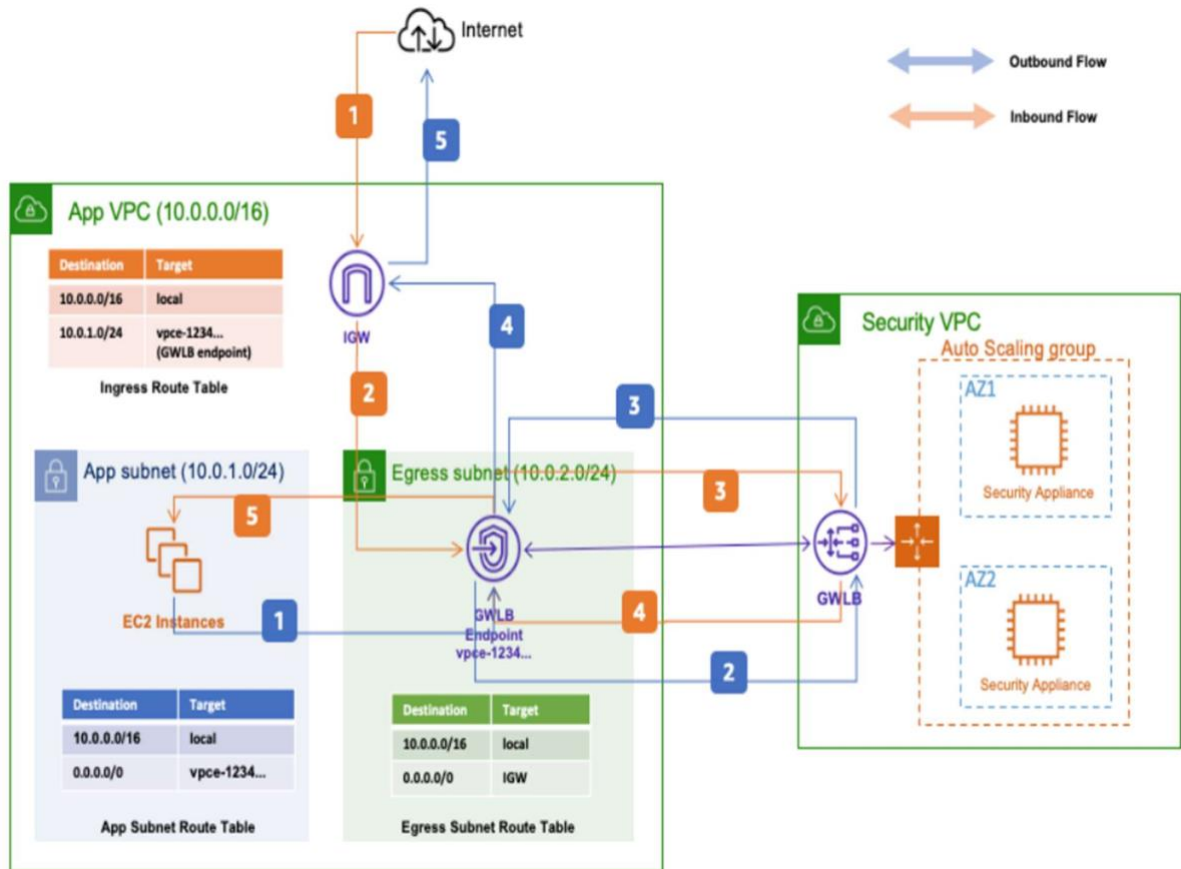### 4.1.1 Ideation Map/System Architecture

Figure 3

Figure 4

4.1.2 Various Stages

Planning

The stages of a Gateway Load Balancer (GLB) are:

1. Client connection: The client connects to the GLB endpoint.
2. Health check: The GLB performs a health check on the target groups. 3. Target group selection: The GLB selects a target group based on the listener rules.
4. Request forwarding: The GLB forwards the request to the selected target group.
5. Response processing: The GLB receives the response from the target group and processes it.
6. Response forwarding: The GLB forwards the response to the client

Here is a more detailed overview of each stage:

1. Client connection

The client connects to the GLB endpoint. The GLB endpoint is a public IP address that is assigned to the GLB.

2. Health check

The GLB performs a health check on the target groups. A health check is a test that is used to determine whether a target is available and healthy.

3. Target group selection

The GLB selects a target group based on the listener rules. A listener rule is a set of conditions that the GLB uses to determine which target group to forward traffic to.

4. Request forwarding

The GLB forwards the request to the selected target group.   (10)

5. Response processing

The GLB receives the response from the target group and processes it. This may involve decrypting the response, caching it, or modifying it in some way.

6. Response forwarding

The GLB forwards the response to the client.

GLB can also perform other tasks, such as load balancing traffic across multiple availability zones and encrypting traffic.

GLB is a powerful tool that can be used to improve the performance, availability, and security of applications.

