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A Survey on Dynamic Resource Allocation technique in cloud Environment

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Abstract: Cloud computing becomes relatively popular among cloud users by contribution a variety of resources. This is an on insist service because it offers dynamic flexible resource allocation and guaranteed services. Cloud computing is a recent advancement wherein IT infrastructure and applications are provided as "services" to end- users under a usage-based payment model. They are using virtualized services requirements varying with time. To overcome these challenges using CloudSim tool.CloudSim is an extensible simulation toolkit that enables modeling and simulation of Cloud computing systems and application provisioning environments. Several researchers from organisations are using CloudSim in their investigation on Cloud resource provisioning and energy-efficient management of data center resources. The utility of CloudSim is verified by a case study involving dynamic provisioning of application services in hybrid federated clouds environment. In proposed study the proposed method is Ant Colony Optimization Algorithm (ACO). ACO adapt genetic operations to enhance ant movement towards solution state. This paper provides complete description of the resource allocation techniques in cloud, for cloud users a comparative study provide the detail about the different Resource allocation methods. After that, the related research problems and challenges are explored to promote the development of cloud computing.

Keywords: Cloud computing, Resource Allocation techniques, ACO algo, virtualization, CloudSim

I. INTRODUCTION

Cloud computing focus on liberation of reliable, secure, fault tolerant, sustainable, and scalable infrastructures for user internet based application services [1].using the cloud we can accessing, manipulating and configuring the application online. . A range of new Green technologies, such as Cloud computing, offer unmatched opportunities to get better the efficiency of business operations and represent a sensible opportunity to reduce energy costs and battle global warming[2].

It offers online data storage, infrastructure and application. One way to think of cloud computing is to consider your experience with email. Your email client, if it is like Yahoo, Gmail, and Hotmail and so on, takes care of accommodation all of the hardware and software necessary to support your private email account. When you want to access your email you release your web browser, go to the email page of client and log in. The most important part of these is having internet access. Your email is not remaining on your physical machine, you access it through an internet connection and you can access it everywhere. If you are on a trip, at work, you can check your email as long as you have access to the internet. Your email is different than software installed on your computer, such as a MS-Office, when you create a document using MS-office software, that document stays on the device you used to make it unless you physically move it. An email client is comparable to how cloud computing works. Except as a substitute of access just your email, you can decide what information you have right to use to within the cloud.

Concept of virtualization:"Virtualization, in computing, is the formation of a virtual (rather than actual) version of somewhat, such as a hardware platform, operating system, a storage space device or network resources" [3].we are receiving many Benefits of using virtual machine like rapid scalability, Live migration is feasible, consolidation in a Data Center is possible, Low downtime of maintenance, Virtual hardware supports inheritance operating systems efficiently, Security and fault isolation. Virtualization is causing a disruptive change in enterprise data centers and giving rise to a new paradigm: shared virtualized infrastructure [4]. When the data center technicians had problems with traditional data centers (static data centers), the dynamic solution was the solution to their problems. The major problem was very simple, if they had high load on their data centres occasionally, they could not manage it easily, hence the greatest achievement was the new technology called as server virtualization [5].

They designed the software which creates different isolated boxes and shares all of the hardware resources between them and give them resources as they need. These boxes as they called virtual machines (VM), acts and services the clients like real servers with their strength and their weakness.

The server virtualization conceptually designed for data centers that they can dynamically control and share all available resources over their data centers and it could be increased or decreased on-demand.

With the help of virtualization technology, we can easily create different virtual machines (not physically) and share all available resources between these virtual machines. Each virtual machine can have its own resources based on the duty which defined for it. VMs are the virtual machines on which cloudlets are executed. These VMs are

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mapped onto hosts (Physical Machines) based on hardware requirements (processing cores, memory and storage). Processing capabilities of host are measured using MIPS (Million Instruction per Second). File size is used as the essential unit to compute the size of the task (cloudlet) [6].

