

A Review Study On Cloud Computing and Load Balancing Algorithms

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Abstract— Cloud Computing is type of computing which means store and access of data and programs over the internet instead of computer hardware. Cloud computing provides the computational resources (server, os, storage and network) to user as service that is based on the demand of user. In this paper we represent the survey of cloud computing and Cloud deployment strategies, cloud service models, benefits and basic issue of cloud computing. This paper discusses the related algorithms regarding load balancing.

Index Terms— Cloud Computing, SaaS,Paas,Iaas,Load Balancing.

INTRODUCTION

Cloud computing is becoming more popular in information technology. Cloud computing is latest technology Where the resources are shared and information and software are provided to computers/laptops over the internet. Cloud computing provides many services on demand such as storage, servers and applications that will deliver to any organization computers through internet.

Cloud storage enables users to remotely store their data and enjoy the on-demand cloud applications without the burden of local software and hardware management. Cloud computing offers on demand virtualization resources and billable utilities.



Fig 1. Cloud computing Environment

In cloud computing, resources can be dynamically allocated. In computing, Virtualization is the creation of a virtual version such as a hardware platform, a storage device, operating system or network resources. Virtualization technologies provides the opportunities for reducing hardware cost and energy through server consolidation. Virtualization can optimize the resource sharing among applications hosted in different virtual machines to meet their resource requirements. As a result, more computing can be conducted in shared resource pools that act as private and public clouds.

The proposed paper provide a systematic survey of existing cloud computing research by categorizing the existing Strategies according to the certain features and analyzing the advantages of these features. The motive of the paper is to provide researchers with in-depth study of subject. The proposed paper is organized in 7 sections. Section 2 deals with the cloud development Strategies. The section 3 demonstrates the comparative study of Cloud computing models. The Section 4 describes the benefits of cloud computing and Section 5 demonstrates issues of cloud computing and Section 6 deals with load balancing algorithms. At last, we summarize the paper.

II. CLOUD DEPLOYMENT STRATEGIES

Clouds can be classified into following types that is depend on their accessibility restrictions and its deployment model. They are.

- Public Cloud
- Private Cloud
- Hybrid Cloud
- Community cloud

Public Cloud: A public cloud is based on the standard cloud computing model, in which a service makes resources like applications and storage, available to the general public over the internet. Public cloud service providers like Microsoft and Amazon AWS, Google own and operate the infrastructure and offer access via Internet. A public cloud provides services to anyone on the Internet. In a typical public Cloud scenario, a third-party vendor many services such as computation, virtualization, storage, networks and applications to various customers.

Private Cloud: A private cloud is a data center or a network that supplies hosted services to a limited peoples. A private Cloud is restricted to members, employees, and trusted parties of the organization.

Hybrid Cloud: A hybrid Cloud enables the use of private and public Cloud in a seamless manner. The cloud infrastructure is a combination of two or more clouds (private or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.

Community Model: A community cloud is controlled and accessed by a group of Organizations/companies that have shared interests, such as a common mission or specific security requirements. The members of the community share access to the data and applications in the cloud.

III. CLOUD SERVICE MODELS

Cloud computing offers many facilities to these three models like Infrastructure as service(IaaS),Platform as a Service(PaaS) and Software as a service. based upon the services offered, cloud are classified in the following ways:

A. Cloud Infrastructure as a service (IaaS) : This provides many features from one server, to private network, disk drives and various long term storage devices such as email servers, domain name servers and messaging system. Infrastructure-as-a-Service such as Amazon Web Services provides the user with virtual server instances and storage, as well as application program interfaces (APIs) that allow the customer to start, access and configure their virtual servers and storage and stop. This model allows a organization to pay for only as much capacity as is needed.

B. Cloud Platform As a Service(PaaS) : PaaS is intended to enable developers to build their own applications on top of the platform. . It refers the environment that provides the software deployment framework and runtime environment, and component on pay to enable the direct deployment of web applications or application level assets. PaaS is a platform where software can be Implemented, debugged and deployed. It means the entire life cycle of software can be ruined on a PaaS. This service model is applicable to application developers, testers and administrators. Example of PaaS include: Google App Engine (GAE).

