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Performance Analysis of Virtual Machines using Hybrid SPRNT Method by Spark Tool

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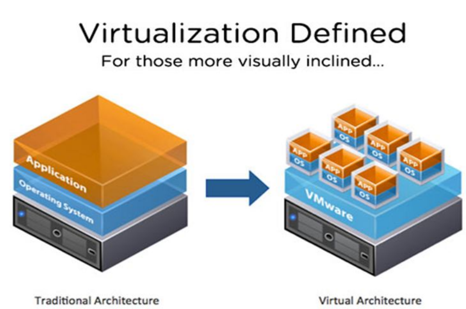
Abstract: Cloud computing is the storage of aggregation's computing and networking resources into a single entity called a "cloud". Cloud computing is an evolution of service oriented architecture (SOA), virtualization and utility computing. In efficient resource management, the virtualized data center has always been a practical concern and has attracted a lot of attention. This allocation system seeks to increase the space of different cloud providers. This paper analyzes overbooking and automatic virtual machines from physical machine management to avoid the provision over resource problem according to runtime demand. It refers to the automatic model for controlling the overbooking process, offering possibilities of usage based on performance and risk. Along with the overbooking process, VM placement is optimized using a resource-aware strategy to meet the QoS requirement of the application. In this paper, the Automated VM Provisioning Approach connects multiple VMs and facilitates them based on their overall capacity requirements. Implement Cloud Analytics in Cloud Computing with the goal of avoiding overload and successfully achieving the green computing concept.
Keywords: Virtual Machine, Third Party Allocation, Data Aggregation, SPARK, Service Oriented Architecture

I. INTRODUCTION

In computing, virtualization is the process of creating a virtual version of a device or resource, such as a server, storage device, network, or operating system, that divides the framework resource into one or more running environments. Virtualization is considered as simple as partitioning a hard drive, because you take one drive and partition it to create two different hard drives [1]. Devices, applications, and human users can communicate with a virtual resource such as a real single logical resource. The term virtualization has become a password, with the result that the term is now associated with many computing technologies:

Word Storage Virtualization: Integration of multiple network storage devices that appear to be a single network unit. Storage virtualization means that physical storage from multiple network storage devices appears as a single storage device controlled from a single central console [2]. VM-Server Virtualization: Divides a physical server into smaller virtual servers. Masking server virtualization of server resources, including the number and identification of individual physical servers, processors, and operating systems from server users [3]. System Operating System Level Virtualization: A type of server virtualization technology that runs on the operating system (kernel) layer. Network Virtualization: Uses network resources through the logical partitioning of a single physical network. In computing, network virtualization is the application of virtual networks to a software-based administrative organization that combines hardware and software network resources and network functionality. Network virtualization includes platform virtualization, which is often combined with resource virtualization [4]. Word Application Virtualization - Application virtualization is software technology that encrypts computer programs from the basic operating system. A fully virtualized application is not installed in the traditional sense, although it is still running [5]. The application works in runtime, which is in direct contact with the original operating system and all the resources it controls, but can be isolated or sandboxed. Virtualization is defined in Fig. 1.



II. RELATED WORK

Presented by Ahmed Ali-Eldin, et. al The cloud is a multi-partner resource flexible execution environment, and provides a fixed level of meter service. An important advantage of using cloud computing compared to the use of internal infrastructure is that the cloud's ability to deliver flexible resources to customers can be customized in seconds or minutes. These resources can be used to manage Flash viewers [6]. The goal of resource management provided by Anthony Julistio, et.al is to maximize profits by giving each customer the right price and to update prices periodically to suit market needs. Therefore, RM methods can be applied to change resource provider requirements and ensure that resources are allocated to the most valuable applications by customers. An increase in the total revenue of resources using RM is more effective than the statistical prices of resources. In fact, users may cancel before or after the start of time (no-show) for reasons such as resources or network failures [8].

Anton Beloglasov, et al, The first sub-issue to focus on is the host overload detection problem. Detecting when the host is overloaded directly affects QoS, because if the resource capacity is not fully utilized the applications are likely to run out of resources and degrade performance. The problem with host overload detection complexity is that it optimizes the system's time-average behavior when performing multiple workloads installed on a single host [9].

