iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** III **Month of publication:** March 2017

DOI: http://doi.org/10.22214/ijraset.2017.3041

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Volume 5 Issue III, March 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

An Expert System for Dynamic Resource Allocation in Hybrid Cloud Computing with the Specification of Proactive Workload Management

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Abstract: ***Cloud computing is a large-scale distributed computing. It offers a pool of computing resources to users via the Internet. Cloud provide various services to the user such as storage, software and platform. In cloud computing, cloud suppliers can offer two provisioning plans to cloud consumers for computing resources, namely reservation and on-demand plans. However, the best advance reservation of resources is hard to be accomplished due to uncertainty of consumer's future demand and providers' resource prices. To address this problem, an optimal cloud resource provisioning ANT COLONY OPTIMIZATION algorithm is proposed to measure the unused utilization of a data centre. The user request would be handled by the data centre who nearest neighbor of it.***
Index Terms: Cloud computing, Resource Allocation techniques, ACO algorithm, virtual machine.

I. INTRODUCTION

Cloud computing is a model for enabling ubiquitous on demand network to shared a pool of configured resources. It is a practice of using a network for Internet to store, manage, and process data instead of local server or a personal computer. In other words cloud computing is a renting of service. We can pay only for what we use. The cloud model is composed of three service models, and four deployment models. The essential characteristics of cloud computing is On-demand self-service, Broad network access, Resource pooling, Rapid elasticity, Measured service. Cloud computing may also consist of Four Deployment models are Private cloud, Public cloud, Hybrid cloud, Community cloud. Since private cloud provides more security only the authorized person can access the data. Public cloud is used by general public. Hybrid cloud is a combination of public and private cloud.

The cloud may also consist of three service models are Software as a service (saas), Platform as a service (pass), Infrastructure as a service (Iaas). In our project we are using the Infrastructure as a service. We providing the infrastructure to the cloud user and sharing the resource between them. It allows users to use virtualized IT resources for computing, storage, networks, and networking. Resource allocation is an essential piece of Infrastructure-as-a-service (Iaas) model of cloud computing and furthermore is one of the issues in cloud computing. Resource allocation is the process of allocating resources to the users according to their requirement. This paper gives finish depiction of the resource distribution systems in cloud.

II. RELATED WORKS

Cloud computing is the next step in the evolution of on-demand information technology services and products. Cloud Computing is an emerging computing technology that is consolidating itself as the next big step in the development and deployment of an increasing number of distributed applications. Cloud computing nowadays becomes quite popular among a community of cloud users by offering a variety of resources.

In cloud platforms, resource allocation takes place at two levels. First, when an application is uploaded to the cloud, the load balancer allocates the requested instances to physical machines, attempting to balance the computational load of multiple application across physical computers. Second, when an application receives multiple incoming requests, these requests should be each allocated to a specific application instance to balance the computational load across a set of instances to balance the computational load across a set of instances of the same application.

III. EXISTING SYSTEM

In the existing system, the resource allocation is done based on the auction model. It calculates dynamic pricing which helps to generate revenue to the provider. Users pay lower price as compared to fixed priced model. The algorithm is beneficial both for user

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and Cloud provider as there is double sided competition. Bidding density for providers and users is calculated. Bid density is used to sort providers and users so that highest paying user and lowest bidder can be mapped. It is evaluated using CloudSim.

Auction based resource allocation technique has been used in scenarios such as market scenarios and developing dynamic pricing model for on demand scenarios of resource allocation. This auction based model provides partial performance to the user based on their priority.

IV. LIMITATIONS

No control over the business information.

Risk of information loss due to improper backups or system failure in the virtualized environment.

High cost and loss of control.

V. PROPOSED SYSTEM

Cloud computing offers on demand access to computational resources over the Internet. Our present system uses virtualization technology to allocate data centre resources dynamically based on application demands and support green computing by minimising the number of servers in use. We have accomplished two main goals in our project.

