COMMERCIAL WEB APPLICATION LOAD BALANCING BASED ON HYBRID CLOUD

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ABSTRACT:- *The rapid growth in population of the industrial as well as residential sector has lead to the increase in the databases or the data belonging to particular individuals. Any sort of data needs to be kept secured and such security is gained from the cloud. As the data is secured onto the cloud, everyone prefers to upload their data on cloud. Considering a website, due to enormous accesses into the website, traffic gets created, leading to system failure or hanging of the system. Previously this traffic was managed by balancing onto different servers and due to huge traffic many servers were needed to be taken under action but the proposed system leads to the balancing traffic directly onto the public cloud it contributes significantly to lessen the hardware components of the existing system that is directly balancing load/ traffic onto the public cloud.*

KEYWORDS:

Cloud computing, public cloud, instances, load balancing, AWS, EC2, traffic,horizontal scaling, classic application load balancing, website, database, round robin algorithm.

1. INTRODUCTION:

As our project is based on balancing of load from a website deployed on a cloud to AWS. Load balancing is both static and dynamic in nature. Load balancing concentrates on minimizing resources and storage consumption, enabling scalability, etc. So we have deployed a website over a cloud which gains numerous access of users and hence traffic is created due to which the website and users both face many problems. It is necessary to overcome this traffic to make the website efficient and flexible to run and also smooth for the users to use it. And hence the load is automatically balanced on the public cloud. This is elastic load balancing which is provided by AWS to balance the load of the website. Elastic load balancing divides application/ network traffic across targets such as Amazon EC2 instances, IP addresses, availability zones. Elastic load balancing supports three types of load balancers: Application load balancers, Network load balancers and Classic load balancers. We can select a load balancer based on our needs. We need to subscribe for AWS i.e Amazon web services because it is a secure cloud service platform offering power, database storage, content delivery, etc. AWS also helps us or allows us to host dynamic websites and securely store all our files on cloud so we can access them at anytime from anywhere.

Various parameters are to be considered in the upcoming proposed work:

AWS -- AWS introduces a pay-as-you-go Cloud computing model that scales to provide users with compute, storage as needed.

Amazon EC2 — These are virtual servers that run your applications on cloud. You can configure your load balancer to manage or balance the traffic to your EC2 instances.

Instances -- Instances are those who provide a small amount of consistent processing unit resources and allows us to increase CPU capacity in short bursts when additional cycles are available.

Load balancing -- Load balancing is a term that describes the division of network traffic among a group of servers. Load balancing also serves as a solution to the performance of hardware and software. Load balancing is a distribution, which gives us maximum output in minimum response time. In load balancing, the load of work is separated among many different servers or hard drives.

Scaling -- Scalability is defined as the capacity of a system to expand from previous configuration for handling high amount of work load. These are two types of scaling techniques namely vertical and horizontal scaling.

Vertical scaling -- For increasing the capacity, if we increase resources in same server then it is vertical scaling. It is also called as "scale up" approach.

Horizontal scaling -- Horizontal scaling actually means increasing or boosting the performance of a server by adding more instances of it to a group of server to spread the workload among them. This is also called as "scale out" approach.

Here, in this topic horizontal scaling is much efficient because as your business grows, say that for example, when your website gets popular and at the same time it's on your website also grows so the responsibility of your server also grows. So to reduce this responsibility we can add other server with the same amount of capacity along with the previous one. Now this both servers can handle the traffic finely. So here we have not changed the capacity of any of the servers rather we have reduced the work load of a single server.

Round Robin algorithm -- In Round Robin algorithm a group of servers are coded to manage the load in a cyclic manner. The algorithm assumes that every system can process the same amount of accesses and is not able to account for active connections.

Load Balancing on Servers (Randomized Algorithm) -It has both a)Round robin b)Assign new request to a server that has minimum load
Availability zone -- Availability zone plays an important part in this load balancing process. When we are enabling an availability zone for one load balancer, the ELB creates a load balancer node in that particular zone. If we register the target in that zone but do not enable it, then these registered targets cannot receive traffic.

DOES CLOUD NEED LOAD BALANCING
A website or a web-application can be accessed by many users at any point of time. It is very difficult for a web application to manage all these user requests at one time. Sometimes it may result in system breakdowns. Here, the load balancer plays an important role. Load balancing is managing/dividing the traffic created on a website or distributing of the work that a single system has to perform between two or more systems so that the work is done or performed faster and provides efficient resource utilization. The work is distributed in such a manner that not a single system contains heavy load and every system has equal amount of tasks to perform. Load balancing is used to achieve maximum utilization of resources and high satisfaction of users. It is done to make use of available resources more efficiently.

2. EXISTING SYSTEM:

Large number of users flock to the e-commerce websites to view products, shop and compare products. This causes the server to compute a large number of information in a very less time, which in turn creates a load on the website. To balance this load AWS is being introduced so that it balances the load and makes it flexible and efficient to use. And this helps in running the website smoothly. Web traffic is the amount of data sent and received by visitor to a website. This necessarily does not include the traffic generated by website. Web traffic has been the largest portion of internet traffic. This is determined by the number of pages of visitors. The users face many issues regarding the loading of web pages of various websites. This results in overloading and creates a lot of traffic on the internet. To overcome this traffic, the concept of load balancing is introduced to balance the load of users on the website. This will balance the load of number of accessing users on the public cloud from private one. Many commercial websites handle the load balancing differently based on their server architecture, but our project scope is to balance it on public cloud (AWS), which is the leading cloud computing platform. AWS gives the on-demand services. AWS provides the flexibility in terms of amount of resources the customers need. Load balancing is a method to distribute work load across one or more servers is the existing methodology but here we are supposed to balance the traffic over a cloud as the previous method includes the servers. And we might need much of the servers to balance the load but by using cloud we can manage any amount of data. Because cloud is an operating system that controls large pools of compute storage and networking resources throughout a data center, all managed through a dashboard that gives control while empowering their users to provision resources through a website.