The estimate suggested by Carlos Vazquez et al., is included in the framework submitted by the ambiguous risk assessment, which includes only general access control methods [10]. Those VMs execute dynamic workloads created by a variety of applications (some of which are static behavior and others are explosive), which are profiled with monitoring tools after the actual applications are executed. Workload is a mixture of applications that come after poison distribution for submission rates [11].

Sijin Hee et al.,introduced an algorithm to improve resource utilization for cloud providers. It uses a multivariate probabilistic general distribution model to select suitable PMs for VM redistribution before formulating a reorganization plan, which leads to redesigning the number of VMs (i.e. lower migration costs). We call this process PM Candidate Selection (PMCS). Two heuristic dimensions are considered, namely asymmetry and volume, which demonstrate the multi-dimensional properties of VMs and PMs to achieve optimal resource utilization [12].

III. SPRNT FRAMEWORK

The cloud computing system offers its users the illusion of "infinite" computing and storage capacity. A new variation of the security diversity caused by competition between the virtual I / O workload - i.e., the fight for shared resources to limit the execution of an under-attack application during VM, where the degree person shares equivalent hardware with each other by investment. In particular, we have a tendency to specialize in I / O resources such as hard-drive products and / or system information calculations - the area unit required for data-intensive applications. Run the SPRNT framework on hard drive outputs and / or I / O resources such as critical network bandwidth for data-intensive applications. We design and run a framework that uses skeptical workloads to achieve significant delays in the targeted application at low cost (i.e., resource usage) .Many users are using the application except for one active tab. Disables bandwidth loading. The speed of the appropriate tab will be assigned back to the new requested user. The user can then use the same application at the same speed. Introduce the design and implementation of an automated resource organization system that achieves a balanced balance between two goals, such as developing a server allocation system and developing a system of replaceable resource allocation while reducing the number of servers used. And the server's "fussy assessment". By analyzing risk assessment, we can expand the overall use of servers within the limits of multi-dimensional resources. We plan an overbooking algorithm that will definitely limit the future resource usage of applications without looking inside VMs. The algorithm understands the growing trend of resource utilization patterns and significantly reduces placement attenuation. To find the optimal solution to the resource allocation problem and the simplest version of effective heuristics, this approach provides a controller that provides virtualization to the storage network.

A. Hybrid SPRNT Framework

We plan to schedule user requests on virtual machines, allocate resources on MAC-based authentication and automatic VM, and expand our approach to cloud analytics analysis.

1) *Authentication Based on MAC Address:* Designing cloud computing security architecture for storage environments is a major challenge. So the technology we use to increase the level of security we use is MACADDRESS cross verification. The MAC address of each device is unique so it helps to identify the exact device using the cloud application. These features increase the security of the application. For maximum protection we have added the technology of MAC address verification, which benefits the user in terms of authenticity. When you sign up the MAC address will be retrieved and saved in the database. The MAC address is verified whenever the user logs in. If the MAC address matches, the user of the application is the real owner. The application will not open if it does not match.

2) *Automated VM Allocation:* This level of risk perception refers to the access controller. This paper implements the authentication framework based on the MAC address. This framework is used to find a suitable server for task scheduling and to calculate reasonable values for overbooking. Summarize all work capabilities operating in VM environments. Fuse calls the risk assessment module and assesses the risk associated with the new incoming request. Calculate acceptance risk and data center risk limits. Resource allocation is used to financially determine available resources. Resource providers can also be determined using computer programs that apply to the exact domain without human intervention. The request is sent to the user access controller. The source of the request may be a request or a file request. The Access Controller analyzes the requirements of user requests. Knowledge DB CPU gets the data center feature that analyzes the available task tasks and idle tasks using memory and io usage, and then calculates the VM execution time and memory. The access controller decides whether to accept it or not. If the service is accepted, a request is sent to the overbooking scheduler to evaluate the horizontal resilience of the virtual machines. If the service is rejected, a request is sent to the Risk Assessment Controller to evaluate the VM capacity. The decision is made based on the following parameters. Request (R) - CPU, memory and I / O capacity required for the new incoming service. Unquest (UR) - The difference between the total data center capacity and the capacity required for all running services. Com (General (f) - The difference between the total data center capacity and the capacity used by all running services. (D) Implement the colocated VM concept to merge two or more pre-defined VMs.
3) *Cloud Analytics:* In this paper we will add Cloud Analytics approach to analyze the service model that provides used spaces for customers. Self-destructive data mainly targets user data. All data and their copies may not be deleted or read after the time specified by the user without user involvement Based on the active storage framework, we use the object-based storage interface to store and control evenly distributed keys. We implemented the Proof of Concept Self Destruction Prototype. In this process, you can set the validity to access resources. Implement a system that has an alert at the time of expiration during resource evaluation. Sources Automatic alert system helps to extend the user. If the user ignores the meaning of this warning, all resources will be automatically destroyed to save resources. Protect the resources of users who do not have access to their resources by default.

