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# Optimal Ant Colony System for Dynamic Virtual Machine Allocation in Cloud Computing

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**ABSTRACT**

Over the past decades cloud computing playing promising role in IT environment, However high energy consumption in data centers will cause a major damages in cloud. Creating dynamic virtual machine providing excellent solution to this issue. Integrating VM is a technique to handle Physical machine to control its mode operations where overloaded condition. At the same energy aware incite poor QoS sometimes. This letter, we presenting Optimal Ant Colony for allocating heterogeneous virtual machine in cloud. Main design of this system improves the high throughput and less latency time for accessing a data from a cloud environment. OAC for DVM (Dynamic Virtual Machine), allocating multiple VM (Virtual Machine) to a PM (Physical Machine). PM controls by Local Agent (LA). It can be allocate and change the resources from VM to VM and Global Agent (GA) for PM to PM based on Server Overloading Condition (P-Normal, P-Overload, P-Under) also extendable with Temporary memory sharing process for resource. The result analysis show that our work is more efficient to compare previous work.

**Keywords:** OAC (Optimal Ant Colony), VM (Virtual Machine), PM (Physical Machine), LA (Local Agent), GA (Global Agent).

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## INTRODUCTION

Cloud computing crosses the years has become one amongst the foremost standard computing paradigms over the net for the user applications and delivery. Cloud Computing consists of three major types: Platform-as-a-Service (PaaS), Infrastructure-as-a-Service (IaaS) and Software-as-a-Service (SaaS). Dependability, Quality of Service (QoS) and hardiness these are some of the enticing advantages that we have a tendency to receive from the adoption and also the preparation of cloud computing platforms. The client is ready to get a lot of or less computing power as he desires, since the cloud seems to be infinite to him. From a point of service provider's perspective, key objective is to reduce the operational prices in order that the profits are maximized. During this regard, since cloud knowledge centres dominate the operational prices, power management is changing into a vital issue. Over the past few years the impact has been tremendous on the knowledge Technology (IT) by the emergence of cloud computing, wherever multi-national corporations like look, IBM, Oracle, Microsoft, Amazon and Sales force just in case of website failures have established new knowledge centres to produce redundancy and guarantee dependability by hosting cloud computing applications in varied locations round the world.

There are many key technologies that build cloud computing for providing ultimate support to the users. Virtualization is among the foremost important ones. It provides a promising approach through division through partial or complete hardware, sharing, and machine simulation of 1 or additional hardware resources and partitioning of the computer code into multiple execution environments, every acting as a whole system. Virtualization permits multiple applications to run in varied performances isolated platforms referred to as Virtual Machines (VMs) by dynamic sharing in cloud computing environments of the physical resources in an exceedingly single physical server. This technology supported the height work demand makes offered computing resources like the processor, disc space and memory to applications only if required and not allotted statistically by the on-demand or the utility computing that could be a simply in time resource provision model. Through virtualization, even whereas achieving energy potency and high server activity, a cloud supplier ensures the Quality-of-Service (QoS) is delivered to the user. The method of mapping virtual machines to its corresponding physical machines is thought as virtual machine placement. It's a crucial facet in cloud infrastructure for rising resource utilization and power potency.

In this paper, we focus energy aware technology for cloud environment especially for allocation of virtual machine and physical machine. Each Physical Machine consist of different Virtual Machine. Optimal Ant Colony is key technology will improve the energy consumption as well as load balancing mechanism. T-memory Allocation is an algorithm which helps to managing data accessing from different machines and reduce the access span. Local Manager monitors the health of CPU while users accessing cloud.

## RELATED STUDIES

There square measure variety of ant algorithms, like ant System (AS), Max-Min AS (MMAS), and Ant Colony System [1], [2]. ACS was introduced to enhance the performance of AS and it's presently one in every of the most effective playing ant algorithms. The present ACO-based resource allocation and server consolidation approaches embody [3], [6], [7], and [8].

Yin and Wang [6], focused Ant Colony Optimization to the nonlinear allocation issues, which allows limited number of allocation to the virtual machines to handle server down problems. To maximize the efficient solution to avoid stagnancy in Virtual Machine Allocation. It recovers untimely allocation issues, so that overloading problem has reduced [2].

