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Dynamic Resource Allocation For Virtual Machine In Cloud

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Abstract — *Cloud computing becomes well liked among cloud users by contribution of various resources. Cloud computing gives dynamic resource allocation, for reliable service in pay as use manner to cloud service users. As many users so load on cloud server is high to manage load on server required dynamic resource allocation. proposed Architecture track the CPU intensive jobs using CPU usage and put that heavy CPU usage jobs in queue and take backup. Heartbeat failover monitor check failure of VM, if failure accurse then it calls failover recovery it use backup and restore VM.*

Keywords- *Cloud Computing, Dynamic Resource Allocation, VM live Migration, Virtual Machine, Software-as-a-Service*

I. INTRODUCTION

Cloud computing is an environment for sharing resources without depending upon infrastructure. Cloud computing is a technology where a resources dynamically issue to private and public networks. Compared to traditional distributed computing paradigms, a major advantage of cloud computing is the ability to provide more reliable, affordable, flexible resources for the applications (or users). To manage the applications in cloud computing creates the challenge of on-demand resource provisioning and allocation in response to dynamically changing workloads. Virtualization technology allows a dynamic allocation of VMs to servers. It reduces server demand and increases energy efficiency of data centers. In cloud computing, Resource allocation is the process of appointing available resources dynamically to the required cloud applications. Resource allocation techniques should be optimized to avoid resource contention, resource fragmentation, over provisioning of resources emerges in cloud. In cloud environment, VMs are usually configured during the initialization with the amount of resource (CPU, memory) specified. Resource over-provision is one of the solutions to lower the SLA violation from users point of view but usually leads to poor infrastructure utilization. In contrast, under provision could lead to potential performance degradation despite the increased utilization. Static allocation cannot deliver good results if most VMs exhibit a similar workload behavior. Dynamic resource allocation is able to cover such scenarios. It periodically reallocates VMs to servers. Live-migration technology is used to move a VM during operation from one server to another without noticeable service disruptions. Dynamic allocation calculates a plan that migrates VMs to a small set of servers during low utilization periods and utilizes a larger set of servers if workload demand increases again.

Three types of service as follows:
1. Infrastructure-as-a-service (IaaS)
IaaS permits us to lease IT infrastructure—servers and virtual machines (VMs), operating systems—from a cloud supplier on a pay-as-you-go premise. It empowers organizations to convey applications all the more proficiently by evacuating the complexities required with dealing with their own particular infrastructure.
2. Platform as a service (PaaS)
Platform-as-a-service (PaaS) is technique of cloud computing that supply an on-request condition for creating, testing, conveying and overseeing programming applications.
3. Software as a Service (SaaS):
Software-as-a-service (SaaS) is a technique for delivering software applications over the Internet, on request and regularly on a membership premise. With SaaS, cloud suppliers have and deal with the product application and fundamental framework and handle any support, similar to software updates and security fixing.

II. RELATED WORK

Mahesh B. Nagpure , Prashant Dahiwale , Punam Marbate author proposed an architecture [1] which allocate resources to cloud user. skewness is used to calculate the uneven utilization of multiple resources on the server among VMs and checks available server resource and predict future load to avoid overload on server. dynamic resource allocation system that avoid overload in server effectively by allocating resource evenly among VMs. Proposed resource management system supports green computing and avoid overload by minimizing the number of servers used. The proposed resource allocation algorithm is based on time, cost and number of processor request.

Andreas Wolke and Lukas Ziegler author proposed an architecture [2] that evaluate the applicability of DSAP in a deterministic environment. DSAP is a linear program, calculating VM allocations and live migrations on workload patterns known a priori. Simulations on DSAP indicate that frequent VM reallocations are necessary to achieve a high consolidation efficiency. dynamic allocation approaches like DSAP or reactive control approaches can reduce server demand compared to static allocations at a reasonable high service quality.