Overbooking process analyzed based on following formula such as

$$\text{risk}_i = \begin{cases} 0 & \text{if } \text{Req}_i < \text{Unreq}_i \\ \text{Req}_i - \text{Unreq}_i & \text{if } \text{Unreq}_i < \text{Req}_i < \text{Free}_i \\ 1 & \text{if } \text{Req}_i > \text{Free}_i \end{cases}$$

The proposed system considers the process of resource management for a large-scale cloud environment. Such an environment includes the physical infrastructure and associated control functionality that enables the provisioning and management of cloud services. The perspective we take is that of a cloud service provider, which hosts sites in a cloud environment.

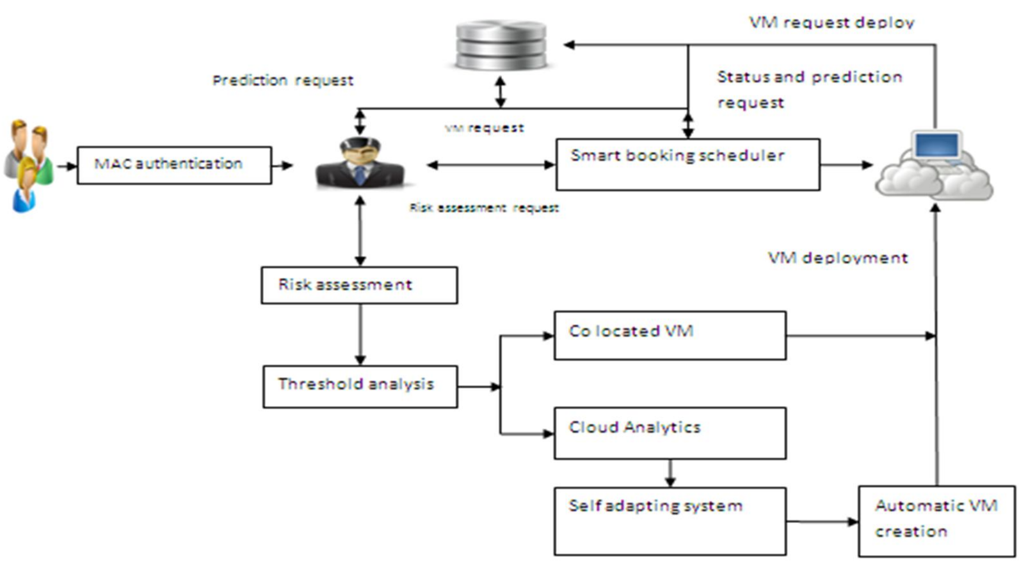


Fig 1. Cloud Analytics System

The pseudo code of the algorithm is:

Optimized VM Scheduling
Input: Memory Utilization
Output: A decision on whether to migrate a VM
1: if the Memory utilization history size > Threshold then
2: Convert the last memory utilization value to a state
3. Invoke the Multisize Sliding Window estimation to obtain the estimates of transition probabilities
4: Invoke the OPVMS-OPT algorithm
5: return the decision by OPVMS-OPT
6: end if
7: return false

This algorithm is necessary to maximize the mean time between VM migrations initiated by the host overload detection algorithm, which can be achieved by maximizing each individual intermigration time interval. Therefore, we limit the problem formulation to a single VM migration, i.e., the time span of a problem instance is from the end of a previous VM migration and to the end of the next. Each VM allocated to a host at each point in time utilizes a part of the CPU capacity determined by the application workload. The CPU utilization created over a period of time by a set of VMs allocated to a host constitutes the host's workload. For the initial analysis, we assume that the workload is known a priori, stationary, and satisfies the Markov property.