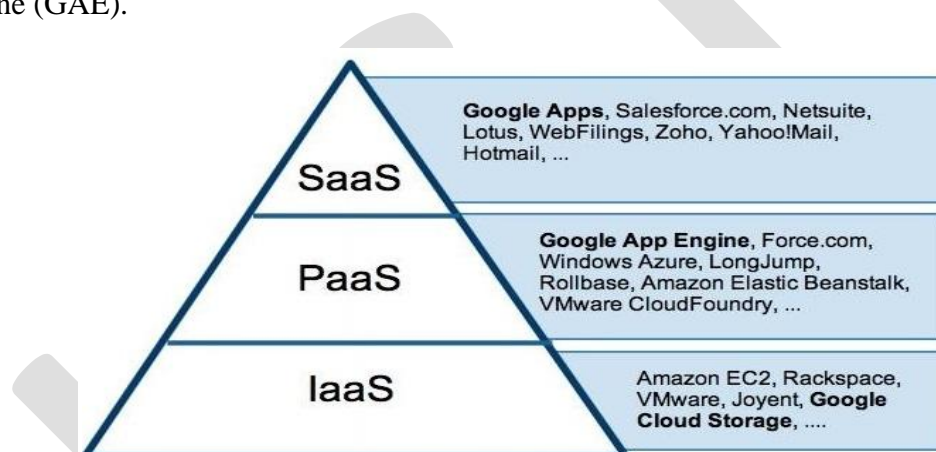


Fig 2: Cloud Service Models

C. Cloud Software as a Service(SaaS) : In the SaaS model, cloud providers install and access application software in the cloud and cloud users can use the software from cloud clients. The cloud users do not require to manage the cloud infrastructure and platform at which the application is running. It eliminates the need of installation and run the application on the cloud user's own computers simplifying maintenance and support. The end user applications are provided on demand over a network and that is offered applications in pay per use manner. The software requires no client installation, just need a browser and network connectivity. The examples of SaaS include: Microsoft office365, google apps .

D . Cloud Network as a Service(NaaS) : NaaS can include flexible and enhanced Virtual Private Network (VPN) and provide bandwidth on demand and multicast protocols, custom routing, instructions detection and prevention , security firewall, Wide Area Network (WAN), content monitoring and filtering, and antivirus. There is no standard specification as to what is included in Naas. Naas Implementations vary.

IV. BENEFITS OF CLOUD COMPUTING:

There are many benefits of cloud computing:

A. Expand scalability: It provides on demand scalability. User can meet his altering requirements with this capacity of cloud computing. It can scale up resources and manage them.

B. Less infrastructure costs: Cloud computing provides facilities of pay as use basis, so no need to invest in the infrastructure cost. Organizations/companies owned memory and resources according to their needs.

C. Better utilization: Number of clients can share computing power, with this utilization is increased in cloud computing .

D. Improve reliability: Data is stored in the cloud, Backup and restoration of data is more easier than on a physical device such as Hard disk.

E. Easy reach to resources: Cloud provides many advanced tools that smaller companies were not able to approach earlier. These tools are accessed with an internet connection.

F. Easy accessible: After registration in the cloud, one can access the information from anywhere and anytime with an internet connection.

V .ISSUES IN CLOUD COMPUTING

In This Section, we explain the issues of the cloud computing. The following are the issues that a cloud computing environment has to still resolve:

A .Security: Security is huge issue for cloud . cloud computing have to face many security issues such as sensitive data access , privacy , authentication and recovery and malicious insiders etc. and in public cloud clutch the higher risk of data exposure and it must be managed with proper caution .Many Well-known issues like data loss, botnet (running remotely on a collection of machines) cause serious threats to organization's data and software. Some of the cloud computing attacks like Denial of service attack(DOS), Man in Middle etc.

B. Performance : Cloud computing Suffers from several performance issues. The cloud provider must ensure that the performance of the service being provided remains the same all through. There may be peak time break downs, technical snags arising. Data replicators, load balancer, high end servers must be installed when needed.

C. Cost: Cloud computing can produce high costs due to the cloud computing requirements for both an “always on” connection, and using large amounts of data back in-house.

