Improvement of Load Balancing using Fuzzy Technique Algorithm

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Abstract - *Load balancing is dramatically impacting the performance in the cloud computing world. This holds that there is no single server carrying excessive demand. By splitting the duty evenly, load balancing increases demand-sensitivity. Better load balancing strategies can impact cloud computing, which will function more effectively which increase user satisfaction. This paper proposes a better load balancing model to pick various approaches for different situations using a public cloud-based framework on server partitioning with transfer mechanism. It automatically transfers the load of servers to specific servers next to, or sequentially in order, which saves time and energy from the system. Our main purpose of this proposal for a technique is to improve processing time and decrease response time.*

Key Words: Cloud Computing1, Load balancing2, FuzzyTechnique3, Load balancer4, Processing time5, Response time6.

1. Introduction

The core concept of our paper relays server load management as they have heavy traffic to handle, they need to be closely monitored, and the key facets of consumers and service providers need to be careful when conducting most of the transactions. In recent years, cloud computing and mobile computing have dominated a great many industries. Especially if we consider sharing data when we get lost in transactions then we are going to be in trouble. In addition, we can also use cloud computing to access data over the Internet on the host applications.

1.1 Load Balancing

There are several characteristics of load balancing consisting of the same department off work across all nodes, encouraging personal daylight performance, improving network capacity, reducing response time and delivering services to achieve useful tortoise resource utilization. Indicate the balance of load in the Cloud. Consequently, response time to thousands of human beings may be too late, and servers very quickly transform into busy resulting in incremental reaction and unsatisfied clients. By adding load balancing to our application, it gets faster, then paintings could be distributed at various nodes, and we could get excessive output and greater reaction.
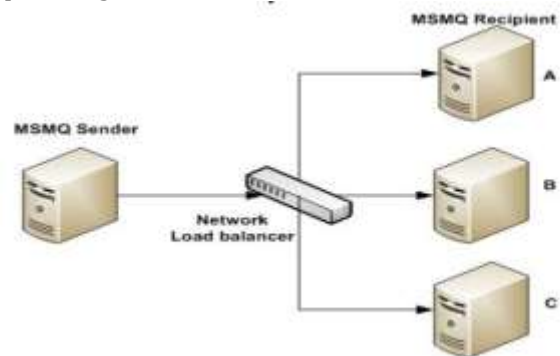

Fig-1 load balancing in network

1.1.1 Techniques Used For Load Balancing

Different load balancing algorithms provide different benefits; the choice of load balancing method depends on your needs:
1. **Random** - randomly distributes requests with the servers to prevent too many connections on one server at a time.
2. **Round Robin** - widely used & easy to implement
3. **Weighted Round Robin** - Capable of sending further requests are terms with higher capacity and load handling capability, where it is easy to manage the load with some special meaning.
4. **Least connection** - Prevents server from overloading by monitoring the number of server connections, unblocking them when requests are greater than the amount.
5. **Weighted Least connection** - considers both the capability of the server and the number of current connections to prevent overloading and crashing able to implement their entrance strategies and oversee them with the goal that they can separate between various client levels and benefits. Plus,

suppliers ought to have a few arrangements of inappropriate data access in cloud with the goal that they perceive not very much acted costumers.

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1.1.2 Uses and Characteristics

1. Same Job Department in all nodes.
2. It provides facilitation in fulfilling the delight of the user.
3. It improves efficiency on the computer.
4. Reduces processing time.
5. Offers programs to the total use of available capital.
6. Provides Scalability which computing process to be used or produced in a range of capabilities.
7. Redundancy which the includes of extra components which are not strictly necessary to functioning, in case of failure in other servers.
8. Flexibility
9. Efficiency
10. Global Server Load Balancing.