B. OPVMS-OPT Algorithm

Input: User Request data size
Output: A decision on whether to create VM or not
1: Build the objective and constraint functions
2: Invoke scheduling to find the m vector for virtual machine
3: if a feasible solution exists then
4: Extract the VM migration probability
5: if the probability is < 1 then
6: return false
7: end if
8: end if
9: return true

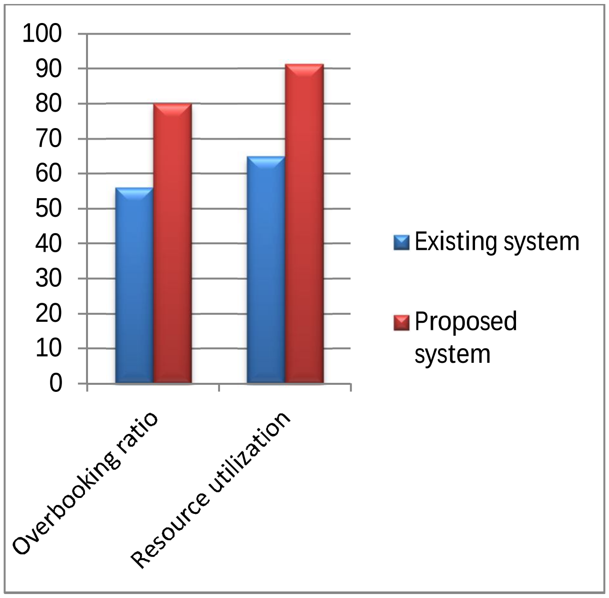
This algorithm refers to a control algorithm based on the model introduced in the Optimal Markov VM Overload Detection (MVMOD-OPT) algorithm. We refer to the MHOD-OPT algorithm adapted to unknown non stationary workloads using the Multi-size Sliding Window workload estimation technique. In the online setting, the algorithm is invoked periodically at each time step to make a VM migration decision.

In MVMOD-OPT, a decision to migrate a VM is made only if either no feasible solution can be found, or the migration probability corresponding to the current state is 1. The justification for this is the fact that if a feasible solution exists and the migration probability is less than 1, then for the current conditions there is no hard requirement for an immediate migration of a VM.

IV. RESULTS AND SIMULATION

Effective resource management in a virtualized data center has always been a practical concern and has attracted a lot of attention. In particular, the financial allocation system seeks to increase the revenue of commercial cloud providers. This paper uses overbooking from Revenue Management to prevent resource over-provision as per runtime demand. We propose a financial model to control the overbooking process while providing risk-based performance assurance to customers using risk estimates.

Together with the overbooking process, we optimize VM placement using a traffic-aware strategy to meet the QoS requirement of the application. We design vague estimates and algorithms to achieve network localization to reduce network bandwidth usage, especially network interference bandwidth, so as to receive more requests and increase future revenue. Simulation results show that our policy greatly improves the request acceptance rate and increases revenue by up to 87% when there is a conflict of acceptable resources.



V. CONCLUSION

Cloud computing allows businesses to increase or decrease their resource utilization based on needs. Virtualization technology brings many benefits from resource multiplexing to cloud modeling. In this project, we demonstrate a system that uses virtualization technology to dynamically distribute data center resources based on application load and to support green computing by optimizing the size of servers in use. We have developed a load prediction algorithm that can accurately capture the future resource usage of applications without having to look inside VMs.

The algorithm understands the growing trend of resource utilization patterns and significantly reduces placement depletion. In cloud computing, we have implemented the concept of resource management to prevent overload and successfully achieve the concept of green computing. We used the PID controller approach concept provided by us to integrate VMs, so all servers are used. Virtual multiplies our system into physical resources based on changing demand. We use the blur metric to optimally connect VMs with different resource features so that we make better use of the server's capabilities. Our algorithm achieves overload avoidance and green computing for multi-resource limited systems. On-demand pricing is on a per-use basis, while a one-time fee is charged on the reservation plan. With a reservation plan, customers can use far less computing resources than the demand plan.