This paper [5], author presents EEVM allocation as variety level of computational problem and apply highly equipped online optimization. Greedy algorithm is one amongst to migrate resource allocation over loaded and unloaded machines [4]. New studies[7] combined ACS with a vector algebra-based server resource utilization capturing mechanism [9]. And [28] used ACS to allocate multiple web applications in a cloud-based shared Serving application.

ACO may be a multi-agent approach to tough combinatorial improvement issues, like traveling salesman problem (TSP) and network routing [2]. It's impressed by the forage behaviour of real hymenopter colonies. Whereas moving from their nest to a food supply and back, ants deposit a chemical substance on

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their path referred to as secretion. Alternative ants will smell secretion and that they tend to like ways with a better secretion concentration. Thus, ants behave as agents UN agency use an easy style of indirect communication referred to as stigmergy to seek out higher ways between their nest and therefore the food supply. It's been shown through an experiment that this straightforward secretion path following behaviour of ants will bring about to the emergence of the shortest ways [2].

## SYSTEM ANALYSIS

This paper, we formulate Optimal Ant Colony system for allocating virtual machines dynamically. Each physical machine allocates for multiple virtual machine. However accessing the cloud, data will be portioning to different shares in cloud. VM is a part to handle the process for balancing server storage in better retrieval process. PM is a real entity which evaluate to store data in multi-dimensional concept.

Local Agent (LA) plays a major role to monitoring CPU health and utilization process comes different scenarios like P-Normal, P-Overload, and P-Under. Also we creates a solution to avoid SLA violations. LA monitors the CPU resource capacity, based on the term it can switch dynamically allocates the data storage in between VM to VM. We introduce GA which monitors the capacity for resource sharing between PM to PM.

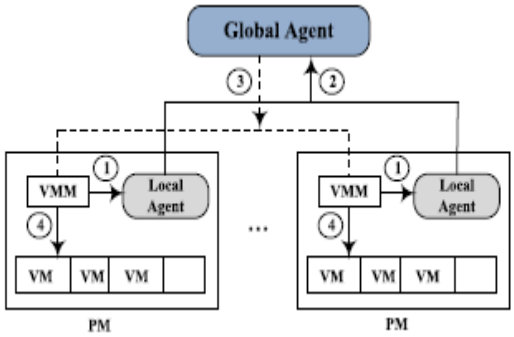


**Fig A: System Architecture**

When users frequently asking most visited data from cloud. System will create a Temporary (cache) memory in cloud machine for increasing the performance for data retrieving from cloud machines. If another user accessing the same data, data will be redirected from temporary memory. So we can avoid more issues like computation problem, energy consumption problem, traffic congestion and improving privacy.

## SYSTEM MODELS

### Creating VM and PM

Virtualization, in computing, is that the creation of a virtual (rather than actual) Version of one thing, like a hardware platform, OS, and a device or network resources.VM live migration could be a wide used technique for dynamic resource allocation in an exceedingly virtualized surroundings. The method of running 2 or a lot of logical ADPS thus on one set of physical entity hardware. Dynamic placement of virtual servers to reduce SLA violations.

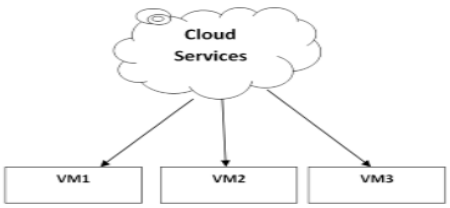


**Fig B: Creating VM**

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**Resource allocation**

Dynamic resource management has become an energetic space of analysis within the Cloud Computing paradigm. Price of resources varies considerably counting on configuration for victimization them. Therefore economical management of resources is of prime interest to each Cloud suppliers and Cloud Users. The success of any cloud management package critically depends on the flexibility; scale and potency with that it will utilize the underlying hardware resources whereas providing necessary performance isolation. No-hit resource management resolution for cloud environments has to offer an upscale set of resource controls for higher isolation, whereas doing initial placement and cargo equalisation for economical utilization of underlying resources.