1.1.3 Issues in Load Balancing

The first problem in load balancing is choosing approach which is appropriate for a given node's workload. Based on observed criteria, a network workload can be estimated based on some measurable parameters below:
1. Total number of processes on the node.
2. Resource demands of these processes.
3. Instruction mixes of these processes.
4. Architecture and speed of the node's processor.

a) Several load-balancing algorithms use the total number of processes to achieve efficiency
b) In some cases, the true load could vary widely depending on the remaining service time of processes on a node, which can be measured in several ways such as Memory less method, Past repeats and Distribution method.
c) An acceptable method for use as the load estimation policy in these systems would be to measure the CPU utilization of the nodes. It can be measured by setting up a timer to periodically check the CPU state (idle/busy).

1.2 Fuzzy Technique

Fuzzy logic is a farm with multiple valued logics where the true variable values can be any real number between zero and one inclusive of both. This is used to discuss the notion of partial truth in which the value of truth differs from truly true or false.
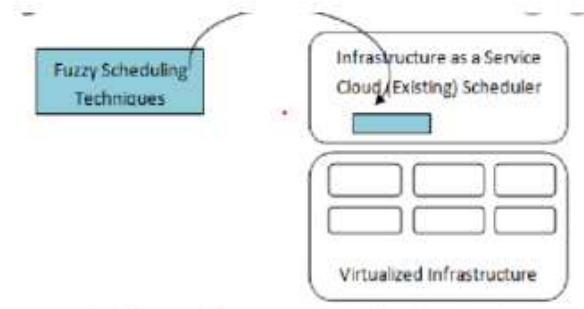

Fig-2 Fuzzy technique

2. LITERATURE SURVEY

2.1 Cloud computing: Distributed internet computing for IT and scientific research

AUTHORS: M. D. Dikaiakos, D. Katsaros, P. Mehra, G. Pallis, and A. Vakali

Cloud computing is location agnostic and provides dynamically scalable and virtualized resources as services over the Internet. Here, the authors provide broad introductory definitions to cloud computing concepts. Articles in this special issue investigate some of the most fundamental issues concerning cloud services' development and deployment.

2.2 Load distributing for locally distributed systems

AUTHORS: N. G. Shivaratri, P. Krueger, and M. Singhal

The problem of judiciously and transparently redistributing the load of the system among its nodes so that overall performance is maximized is discussed. Several key issues in load distributing for general-purpose systems, including the motivations and design trade-offs for load-distributing algorithms, are reviewed. In addition, several load-distributing algorithms are described and their performances are compared. These algorithms are sender-initiated algorithms, receiver-

initiated algorithms, symmetrically initiated algorithms, and adaptive algorithms. Load-distributing policies used in existing systems are examined, and conclusions about which algorithm might help in realizing the most benefits of load distributing are drawn.

2.3 Availability and load balancing in cloud computing

AUTHORS: Z. Chaczko, V. Mahadevan, S. Aslanzadeh, and C. Mcdermid

Availability of cloud systems is one of the main concerns of cloud computing. The term, availability of clouds, is mainly evaluated by ubiquity of information comparing with resource scaling.

In clouds, load balancing, as a method, is applied across different data centers to ensure the network availability by minimizing use of computer hardware, software failures and mitigating recourse limitations. This work discusses the load balancing in cloud computing and then demonstrates a case study of system availability based on a typical Hospital Database Management solution.

2.4 Load balancing of nodes in cloud using ant colony optimization

AUTHORS: K. Nishant, P. Sharma, V. Krishna, C. Gupta, K. P. Singh, N. Nitin, and R. Rastogi

An algorithm for load distribution of workloads among nodes of a cloud by the use of Ant Colony Optimization (ACO). This is a modified approach of ant colony optimization that has been applied from the perspective of cloud or grid network systems with the main aim of load balancing of nodes. This modified algorithm has an edge over the original approach in which each ant build their own individual result set and it is later on built into a complete solution. However, in our approach the ants continuously update a single result set rather than updating their own result set. Further, as we know that a cloud is the collection of many nodes, which can support various types of application that is used by the clients on a basis of pay per use. Therefore, the system, which is incurring a cost for the user should function smoothly and should have algorithms that can continue the proper system functioning even at peak usage hours.

