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Novel Technique for Workflow Computation with Ant Colony Optimization Method in Cloud Environment

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Abstract: Cloud computing used for task scheduling which guided by broker and computer by virtual machine, but cost of computation will increase if use random task localization and this problem exponential high when use workflow which have huge number of task with dependency, so in this paper optimize the cost and time by intelligent and colony optimization which give decision to broker.

Keywords: Cloud Computing, Scheduling, Energy Consumption, Virtualization, Bandwidth Cos.

I. INTRODUCTION

Cloud computing has been referred to as an architecture, a platform, an operating system, and a service, and in some senses, it is all of these. A basic definition of cloud computing is using the Internet to perform tasks on computers. It is an approach to computing in which resources and information are provided through services over the Internet, in which the network of services is collectively known as the cloud [1].

Cloud computing is a buzzword that means different things to different people. For some, it's just another way of describing IT (information technology) "outsourcing"; others use it to mean any computing service provided over the Internet or a similar network, and some define it as any bought-in computer service you use that sits outside your firewall.[6]

1.1 Types of cloud computing

IT people talk about three different kinds of cloud computing, where different services are being provided for you. Note that there's a certain amount of vagueness about how these things are defined and some overlap between them.

- Cloud software as a service (SaaS), where the customer uses applications provided by the seller. One example that has been in use for some time is web-based e-mail. In this respect, the customer uses the network, servers, operating systems, storage facilities, and possibly individual applications provided by the seller [1].
- Cloud platform as a service (PaaS), by which the seller provides the infrastructure (network, servers, operating systems, storage facilities) to enable a customer to use their own applications that they create by using any programming languages and tools supported by the seller. The seller will not necessarily offer its own or a single infrastructure to provide the service. It may act as an 'aggregator' by which the seller uses a number of third parties to provide separate applications and sets of hardware, but the buyer is given the impression that the service they are paying for is one consolidated infrastructure[1].
- Cloud infrastructure as a service (IaaS) (sometimes called a 'hosted 'service), where the seller provides the infrastructure (network, servers, operating systems, storage facilities) to enable the customer to use and run software of their choice, which can include operating systems and applications [1].

1.2 Cloud Computing Issues and Challenges

The existing computing paradigms viz. distributed computing, SOA, networking etc. are building blocks of cloud computing. There are numerous issues associated with these computing paradigms and some new challenges emerged from cloud computing are required to be addressed properly in order to realize the cloud to its full extent. [6]

A. Security and Privacy
B. Performance
C. Reliability and Availability
D. scalability and elasticity

E. Interoperability and portability.
F. Resource Management and Scheduling
G. Energy Consumption
H. Virtualization
I. Bandwidth Cos

II. LITERATURE REVIEW

This section gives a brief review of the work carried out by various researchers in this field. Work has been done by researchers in the area of Workflow on Cloud. Various aspects of the problem were studied.

In [29] Zheng and Sakellariou: In this paper, they proposed budget and deadline constrained, BHEFT, which is the extension of HEFT algorithm that gives Budget and Deadline Constrained (BDC) plan to check whether a workflow request should be accepted or not while considering the confirmed resource reservations from the other users. During the creation of a BDC plan, the authors considered the spare budget for each task of workflow while selecting the resource. Firstly, the majority of current commercial cloud providers allow a user to launch a new instance of a resource even if that resource is reserved by some another user [5], while in the case of utility grids, there are fixed resources with restricted available time slots. Secondly, current commercial clouds use the pay-as-you-go pricing.
The proposed work gives a BDC schedule plan which has significantly reduced execution cost as compared to the BDC plan created by state-of-art scheduling heuristic under the same deadline and budget constraints model where the users are charged based upon the number of time intervals that they have used. To address all these gaps, we introduced in this paper novel heuristic that generates a BDC schedule plan by considering the spare deadline along with spare budget while selecting the suitable resource for each workflow's task.

In [17] Saeid et al: In this paper researcher proposed two workflow scheduling algorithms for cloud environment: one-phase algorithm, IC-PCP and two-phase algorithm, IC-PCPD2. Both algorithms have a polynomial time complexity for scheduling large workflows and minimized the cost of workflow execution under deadline constrained. The authors considered different types of pricing models for simulation.
In [19] Amandeep Verma and Sakshi Kaushal: In this research paper, they proposed a set of algorithms to schedule the deadline constrained bag of tasks applications on hybrid clouds to minimize the execution cost (again only one of the objectives is minimized). Also, this work is only suitable for application consisting of a number of independent tasks. In our previous work, we had proposed deadline and budget constrained heuristic based Genetic Algorithms to schedule workflow tasks over the cloud resources that minimize either computation cost or makespan at a time. The major key issue with all these heuristics and meta-heuristic techniques is that majority of them are only a few works in the past considered bi-objective (time and cost mainly) criteria to schedule workflow tasks in distributed environment.
In [28] Benyi et al: in this paper researchers proposed a fuzzy logic based Pliant system to migrate virtual machines and thus found a trade-off between energy consumption of IaaS data center and execution time. This work only considered the virtual machine scheduling. So, it cannot be directly applicable for workflow scheduling in clouds. From the review of the literature, it has been found that majority of these multi-objective heuristics are only suitable for utility grid model.
In [18] Chopra and Singh: In this paper, they proposed HEFT based hybrid workflow scheduling algorithm for cost optimization within deadline in the hybrid cloud. The authors used the concept of sub deadline for rescheduling and allocation of resources in public cloud and optimized one of the objectives, i.e., execution cost within assigned deadline

