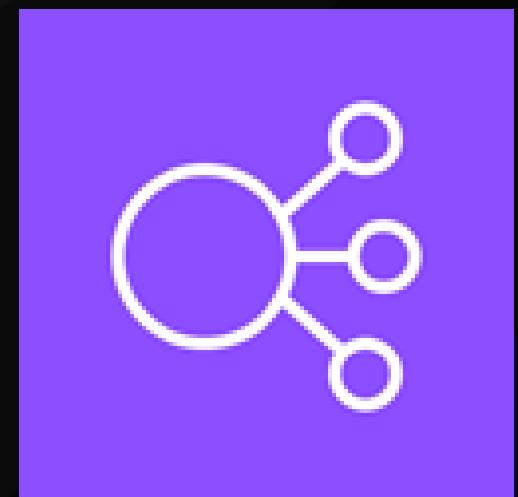




AWS ELASTIC LOAD BALANCER



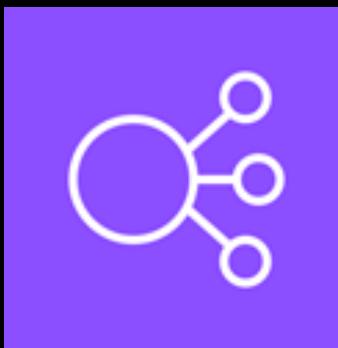
Overview

- *Introduction*
- *Types of ELB*
- *Key Features*
- *Use Cases*
- *Integrations*
- *Best Practices*



