Elastic Load Balancing

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Elastic Load Balancing automatically distributes your incoming traffic across multiple targets, such as EC2 instances, containers, and IP addresses, in one or more Availability Zones. It monitors the health of its registered targets, and routes traffic only to the healthy targets. Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Load Balancer Benefits

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A load balancer distributes workloads across multiple compute resources, such as virtual servers. Using a load balancer increases the availability and fault tolerance of your applications.

You can add and remove compute resources from your load balancer as your needs change, without disrupting the overall flow of requests to your applications.

You can configure health checks, which monitor the health of the compute resources, so that the load balancer sends requests only to the healthy ones. You can also offload the work of encryption and decryption to your load balancer so that your compute resources can focus on their main work.

Types of Load Balancers

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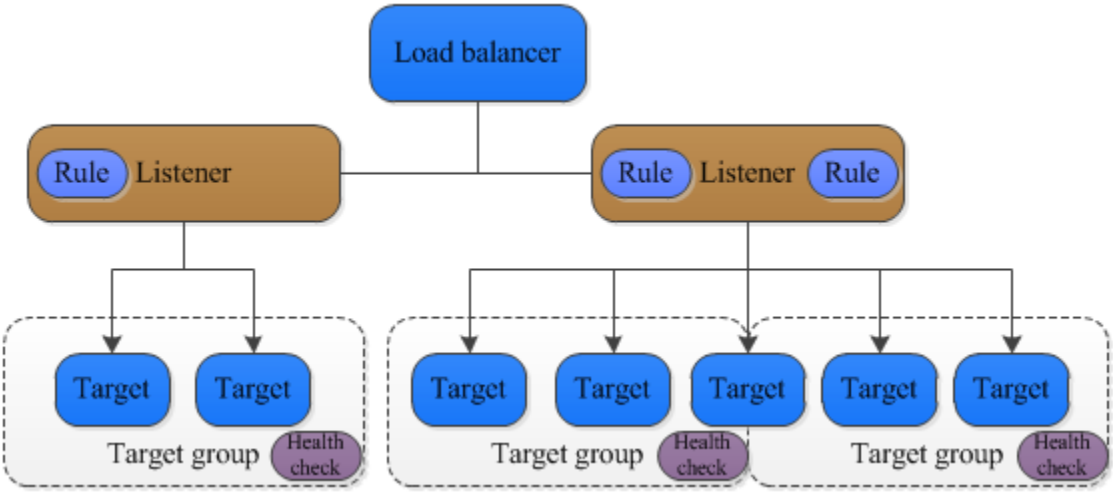
1. Application Load Balancers

After receiving the request Application Load Balancer analyzes the rules provide by the listener in priority order and determines the rule which has to apply. After that, it selects a target from the target group for the rule action.

An Application Load Balancer functions at the Open Systems Interconnection (OSI) model which is the seventh layer of the OSI model.

The User can analyze the rules of the listener and can modify it by sending it to different target groups based on the content of the application traffic even when the target is associated with multiple target groups.

Addition and removal of tags can do from the load balancers as per your needs. This can done without breaking the flow of your requests of the application.



Benefits of Application Load balancers-

1. Load Balancer's performance improve in Application Load Balancer.
2. Access logs containing information compress such that they may not require the additional space.
3. Provides benefit for registering targets by IP address, including targets outside the VPC for the load balancer.

2. Network Load Balancers

It is the fourth layer of the Open System Interconnection Model. After the load balancer receives a connection request, it selects a target from the group which targets for the default rule.

After enabling the availability zone Elastic Load Balancer creates the load balancer node in the availability zone. Each load balancer node automatically distributes traffic across the registered targets in its Availability Zone only.

Cross-zone Load Balancing enables to distribute traffic across the registered targets in all enabled Availability Zones.

Enabling Multiple Availability Zone can cause harm by increasing the fault tolerance of the applications and it will happen if each target group has at least one target in each enabled Availability Zone.

The problem can overcome in such a way that if one or more target groups do not have a healthy target in an Availability Zone, the IP address for the corresponding subnet from DNS is removed. If a person attempts again the request fails.

Benefits of Network Load Balancers-

1. NLB Provides the Support for static IP addresses for the load balancer.
2. Provides support for registering targets by IP address which includes target outside the VPC for the Load Balancer.
3. Provides support for monitoring the health of each service independently.