3. METHODOLOGY:
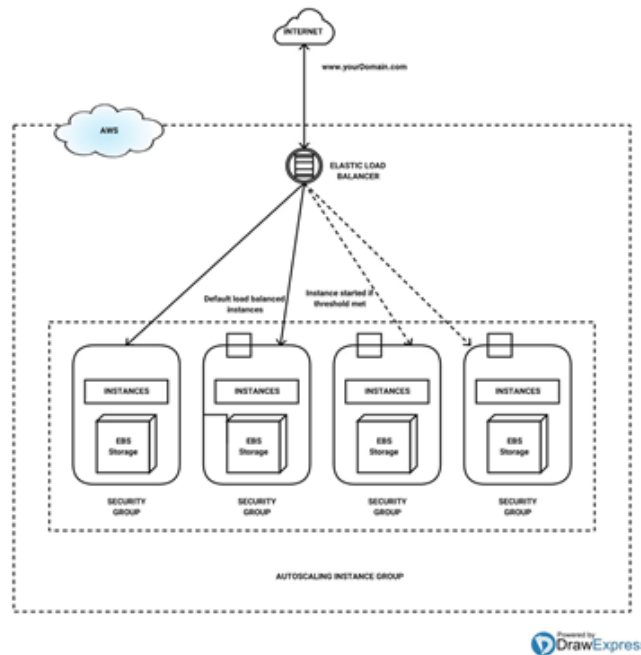
The working diagram of our project explains that we are
creating number of instances to balance the load. Each instance is scaled up-to a particular limit. And after reaching to the scaled limit the very next access enters the second instance. Similarly, it works for the third instance and so on. These services are provided to us by the AWS. And hence, in this way the load is balanced.

We have developed a e-commerce website for shopping which is deployed on the private cloud. Users will access the website and traffic will be created.

AWS that is Amazon web services help us in providing resources as we subscribe them. It follows a Pay-as-you-go policy.

In AWS, we get an elastic load balancer through which we create instances. Instances have their storage, called as EBS storage. Each instance is allocated with a separate security group. As we have four instances here we have different security groups for different instances. Auto scaling is done to the instances that is the threshold is applied.

The algorithm here is a round robin algorithm where threshold of two access is applied to a single instance so that   if the first user signs up then it enters the first instance and if the second user signs up then too it enters the first instance as the threshold applied is two. And now if the third user signs up then load gets created and it enters the second instance automatically and the load is balanced.After all this process a domain name is given to the owner so that the website/webpage can be accessed from anywhere on the search engine.

In EC2, we can run/deploy any application and we can also increase or decrease the scaling accordingly. Instances for windows are costly and tough and the same for Linux are cheap and easy.

Round Robin algorithm contains a cluster of servers/instances that are programmed to balance the load in a sequential clockwise manner. This algorithm takes into consideration that each of the system can authenticate the same number of entries.

4. ARCHITECTURE DAIGRAM
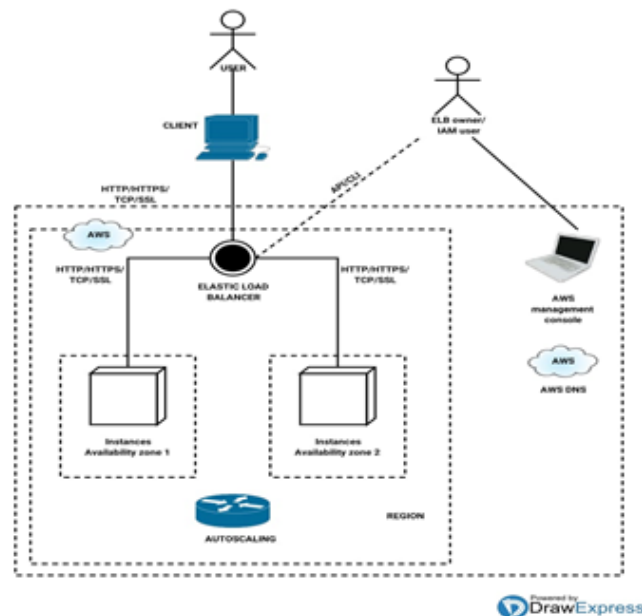
In the following diagram we have created an account on AWS and so we got the consoles. Say we have created two instances. Each instance have separate availability zones. Now we create a elastic load balancer with the help of AWS and that balancer is owned by us now. For the load balancer we need rules like HTTP/HTTPS/TCP/SSL. After this auto scaling of instances is done which mean applying threshold. The API/CLI is required to apply the threshold to the respective instances. Regions are the availability zones allocated to the instances. In this manner the load balancing is done as per the diagram.

5. CONCLUSION:

In this study, requirements such as management, balancing and transferring where determined and based on this the load balancing was performed using a hybrid cloud environment.Due to this, the traffic won't be forming to be an obstacle between the users to access the websites and it would be convinient for them to operate it simultaneously. This will result in smooth functioning of the websites to be accessed.

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