3. Therotical analysis

3.1 Load Balancing Using Fuzzy Technique

Load balancing is accomplished in this paper by Fuzzy logic control. The complete load of feeders is input to the Fuzzy. The input Load Balancing Device is the output of the fuzzy stage. Load balancing method uses a technique of optimization to translate KW values into load points and define load points.
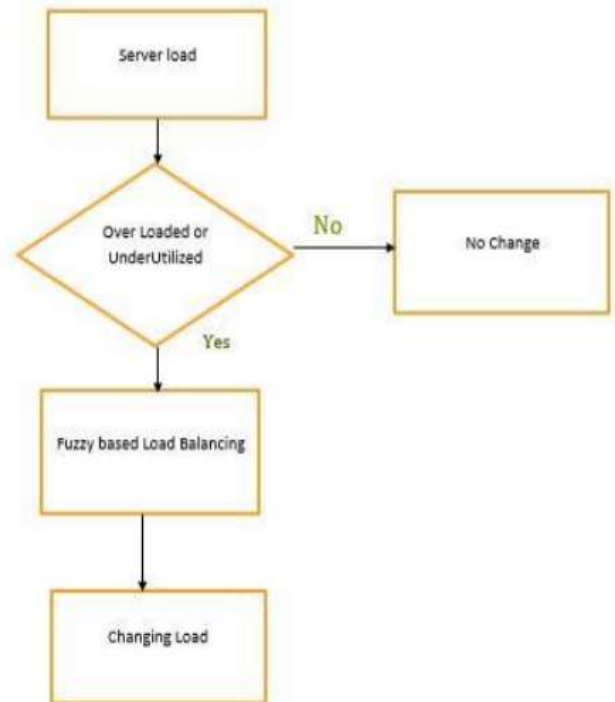
Flowchart

3.2 Load balancer

Provides effective distribution of client requests or network loads across several servers. Guarantees high availability and reliability by sending requests only to web servers.Offers the ability to add and remove servers as determined by demand.It routes to the closest server, which is most appropriate to them, which is very nearer to it. Software's also have load balancing in it which can balance through online automatically.
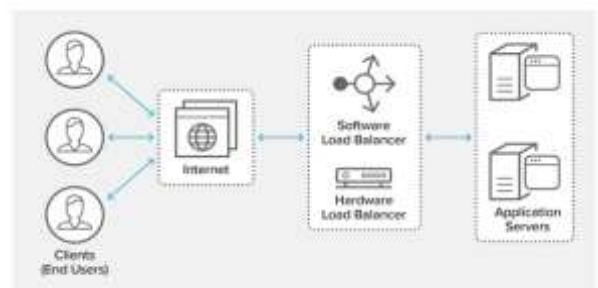

Chart -1: Present using load balancer

3.2.1 Examples of Load Balancers:

A hardware load balancer is a dedicated appliance to provide load distribution, and it's relevant features.

Some of the popular LB hardware vendors are:
1. F5
2. TP-Link
3. Barracuda

They are expensive but give you full control.

Cloud load balancer is trending more than ever
1. AWS
2. Google Cloud
3. Cloudflare
4. Incapsula
5. Digital Ocean

Free/Open Source Load Balancer
1. Seesaw
2. Load master by KEMP
3. HAP Roxy
4. ZEVENET
5. Neutrino

4. Proposed System Architecture

In this Session, we first Deliver overview of our proposed fuzzy technique and then present the detailed interaction with the process. At first, we will be dealing with the improvement of processing time and response time of server when it has been overloaded using fuzzy technique. We have come across many load balancing techniques in which we have chosen round robin because it is simple and very accurate.

We are working on its disadvantages where it allocates load to servers sequentially without checking server is free or not. In this process we will be allocating to the servers after checking its availability. we will be taking input as online shopping requests from each user. one request as one input. And in the process the server-side admin has access to modify the number of requests and the number of servers in a network.