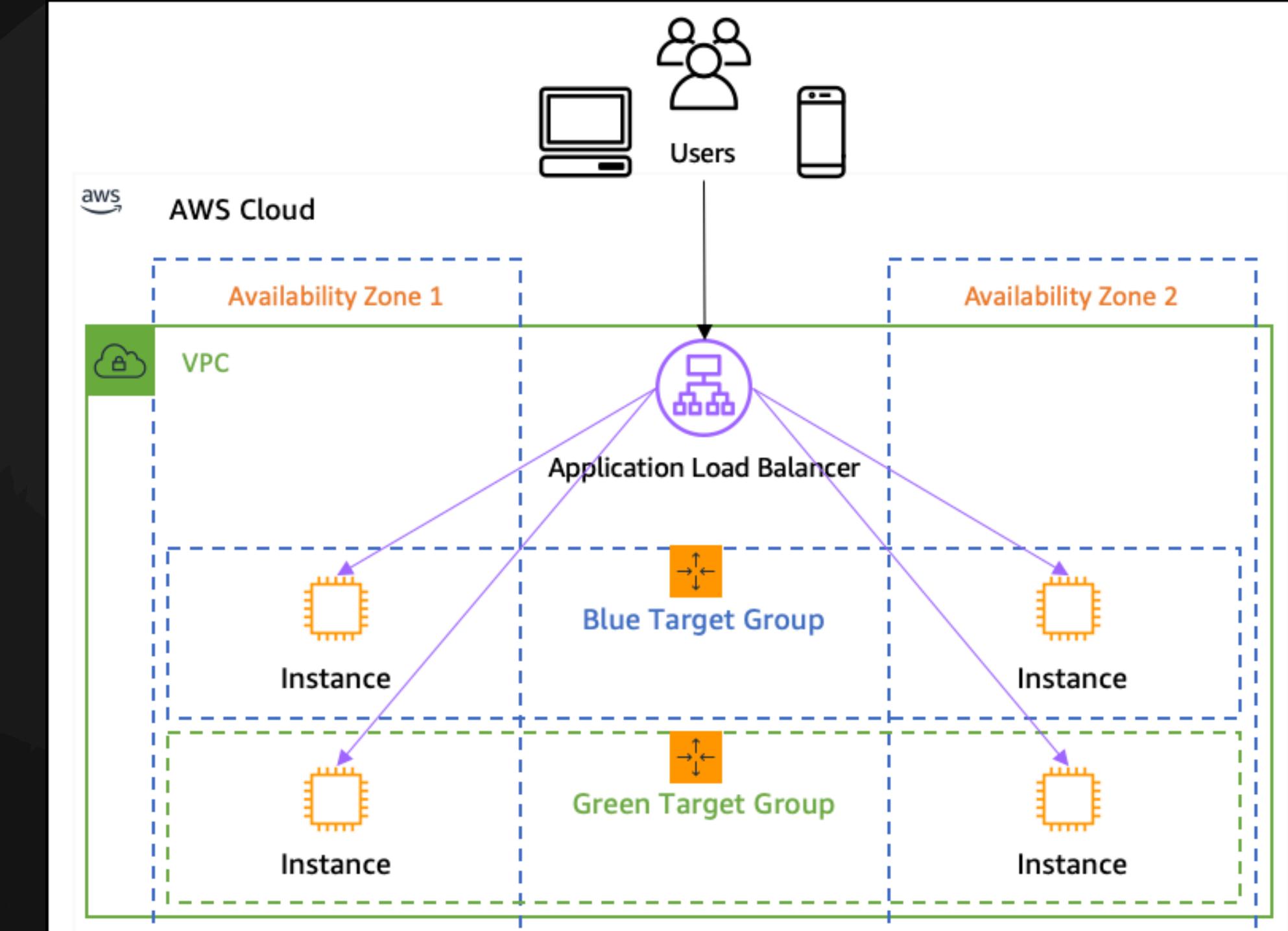
Topic 01

Introduction



Introduction

- Amazon Elastic Load Balancer (ELB) is a service that automatically distributes incoming application traffic across multiple targets, such as EC2 instances, containers, and IP addresses, in one or more Availability Zones. ELB scales your applications as traffic grows and provides a single point of access to your application, improving availability and fault tolerance.



Benefits



01)

High Availability:
Distributes traffic across
multiple targets, increasing
application resilience.



02)

Fault Tolerance:
Automatically reroutes
traffic to healthy instances
in case of failure.



Benefits



03)

Scalability:

Adjusts to varying traffic demands, scaling resources up or down as needed.



04)

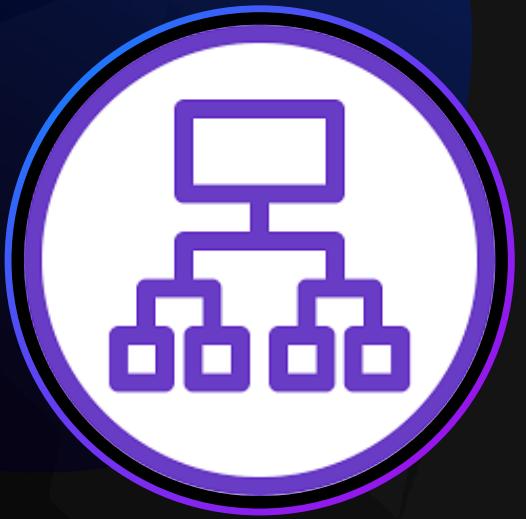
Security:

Integrates with AWS Certificate Manager (ACM) for SSL/TLS termination.



Topic 02

ELB Types



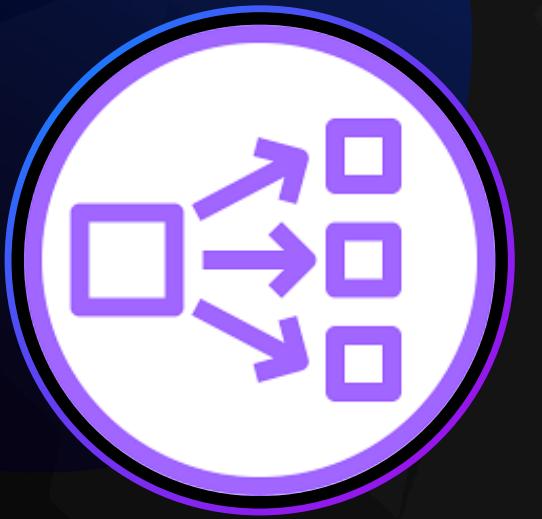
ELB Types

1) Application Load Balancer (ALB)

- Best Suited: for HTTP/HTTPS Traffic
- Layer: Operates on Application Layer (Layer 7)

Features:

1. Content-based routing: Routes requests to different targets based on the content of the request (e.g., URL path, HTTP headers).
2. WebSockets and HTTP/2 support.
3. Flexible target groups: Supports EC2 instances, ECS tasks, IP addresses, and Lambda functions.
4. Enhanced security: Supports SSL termination and integration with AWS Certificate Manager (ACM).
5. Host-based routing: Routes based on host fields in HTTP headers.
6. Path-based routing: Routes based on URL path.



ELB Types

2) Network Load Balancer (NLB)

- Best Suited: TCP, UDP, and TLS traffic
- Layer: Operates at the transport layer (Layer 4).

Features:

1. Static IP: Provides a static IP address for the load balancer.
2. High throughput: Handles millions of requests per second.
3. TLS termination: Offloads TLS termination to the load balancer.
4. Preserve client IP: Maintains the client's source IP address for backend applications.