D. Bandwidth, quality of service and data limits : Cloud computing requires “broadband of considerable speed” where many websites are used on non-broadband connections or slow broadband connections; cloud-based applications are often not usable in slow speed connection. Connection speed must be in Kilobyte per second (or MB/s and GB/s) is important for use of cloud computing services. Also important are Quality of Service (QoS); indicators for which include the amount of time the connections are dropped and the extent of the delays in the processing of network data (latency), response time (ping), and loss of data (packet loss).

VI. LOAD BALANCING IN CLOUD COMPUTING

Load balancing is a method for distributes the workloads across multiple computational resources, such as computers central processing units, network links. Load balancing used to optimize resource use, minimize response time, maximize throughput, and avoid overloading of any of the resources.

The Load balancing algorithms, in general, can be categorized into two main categories: static load balancing algorithm and dynamic load balancing algorithm. A static load balancing algorithm during the load distributing, it does not take into account the behavior of a node or previous state. On the other side, a dynamic load balancing algorithm during the load distributing, it checks the previous state of a node.. The dynamic load balancing algorithm is applied either as a distributed or non-distributed. The advantage of dynamic load balancing is that if any of the node fails, it will only affect the system performance ,it will not halt the system.

In this paper, we will analyze the various static and dynamic load balancing algorithms.

A. Static Load Balancing

Round Robin Algorithm: Round robin algorithm is a static load balancing algorithm in which it uses the round robin scheduling algorithm for allocating the jobs. Round Robin takes the first node randomly and then it allocates jobs to all other nodes in a round robin sequence. This algorithm will not be applicable for cloud computing because some nodes may be heavily loaded and some nodes are not . When the running time of any process is not known prior to execution then there is a possibility that nodes may get heavily loaded

The weighted round-robin algorithm are proposed to solve the problem. In this algorithm, each node is assigned with a specific weight. Depending on the weight assigned to the node, it will receive multiple requests. If the weights assigned to all the nodes are equal, then each node will receive same traffic. In this, the precise prediction of computation time is not possible therefore, this algorithm is not preferred.

Min-Min Algorithm : Min-Min algorithm starts with a group of all unassigned jobs. Firstly, minimum completion time for all jobs is calculated. Select the job that have minimum completion time. Then, the node which has the minimum completion time for all jobs is selected. Finally, the selected job and the selected node are mapped. The ready time of the node is upgraded. This process is iterated until all the unassigned jobs are assigned. The advantage of min-min algorithm is that the job which have small execution time is executed. The drawback of min-min algorithm is that some jobs may experience starvation.

Max-Min Algorithm : In this Algorithm, Firstly find out minimum completion time of jobs then select the maximum value. The machine which has the minimum completion time for all the jobs is selected. Finally the selected job and the selected node are mapped. Then the ready time of the node is upgraded by adding the execution time of the assigned task.

B. Dynamic Load Balancing Algorithm

Equally Spread Current Execution :It is a dynamic load balancing algorithm in which it handles the process according to priority. It determines the priority of process by checking the size. This algorithm distributes the load randomly by checking the size of the process

and then transfer the load to a Virtual Machine, which is lightly loaded. The load balancer distributes the load on different nodes, and so, it is known as spread spectrum technique.

Active Clustering : Active Clustering is based on clustering algorithm in which it introduces the concept of clustering in cloud computing. The performance of an algorithm can be improved by making a cluster of nodes. Each cluster can be assumed as a group. The principle behind active clustering is to group the similar nodes together and then perform work on these groups.

Throttled Load Balancer : It is a dynamic load balancing algorithm. In this algorithm, the client firstly send request the load balancer to find a Virtual machine to perform the appropriate operation. In Cloud computing, there may be multiple instances of virtual machine. The virtual machines can be grouped based on the type of requests that they can handle. When a client sends a request, the load balancer will first check for that group that can handle this request and assign the process to the lightly loaded instance of that group.

VII. CONCLUSION

This paper provides literature review on cloud computing models and load balancing algorithm. cloud computing provides on demand service and There are a variety of load balancing algorithms and issues in cloud computing. We surveyed basic types of cloud Computing in this paper. We studied the various service models (IaaS, SaaS, PaaS) and Load Balancing algorithms (Min min, Max-min, Round Robin, Active Clustering) that helps to distribute the load over the network.

VIII. REFERENCES

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