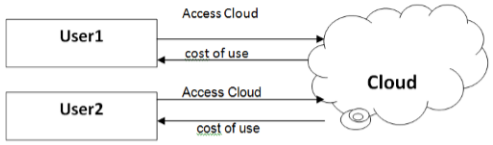


**Fig C: Cost Calculator**

**Temporary Memory Allocation**

This model for dynamically changing a data resource from VM to VM and PM and PM. Local and Global Agent these are the agents continually monitoring the resource sharing load factor in CPU. Depends on this factor system will allocates a memory management system in cloud space.

**ALGORITHM**

1. V= {v1, v2, ……vm}
2. V→ Number of virtual machines
3. P= {p1, p2, ……pm}
4. P→ Number of physical machines
5. T→ Temporary memory
6. If {CPU exceed Memory}
7. {
8. Check (V)
9. {
10. If {V<P}
11. {
12. Allocates V
13. }
14. Else
15. {
16. Allocates P
17. }
}
18. If continuously accessed data
19. Allocates T

**RESULT ANALYSIS**

Finally, system result shows the comparison result between existing system with our proposed system Our design has increase the performance ratio as well as low cost and energy consumption. So it will improve the resource management in cloud and ease of access in data retrieving in cloud because here we implemented temporary data storing process.

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## CONCLUSION

In this paper, we have a tendency to confer a completely unique dynamic Virtual Machine consolidation approach referred to as ACS-based VM Consolidation. It reduces the energy consumption of knowledge centres by consolidating VMs into a reduced range of active Physical Machines whereas conserving Quality of Service needs. Since the VM consolidation drawback is strictly NP-hard, we have a tendency to use the Optimal Ant Colony to search out a near-optimal answer. We have a tendency to outlined a multi-dimensional perform that considers each of dormant PMs and also the number of migrations. When put next to the present dynamic VM consolidation approaches, OAC-DVM not solely reduced the energy consumption, however conjointly reduced SLA violations and also the range of migrations. We tend to evaluate the performance of our planned approach by conducting experiments with ten completely different real employment traces.

## REFERENCES

[1] M. Dorigo and L. Gambardella, "Ant colony system: A cooperative learning approach to the traveling salesman problem," IEEE Trans. Evolutionary Comput., vol. 1, no. 1, pp. 53–66, Apr. 1997.

[2] M. Dorigo, G. Di Caro, and L. M. Gambardella, "Ant algorithms for discrete optimization," Artif. Life, vol. 5, no. 2, pp. 137–172, Apr. 1999.

[3] E. Feller, C. Morin, and A. Esnault, "A case for fully decentralized dynamic VM consolidation in clouds," in Proc. IEEE 4th Int. Conf. Cloud Comput. Technol. Sci., Dec. 2012, pp. 26–33.

[4] .Wood, P. Shenoy, A. Venkataramani, and M. Yousif, "Sandpiper: Black-box and gray-box resource management for virtual machines," Comput.Netw., vol. 53, pp. 2923–2938, 2009.

[5] M. Harman, K. Lakhotia, J. Singer, D. R. White, and S. Yoo, "Cloud engineering is search based software engineering too," J. Syst. Softw., vol. 86, no. 9, pp. 2225–2241, 2013.

[6] P.-Y. Yin and J.-Y.Wang, "Ant colony optimization for the nonlinear resource allocation problem," Appl. Math.Comput., vol. 174, no. 2, pp. 1438–1453, 2006.

[7] M. Ferdaus, M. Murshed, R. Calheiros, and R. Buyya, "Virtual machine consolidation in cloud data centers using ACO metaheuristic," in Proc. 20th Int. Eur. Conf. Parallel Process., 2014, vol. 8632, pp. 306–317.

[8] A. Ashraf and I. Porres, "Using ant colony system to consolidate multiple web applications in a cloud environment," in Proc. 22nd Euromicro Int. Conf. Parallel, Distrib.Netw.-Based Process., 2014, pp. 482–489.

[9] M. Mishra and A. Sahoo, "On theory of VM placement: Anomalies in existing methodologies and their mitigation using a novel vector based approach," in Proc. IEEE Int. Conf. Cloud Comput., Jul. 2011, pp. 275–282.