ELB Types

3) Gateway Load Balancer (GWLB)

- Best Suited: Deploying, scaling, and running third-party virtual appliances.
- Layer: Operates on Layer 7

Features:

1. Combines gateway and load balancer: Provides a single entry point to your network.
2. Integrated with EC2 and VPC: Supports deployment in VPC for network security functions like firewalls, intrusion detection, and prevention systems.



Topic 03

Key Features

Key Features

01

High Availability and Fault Tolerance

ELB automatically distributes incoming traffic across multiple targets and Availability Zones.

02

Scalability

Automatically scales to handle varying levels of application traffic.

03

Health Checks

Continuously monitors the health of registered targets and routes traffic only to healthy targets.

Key Features

04

Security

Supports HTTPS, SSL termination, and integration with AWS WAF for application security.

05

Integration with AWS Services

Seamlessly integrates with EC2, ECS, EKS, Lambda, Route 53, and CloudWatch.

06

Cross-Zone Load Balancing

Distributes incoming traffic evenly across all targets in different Availability Zones.

Sticky Sessions

- Known as session persistence, is a feature in AWS Elastic Load Balancer (ELB) that binds a user's session to a specific target (instance) behind the load balancer. This means that all requests from a single user during a session will be sent to the same target, ensuring that session-specific data is consistently handled by the same instance.

Benefits

Benefit 01

Consistency:

Ensures that session data (like user login state) is maintained consistently by directing requests to the same instance.

Benefit 02

Stateful Applications:

Beneficial for stateful applications that do not handle session data well across different instances.

How does it work?

- 1) ELB generates a cookie and assigns it to the client's session.
- 2) The cookie is then used by the load balancer to route subsequent requests to the same instance.
- 3) Cookie duration can be controlled either by the application or the load balancer.

Cross Zone load Balancing

- Cross-Zone Load Balancing is a feature of AWS ELB that distributes incoming traffic evenly across all the registered instances in all enabled Availability Zones (AZs).

Benefits

Benefit 01

Uniform Load Distribution:

Helps in distributing traffic more evenly across all instances in different AZs, preventing overloading a single AZ.

Benefit 02

Improved Fault Tolerance:

Enhances availability and fault tolerance by balancing the load across AZs, making the application more resilient to failure in a single AZ.

How does it work?

- 1) When enabled, ELB routes the incoming requests to instances in all enabled AZs, not just within the same AZ.
- 2) Ensures that each instance, regardless of the AZ, receives a balanced portion of the traffic.

SSL Certificates

- SSL Certificates are used in AWS ELB to encrypt traffic between the clients and the load balancer, ensuring secure data transmission.

Benefits

Benefit 01

Security:

Encrypts data in transit, protecting it from interception and tampering.

Benefit 02

Trust:

Provides a way to authenticate the server to the clients, establishing a trust relationship.

How does it work?

- 1) HTTPS Listener: ELB uses an HTTPS listener to handle encrypted traffic.
- 2) SSL/TLS Certificates: You can use AWS Certificate Manager (ACM) to provision and manage SSL/TLS certificates. Alternatively, you can upload your own certificates.
- 3) **Termination:** SSL termination can occur at the load balancer (offloading the decryption process from backend instances) or end-to-end encryption can be used, where decryption happens at the instance level or the load balancer.

Topic 04

Use Cases

Use Cases

Web Applications

Distribute incoming HTTP/HTTPS traffic across multiple EC2 instances.

Microservices Architecture

Route traffic to various microservices based on URL paths.

High-Performance Applications

Handle large volumes of TCP/UDP traffic with low latency.

Network Virtual Appliances:

Manage and scale virtual appliances for network security, intrusion detection, etc.



Topic 05

Integrations

Integrations

Auto Scaling

Automatically adjusts the number of EC2 instances based on traffic load.

AWS WAF

Protects web applications from common web exploits.

Route 53

Provides DNS-based load balancing.

Cloud Formation

Automates ELB deployment and configuration through templates.



Topic 06

Best Practices

Best Practices



01

Enable Cross-Zone Load Balancing:
Improves distribution of traffic and availability.



02

Configure Health Checks:
Regularly monitor the health of targets to ensure reliability.



03

Use Multiple Availability Zones:
Distribute instances across multiple AZs for higher availability.



04

Implement SSL/TLS Termination:
Offload encryption/decryption processes to ELB.



05

Regularly Review Security Settings:
Ensure appropriate security groups and IAM policies are in place.

THANK YOU



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The Tech Stuff