III. OBJECTIVES

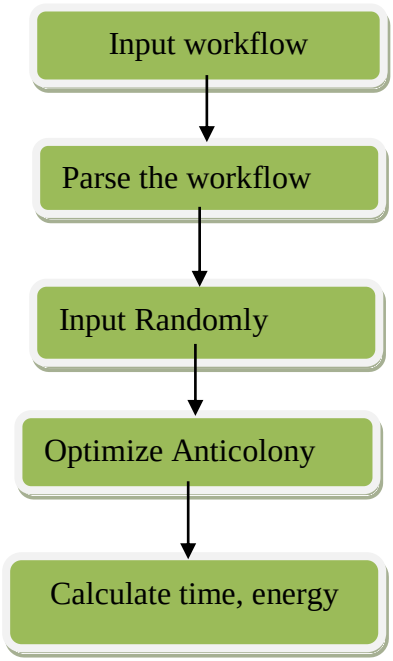
This thesis encompasses a set of objectives that is associated with the milestone of this process. The objectives are given as follows:

1. To reduce processing time of Optimize VM migration by ANT colony optimization method
2. To improve the VM migration on the basis of energy consumption.
3. To improve the failure point by decentralized with Ant colony method.
4. To compare proposed approach by an existing method.

IV.METHODOLOGY

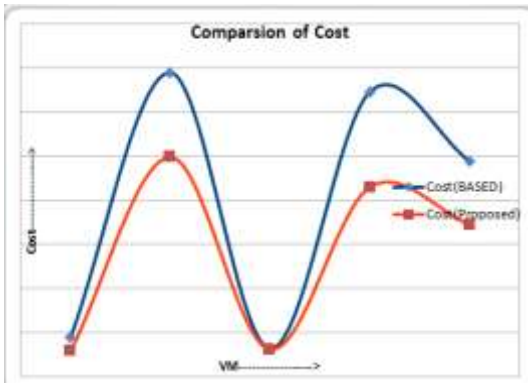
Proposed Methodology

1. Input the workflow in form of .dag file format.
2. Parse the workflow by Topological sorting.
3. After the parsing task input to VM randomly.
4. Optimize the VM by migration with Ant colony optimization.
5. Calculate time and energy of the VM migration



V. RESULT

				CYBERSHAKE		
VM	Cost(BASED)	Cost(Proposed)	Energy(BASED)	Energy(Proposed)	Time Delay(ACO)	Time Delay(Proposed)
two	0.45	0.29	112	100.2756	0.567	0.435
four	3.45	2.49	400	351.88	4.34	3.735
six	0.32	0.31	102	99.3966	0.578	0.465
eight	3.23	2.15	378.45	357.92	3.567	3.225
ten	2.45	1.73	345.34	336.3398	2.976	2.595



REFERENCES

[1] Benyi, A., Dombi, J.D., Kertesz, A.: Energy-aware VM Scheduling in IaaS Clouds using pliant logic. In: Proceeding of the 4th International Conference on Cloud Computing and Services Science pp. 519–526 (2014)

[2] Chopra, N., Singh, and S.: HEFT based workflow scheduling algorithm for cost optimization within deadline in hybrid clouds. In: Proceeding of Fourth International Conference on Computing, Communications and Networking Technologies (ICCCNT), India, pp. 1–6 (2013)

[3] Rodrigo, N.C., Ranjan, R., Anton, B., Cesar, A.F.D.R., Buyya, and R.: Cloudsim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource provisioning algorithms. J. Softw. Pract. Exp. (SPE) 41(1), 23–50 (2011)

[4] Sakellariou, R., Zhao, H., Tsiakkouri, E., Dikaiakos, M.D. scheduling workflows with budget constraint. In: Gorlatch, S., Danelutto, M. (eds.) Integrated Research in GRID Computing, pp. 189–202. Springer (2007)

[5] Verma, A., Kaushal, and S.: Deadline and budget distribution based cost-time optimization workflow scheduling algorithm for the cloud. In: IJCA Proceeding of International Conference on Recent Advances and Future Trends in IT, Patiala, India, pp. 1–4 (2012)

[6] Zheng, W., Sakellariou, R.: Budget-deadline constrained workflow planning for admission control. J. Grid Comput.11 (4), 633–651 (2013)