He can see what server is overloaded and which is in rest or shutdown. So, we can differentiate many server requests at a time without being confused. The data of the servers is stored using back end database system in the servers.

Where Fuzzy good judgment pleases herbal language like language in which their trouble is easy to articulate. The advantages of the physical judgment of the most to be apprehended, versatile, tolerant of ambiguous statistics and may be the nonlinear characteristics of arbitrary complexity, and the ability to formulate the mapping from the given input to the output of Fuzzy's use of good judgment and then estimate the ability by Application provides a framework on which decisions can be made or known trends.

In our proposed technique, the fuzzifier plays a fuzzification procedure which converts two types of input records such as processor speed and assigns server loads to one input such as the balance loads needed in the inference system. Yes, but we found the speed of the processor and the load in the digital device as input parameters to make the load balancing performance of cloud computing higher using the foolish good judgment. These parameters are taken as user inputs to the fuzzifier to degree the load balance as in output.

4.1 Proposed Scheme

In this session we are going to explore how you can load balancing algorithms based on round Robin in cloud computing to achieve better response time and processing time. The load balancing of the difficult rules is finished before it hits the processing system, the job is planned based on different criteria such as process speed and load allocated to eat the system for a certain period of time and several others.

It gives many requests currently allocated to virtual machine on the network to the information that you need in VM. Upon request, it selects the least loaded device and recognizes the primary device if there is a multiple list loaded program.

➢ We're trying to introduce a brand-new load balancing approach focused on flippant good judgment. Where Fuzzy good judgment pleases herbal language like language in which their trouble is easy to articulate.

➢ The advantages of the physical judgment of the most to be apprehended, versatile, tolerant of ambiguous statistics and may be the nonlinear characteristics of arbitrary complexity, and the ability to formulate the mapping from the given input to the output of fuzzy's use of good judgment and then estimate the ability by Application provides a framework on which decisions can be made or known trends.

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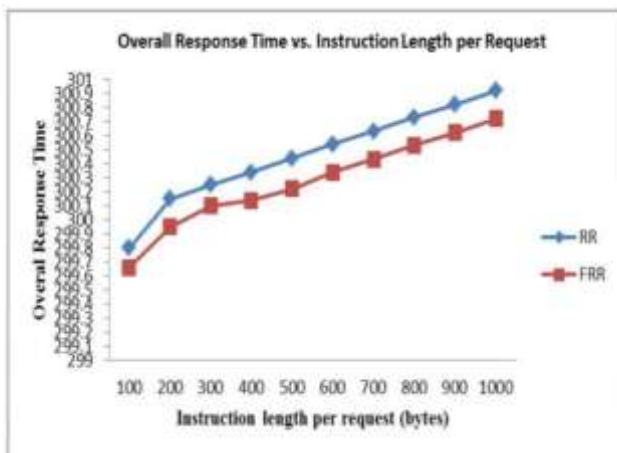

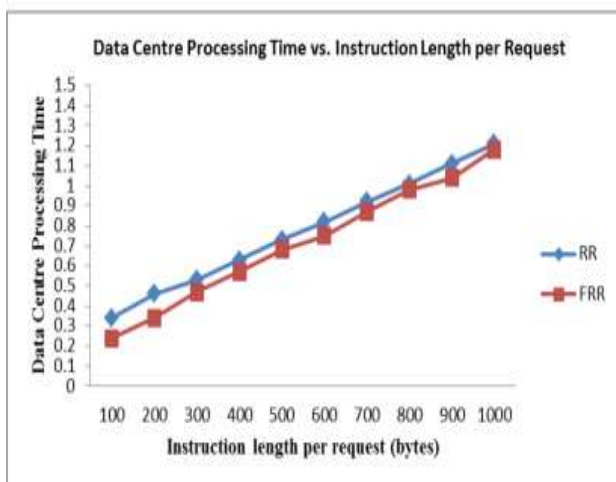Fig-2 Overall response time vs. Instruction length per request