Load Prediction

Green Computing

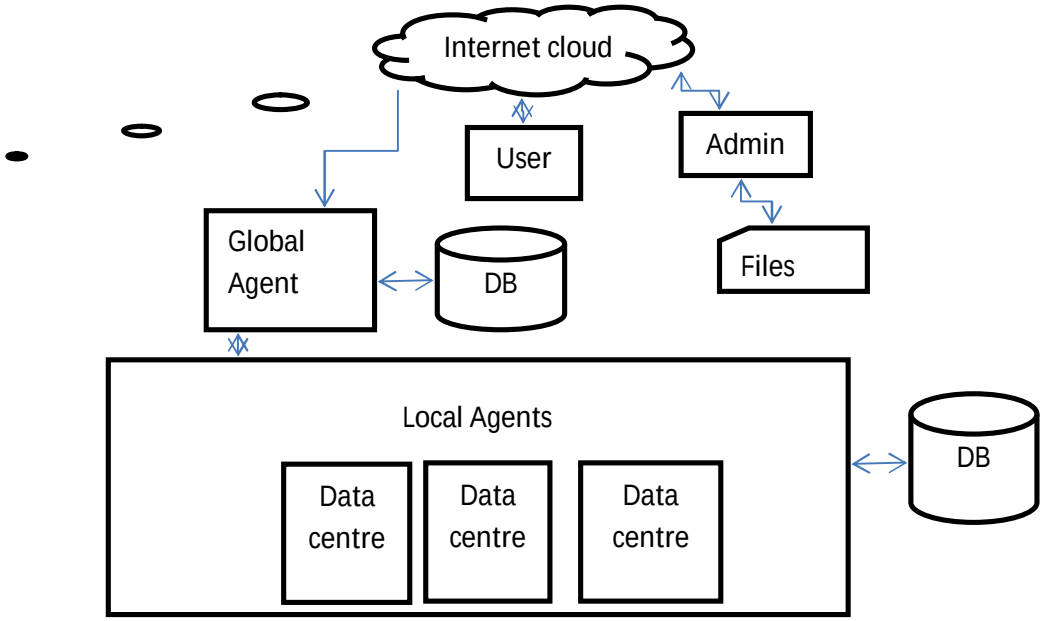
VI. ANT COLONY ALGORITHM

In our proposed system we use “ANT COLONY OPTIMIZATION ALGORITHM (ACO)” to measure the unutilised storage of a data centre. ACO is a probabilistic technique for finding the shortest path through graph. In ACO, a set of software agents called artificial ants search for good solutions to a given optimization problem.

In our project we use two terms called Local Agent and Global Agent. Local Agent is a collection of a data centre and it stores information about each data centre. Global Agent would act as an admin which monitor all the activities of a Local Agent.

Virtualization is the process of creating a virtual version of something, such as a hardware, operating system, and a storage device or network resources. To create a VM the user need to register in the cloud. After registration the user need to specify their domain and required spaces and based on the domain the user has to pay. Based on the users’ specification, the memory would be allocated for the user. If the user doesn’t use the allocated data centre for a long time, then that unutilized space can be shared by other user. At this stage our algorithm is designed in such a way that, the new user share the resources to the existing user who nearest neighbor of it. Here, when the existing user share their memory with the new user cost optimization takes place. (i.e) During the VM allocation, the new user payment would be forwarded to the existing user.

VII. ARCHITECTURE DIAGRAM



The working process of ant colony optimization algorithm is illustrated below:
Step1:
Initialization
Input→user VM (size)
s→ no of virtual machine
Get VM size
End
First collecting all virtual machine size that means no of virtual machine in resource.
Step2:
Finding MIN(VM)
For k=1 to m do (k=1,k<=min(value));k++)
K=Random selection of virtual machine by users.
Step3:
Retrieving user list
For t=1 to m do
For k=1 to m do
Choose user array list

$$P^{k}_{ij}(t) = \frac{|T_{ij}(t)|^{\alpha} \cdot |\eta_{ij}|^{p}}{\Sigma l_{\in} J_i^k [T_{il}(t)]^{\alpha} \cdot [\eta_{il}]^{\beta}}$$

Current VM
Step 4:
Allocation VM to N (VM)
Where T1 (VM1) to T2 (VM2)
Display min requirements user list and allocate
For every min shortest path (i,j) do
T(T+1) = T(VM)
End
Step5:
Change memory to AT(VM)→ user

VIII. CONCLUSION

Resource allocation is dynamic and it is based on user demands and support green computing by optimizing the number of servers in use. We use the Ant colony algorithm to check the capacities of servers. Our algorithm achieves to find the nearest unutilized data centre share the unused resources to new users. We have developed a system that focuses on sharing the reserved resources of one user to the other user by using virtualization technology. We have proposed a new dynamic strategy that can be included in the Cloud-Analyst to have cost effective results. We develop a set of methodologies that prevent overload in the system effectively. Experiment results demonstrate that our algorithm achieves good performance.