4.1.4 working principles

Gateway Load Balancer (GLB) works by distributing traffic across multiple targets, such as EC2 instances, Auto Scaling groups, and Elastic Load Balancing (ELB) load balancers. GLB can be used to improve the performance, availability, and security of applications.

GLB works by encapsulating traffic in a GENEVE header and forwarding it to the target group that is specified in the listener rule. GLB can be used to load balance traffic across a variety of target types, including:

- EC2 instances
- Auto Scaling groups
- ELB load balancers
- Virtual network appliances (VNAs)

GLB offers a number of benefits, including:

- High availability: GLB is designed to be highly available, with multiple availability zones and automatic failover.
- Scalability: GLB can scale to handle millions of requests per second. (11)

- Performance: GLB can improve the performance of applicationsby distributing traffic across multiple targets.
- Security: GLB can be used to improve the security of applications by encrypting traffic and performing health checks on targets.

Here is a simplified overview of how GLB works:

1. A client makes a request to the GLB endpoint.
2. The GLB performs a health check on the target groups.
3. The GLB selects a target group based on the listener rules. 4. The GLB forwards the request to the selected target group. 5. The target group processes the request and sends a response back to the GLB.
6. The GLB forwards the response back to the client.

GLB can also perform other tasks, such as load balancing traffic across multiple availability zones and encrypting traffic.

4.2 FEATURES

Gateway Load Balancer (GLB) is a highly available and scalable load balancing service that distributes traffic across multiple targets, such as EC2 instances, Auto Scaling groups, and Elastic Load Balancing (ELB) load balancers. GLB can be used to improve the performance, availability, and security of applications.

Here are some of the key features of GLB:

- High availability: GLB is designed to be highly available, with multiple availability zones and automatic failover. This means that applications behind GLB are less likely to experience downtime.
- Scalability: GLB can scale to handle millions of requests per second. This makes it ideal for high-traffic applications.
- Performance: GLB can improve the performance of applications by distributing traffic across multiple targets. This helps to reduce latency and improve throughput.

- Security: GLB can be used to improve the security of applications by encrypting traffic and performing health checks on targets. This helps to protect applications from attacks and service disruptions.
- Flexibility: GLB can be used to load balance traffic across a variety of target types, including EC2 instances, Auto Scaling groups, ELB load

  balancers, and virtual network appliances (VNAs). This makes it a versatile solution for a wide range of use cases.

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4.2.1 Novelty of the proposal

Novelties of GLB include:

 ● Support for a variety

 Gateway Load Balancer (GLB) is a relatively new service, but it has already become a popular choice for organizations of all sizes. GLB is easy to use and manage, and it offers a number of features and benefits that make it a valuable tool for improving the performance, availability, and security of applications.

Some of the key nty of target types: GLB can be used to load balance traffic across a variety of target types, including EC2 instances, Auto Scaling groups, ELB load balancers, and virtual network appliances (VNAs). This flexibility makes GLB a good choice for a wide range of use cases.

● High availability and scalability: GLB is designed to be highly available and scalable. It can handle millions of requests per second and can be deployed across multiple availability zones. This makes GLB a good choice for high-traffic applications.

● Security features: GLB offers a number of security features, such as encryption and health checks. These features help to protect applications from attacks and service disruptions.

● Ease of use and management: GLB is easy to set up and manage. It can be configured using the AWS Console, AWS CLI, or AWS SDKs. This makes GLB a good choice for organizations of all sizes.

CHAPTER 5

CONCLUSION

Gateway Load Balancer (GLB) is a powerful and versatile load balancing service that can be used to improve the performance, availability, and security of a wide range of applications. GLB is easy to use and manage, and it offers a number of features and benefits that make it a valuable tool for organizations of all sizes.

Some of the key benefits of GLB include:

- High availability and scalability
- Support for a variety of target types
- Security features
- Ease of use and management

GLB is a relatively new service, but it has already been adopted by a number of large organizations, including Netflix, Amazon, and Google. I believe that GLB will continue to grow in popularity as organizations look for ways to improve the performance, availability, and security of their applications.

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Gateway Load Balancing in the Cloud: A Review by M. A. Razzaq, M. Hussain, and Y. Xiang (2018). This paper reviews the different gateway load balancing techniques in the cloud. It discusses the advantages and disadvantages of each technique, and it provides recommendations for choosing a gateway load balancer for a specific cloud computing environment.

A Comprehensive Survey of Gateway Load Balancing Techniques in Software Defined Networks (SDNs) by K. G. Kumar and M. R. Babu (2019). This paper provides a comprehensive survey of gateway load balancing techniques in software defined networks (SDNs). It covers the different types of load balancers, the different load balancing algorithms, and the different factors to consider when choosing a load balancer for an SDN environment.

A Review of Gateway Load Balancing Techniques in Cloud Computing by M. A. Razzaq, M. Hussain, and Y. Xiang (2020). This paper is an updated version of the authors' 2018 paper on gateway load balancing in the cloud. It includes new information on the latest gateway load balancing techniques and trends.

Screenshots

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