3.Gateway Load Balancer

Gateway load balancer is the type of elastic load balancer provided by AWS and can be used to deploy, manage and scale virtual appliances like IDS, IPS and firewalls. It is the latest type of load balancer and operates at the 3rd layer of the OSI (open system interconnection) layer model and listens for all IP packets on all ports of the load balancer, then forwards the traffic to a specific target group configured in the listener rule.

Cross Zone Load Balancing

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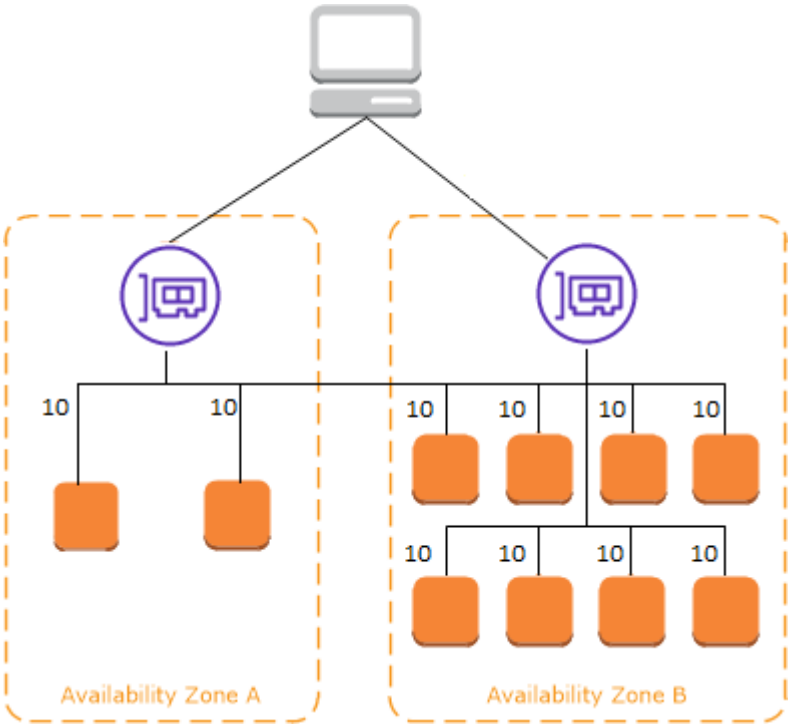
The nodes for your load balancer distribute requests from clients to registered targets. When cross-zone load balancing is enabled, each load balancer node distributes traffic across the registered targets in all enabled Availability Zones. When cross-zone load balancing is disabled, each load balancer node distributes traffic only across the registered targets in its Availability Zone.

The following diagrams demonstrate the effect of cross-zone load balancing with round robin as the default routing algorithm. There are two enabled Availability Zones, with two targets in Availability Zone A and eight targets in Availability Zone B. Clients send requests, and Amazon Route 53 responds to each request with the IP address of one of the load balancer nodes. Based on the round robin routing algorithm, traffic is distributed such that each load balancer node receives 50% of the traffic from the clients. Each load balancer node distributes its share of the traffic across the registered targets in its scope.

If cross-zone load balancing is enabled, each of the 10 targets receives 10% of the traffic. This is because each load balancer node can route its 50% of the client traffic to all 10 targets.



If cross-zone load balancing is disabled:

- Each of the two targets in Availability Zone A receives 25% of the traffic.
- Each of the eight targets in Availability Zone B receives 6.25% of the traffic.

This is because each load balancer node can route its 50% of the client traffic only to targets in its Availability Zone.

With Application Load Balancers, cross-zone load balancing is always enabled at the load balancer level. At the target group level, cross-zone load balancing can be disabled.

Application Load Balancer Components

A load balancer serves as the single point of contact for clients. The load balancer distributes incoming application traffic across multiple targets, such as EC2 instances, in multiple Availability Zones. This increases the availability of your application. You add one or more listeners to your load balancer.

A listener checks for connection requests from clients, using the protocol and port that you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets. Each rule consists of a priority, one or more actions, and one or more conditions. When the conditions for a rule are met, then its actions are performed. You must define a default rule for each listener, and you can optionally define additional rules.

Each target group routes requests to one or more registered targets, such as EC2 instances, using the protocol and port number that you specify. You can register a target with multiple target groups. You can configure health checks on a per target group basis. Health checks are performed on all targets registered to a target group that is specified in a listener rule for your load balancer.

The following diagram illustrates the basic components. Notice that each listener contains a default rule, and one listener contains another rule that routes requests to a different target group. One target is registered with two target groups.