II. BACKGROUND

Cloud data centers can be a distributed network in structure, which is composed of many compute nodes, storage nodes, and network node. Each node is formed by a series of resources such as CPU, memory, network bandwidth and many more. These resources are called multidimensional resources. The number of virtual machines (VMs) deployed in a huge cloud data center each day can be very large, and their deployment introduce a significant load on the data center network. The inappropriate VM placement not only eject I/O demanding applications but also to other non-I/O demanding applications that will see bulky I/O waiting time due to shared be integrated and oversubscription in network tools common in the data centers. Virtualization is causing a troublesome change in activity data centers and giving rise to a new paradigm: shared virtualized infrastructure. disparate the traditional hosting model where applications run on devoted nodes, resulting in low resource utilization, this model allows applications to be consolidate onto smaller quantity nodes, reducing capital expenditure on infrastructure as well as operating costs on power, cooling, preservation, and support[15].

III. LITRATURE SURVEY

Basically we have five types of resource allocation techniques. One by one will see the description of each allocation method.

An Auction Mechanism for Resource Allocation in Mobile Cloud Computing Systems:

A mobile cloud computing system is cool, calm and collected of heterogeneous services and resources to be to be paid by the cloud service provider to mobile cloud users. On other hand, some of these resources are substitutable (e.g., users can use storage from dissimilar places) that they have similar functions to the users. On the other hand, some resources are complementary that the user will need them as a bundle (e.g., users need both wireless connection and storage for online photo posting. The quality and discount factors indicate complementary and substitutable relations between cloud resources provided by the service provider. Then, we analyze the individual consistency and incentive compatibility (truthfulness) properties of the users in the auction mechanism [7].

Resource Allocation in a Network-Based Cloud Computing Environment: Design Challenges:

Cloud computing is an more and more popular computing concept, now prove a requirement for utility computing services. Each provider offers a unique service collection with a range of resource arrangements. Resource provisioning for cloud services in a wide-ranging way is critical to any resource allocation model. Any model should think about both computational resources and network resources to perfectly represent and provide practical needs. An additional aspect that should be considered while provisioning resources is energy consumption. This aspect is getting extra attention from industry and governments parties. Calls of maintain for the green clouds are gaining momentum. With that in mentality, resource allocation algorithms aim to accomplish the task of scheduling virtual machines on data center servers and then scheduling correlation requests on the network paths available while comply with the problem constraints. Quite a few external and internal factors that have an effect on the performance of resource allocation models. Design challenges are discussed with the aim of providing a indication to be used when designing a comprehensive energy conscious resource allocation model for cloud computing data centers [8].

Dynamic Resource Allocation using Virtual Machines for Cloud Computing Environment:

Cloud computing allow big business customers to scale up and down their resource usage based on needs. Many of the tout gain in the cloud model come from resource multiplexing through virtualization technology. We present a system that uses virtualization technology to allocate data center resources dynamically based on application demands and support green computing by optimizing the number of servers in use. We introduce the concept of “skewness” to measure the irregularity in the multi-dimensional resource utilization of a server. By minimizing skewness, we can come together different types of workloads satisfactorily and get better the overall utilization of server resources. We build up a set of heuristics that avoid overload in the system effectively while saving energy used. Trace driven reproduction and experiment results make obvious that our algorithm achieve good performance [9].

Service Level Agreement-Based Joint Application Environment Assignment and Resource Allocation in Cloud Computing Systems:

Cloud computing have paying attention a lot of consideration recently due to increasing demand for far above the ground performance computing and storage. Resource allocation is one of the largely imperative challenges in the cloud computing system particularly when the clients have some Service Level Agreements (SLAs) and the total profit depends on how the system can meet these SLAs. Moreover, a data center on average hosts and manages a suite of application environments and a fixed number of servers that are allocated to these

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application environments in a technique that maximizes a definite utility function. We consider the problem of SLA-based joint optimization of application environment task, demand dispatching from the clients to the servers, as well as resource allocation in a data center comprised of heterogeneous servers. The intention is to maximize the total profit, which is the total price gained from serving the clients subtracted by the operation cost of the data center. The total cost depends on the average facility request response time for each client as defined in their utility functions, while the operating cost is associated to the total energy consumption. A near-optimal clarification of the joint optimization problem based on the Hungarian algorithm for the assignment problem, as well as convex optimization techniques, in a way that is similar to the constructive partitioning algorithm in VLSI Computer Aided Design (CAD). Experimental results make obvious that the proposed near optimal joint application environment assignment and resource allocation algorithm performs baseline algorithms by up to 65.7% [10].