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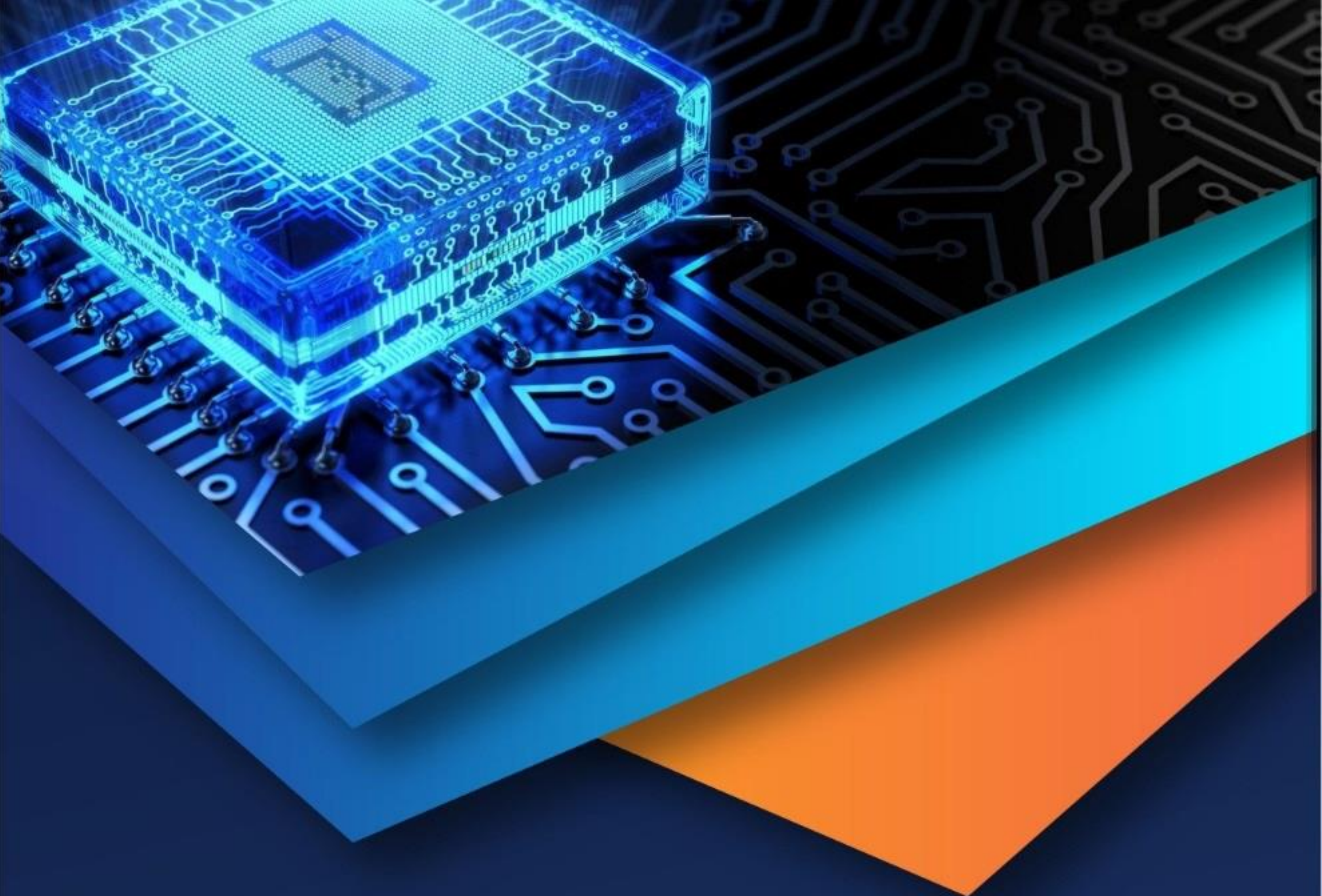

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