Fig-3 Processing time vs. Instruction length per request

4.2 Proposed Algorithm

```
Begin
        Connect_to_resource ()
        L1
        If (useful resource found)
              Begin
```

```
                  Calculate connection_string ()
                  Select fuzzy_connection ()
                  Return resource to requester End
Else if
                  Begin If (Anymore resource to be
        had)
                  Choose_next_resource ()
                  Go to L1
Else
                  Exit
              End
End
```

5. Experimental Results

New customers may be registered inside the database, after they have been officially they could download records for each seek. SQL Query types can consist of, limits, order via, descending, ascending, index, greater than, less than, or equal to. Clients can pick each cloud and file down load request their permission to the best cloud and see the reaction. All files are allowed given the choice of downloading.

Fig-4 Authentication for user page

Each user each user credentials can login into the homepage and then select the category where they want to buy by the products concerts for the quantity that is required by them and then pay now option Wait they will be taken to another web page for payment purpose.

Fig-5 Home page for user

Each user each user credentials can login into the homepage and then select the category where they want to buy by the products concerts for the quantity that is required by them and then pay now option wait they will be taken to another web page for payment purpose.

These requests are taken as input by the server and then assign load to a particular server depending on the request and the time. give the maximum capacity of the server is totally occupied then will be overloaded the requested diverted to nearest server where server is ideal.

Fig-6 Requesting for products

The login page of admin consists of username and password where they can enter the credentials and login. if the authentication is failed will show error saying username Error type correctly. now admin can monitor the servers present in network. you can also change password for his login. he can give service idle and what are the services for loaded.

He can reset the connections where every server will be reset and every server will be in its ideal state. Admin can also add server locations depending on the availability and need of the resources in a particular location. so that he can easily manage the server without being overloaded.

Fig-7 Login page for admin

The click here button is the easy way to access the online shopping website so that the request will be countable from this step. and its request will be taken as input for this server and the load will be divided among the service in the network.

Normally every server will have fixed amount of load to running normal stage if that fixed value is overloaded then the request from the server will be relocated to another server,value is called threshold value. Every server will have the fixed threshold value to maintain.

Fig-8 Monitoring of servers by admin

The admin can manipulate the number of servers and he can also change the threshold value depending on the requests from a particular location so that he can use few instead of using high number of servers. he can also register a new server and location he want and also threshold value depending on the location. if all the server were overloaded he can reset all the servers at a time.

Fig-9 Number of servers allocated by admin

The cloud admin can do changes on the server side by adding new servers to the network whenever needed due to overload of another server. so, the admin Can add server name and location, threshold value which is already set as default 3 requests.

So, this server will be added to the network after the position of last server in the network. admin can also delete the server at a particular location it is not needed. If the server got overloaded admin gets a message saying the load is re balancing in a particular server host. that is the automatic message by fuzzy technique. where it automatically diverts the request to other servers.
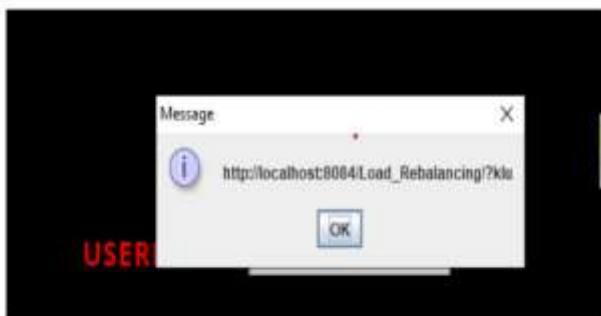

Fig-10 Automatic server balance message

6. CONCLUSIONS

We were served a two-cloud structure with a series of protocols for interaction outsourcing database services, which ensures the maintenance of the privateness of the contents of the data, the statistical nature and patterns of demand. At the same time, with the guide of the demand it no longer simplest protects the confidentiality of the records is static, however additionally speak the ability privacy leak on statistical homes or after a huge variety of question methods. Safety evaluation shows that our scheme can meet the necessities of privacy maintenance.

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