Prediction-Based Dynamic Resource Allocation for Video transcoding in Cloud Computing:
This presents prediction-based dynamic resource allocation algorithms to scale video transcoding service on a specified Infrastructure as a Service cloud. The algorithms provide mechanisms for allocation and deallocation of virtual machines (VMs) to a cluster of video transcoding servers in a horizontal approach. We use a two-step load prediction method, which agree to proactive resource allocation with high prediction correctness underneath real-time constraints. For cost-deficiency, our work supports transcoding of multiple on-demand video streams simultaneously on a single VM, resulting in a abridged number of compulsory VMs. We use video segmentation at collection of pictures level, which split video streams into lesser segments that can be transcoded autonomously of one another. The approach is demonstrated in a discrete-event simulation and an experimental evaluation involving two different load patterns.

IV. REVIEW

In our research we are using a Dynamic allocation technique among all five algorithms.

To better understand the working of resource allocation and task scheduling algorithms with the aim to accomplish load balancing in cloud computing environment a simulated setup was prepared using CloudSim tool. Comparison of the dynamic resource allocation techniques:

TITLE	ADVANTAGE	PARAMETE R RESULT
Dynamic Optimization of MultiAttribute Resource Allocation in Self Organizing Cloud	Locating qualify nodes and optimize task completing time	Throughput Ratio: 60% enhancement
Priority Based Resource Allocation Models for Cloud Computing	Resource consumption is Minimized	Parameters: No. Of users, Time to run, No. Of processor, job type, User type
Dynamic Resource Allocation Using Virtual Machine for Cloud Computing Environment	Server overload is minimized	Migration of VM for resource prerequisite
Survey on Resource Allocation Strategies in Cloud Computing	It should preserve the SLA and also manage the Qos	Strategies: Virtual machine,SLA, Utility
Heterogeneity Aware Resource Allocation In Cloud	Provide the equality among jobs when multiple jobs are submitted	The result is based on the occurrence Type
Dynamic Resource Allocation for Parallel Data Processing in cloud	Overload is avoided	Gain utility: Pre-emptive NonPreemptive Penalty: Non Preemptive.pr
Dynamic Resource Allocation for equivalent Data Processing in cloud	overwork is avoided	Gain utility: Preemptive,N on-Pre-emptive Penalty: Non Pre-emptive>
Survey on Resource Allocation in Cloud Computing	This avoids the resource conflict and scarceness of resources	Technique: Topology aware resource allocation
Dynamic Resource Allocation for Spot Market in Cloud	Total revenue is Maximized	Income:15173. 28 Loss:1083.63 NetIncome:140 89.65

V. PROPOSED WORK

In our research work we are use sing an Ant colony optimization algorithm using the tool CloudSim. Ant Colony Optimization (ACO) algorithms have been successfully applied to combinatorial optimization tasks

especially to data mining classification problem. The ant miner algorithm is based on the behaviour of ants in searching of food. An essential parameter of ACO algorithm is a heuristic function. It was determined that the selection of heuristic function has huge influence on calculation time of the algorithm [14]. ACO is based on the indirect communication of a colony of simple agents, called (artificial) ants, mediated by (artificial) pheromone trails. The pheromone trails in ACO serve as distributed, numerical information which the ants use to prob-abilistically construct solution to the problem being solved and which the ants adjust during the algorithm's completing to reflect their search experience. The (artificial) ants in ACO implement a randomized construction heuristic which makes probabilistic decisions as a function of artificial pheromone trails and possibly accessible heuristic information based on the input data of the problem to be solved. ACO can be interpreted as an extension of traditional construction heuristics which are with good grace available for various combinatorial optimization problems [16].

VI. CONCLUSION

These papers address the theoretic study of various dynamic resource allocation techniques in cloud background. The feature explanation of the techniques is summarize and also summarizes the advantages with parameters of the various techniques in cloud computing environment.

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