IX. FUTURE WORK

From the work done, we conclude that the simulation method will be improved by modifying or adding new ways for traffic routing. To make researchers and developers able to do prediction of real implementation of cloud, easily. From the work of our project the algorithm focuses on sharing resources to the nearest user, in future we can proceed sharing resources to all the users.

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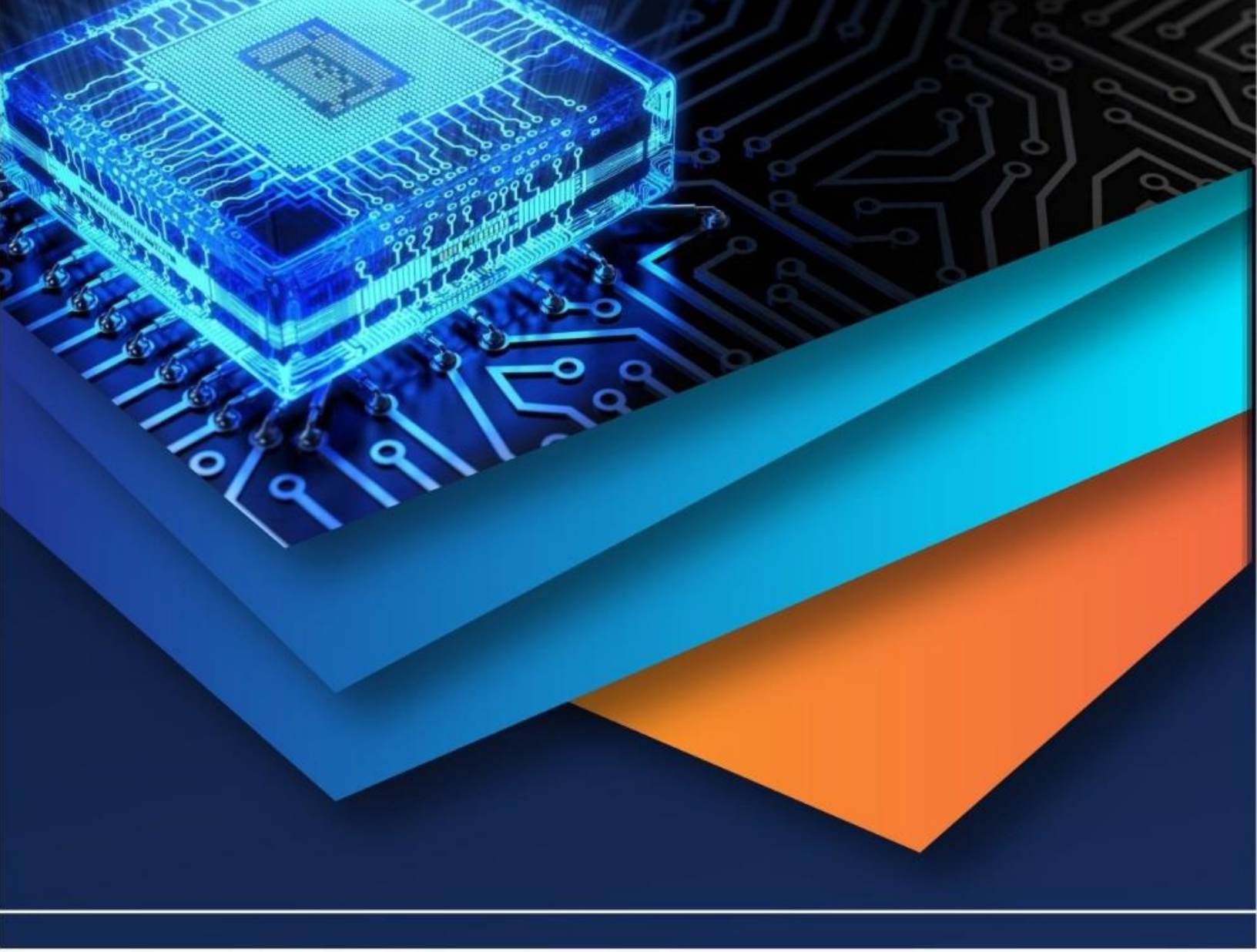

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