Weiwei Lin, James Z. Wang, Chen Liang, Deyu Qi author proposed an architecture [3] threshold-based dynamic resource allocation scheme for cloud computing that dynamically allocate the virtual resources (virtual machines) among the cloud computing applications based on their load changes and can use the threshold method to optimize the decision of resource reallocation. Threshold-based dynamic resource allocation scheme consists of two procedures, Datacenter and Broker. The broker procedure runs on user's machine with the application. The datacenter procedure, which works as the manager of the cloud computing resources, runs on the datacenter's central computer. These two procedures interact with each other to dynamically manage the virtual resources for cloud applications. The experimental results show that the proposed dynamic resource allocation scheme can improve resource utilization and reduce the user usage cost.

Javier Espadas, Arturo Molina, Guillermo Jimenez, Martin Molina, Raul Ramirez, David Concha author proposed an architecture [4] a tenant-based model is presented to tackle over and underutilization when SaaS platforms are deployed over cloud computing infrastructures. This model contains three complementary approaches: tenant-based isolation which encapsulates the execution of each tenant, tenant-based load balancing which distributes requests according to the tenant information, and a tenant-based VM instance allocation which determines the number of VM instances needed for certain workload, based on VM capacity and tenant context weight In this architecture Each Tenant Context object holds information about tenant status such as active users, logged users, subscriber ID, total of requests, etc..

Yuda Wang, Renyu Yang, Tianyu Wo, Wenbo Jiang, Chunming Hu author proposed an architecture [5] that combine long running VM service with typical batch workload like MapReduce. The objectives are to improve the holistic cluster utilization through dynamic resource adjustment mechanism for VM without violating other batch workload executions. VM migration is utilized to ensure high availability and avoid potential performance degradation. The experimental results reveal that the dynamically allocated memory is close to the real usage with only 10% estimation margin, and the performance impact on VM and MapReduce jobs are both within 1%.

III. PROPOSED WORK

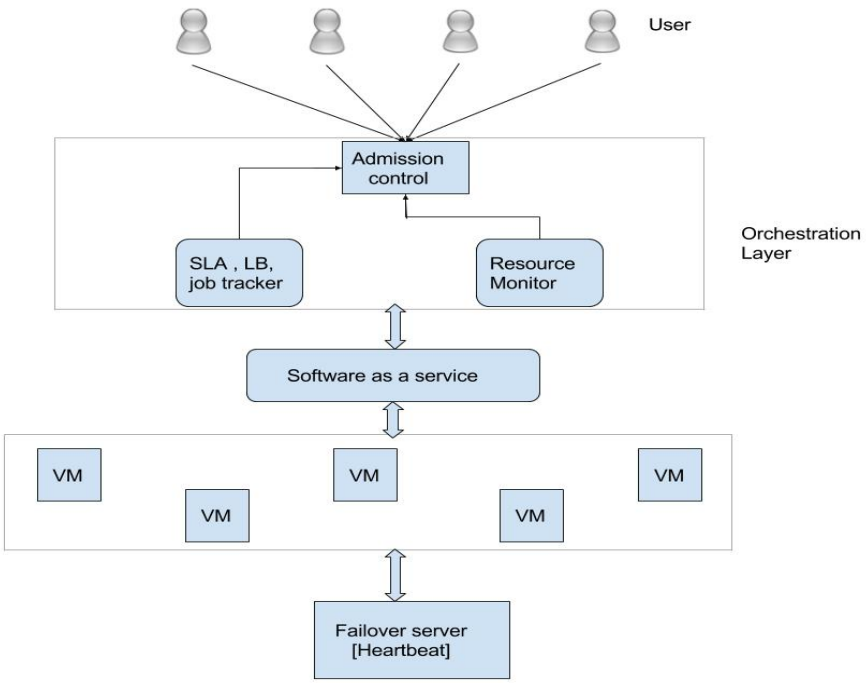

Figure 1. Proposed architecture

In proposed architecture hybrid cloud environment is used for dynamic resource allocation. In this architecture CPU intensive jobs are tracked using job tracker and resource monitor will account resource utilization. Admission control keeps the information of job tracker and Resource Monitor. Software-as-a-service layer used for usage

monitoring. If VM is used more then 80% then make the queue of VM. HBF(Heartbeat Failover) is more used then HBT(Heartbeat Threshold) then call failover recovery. In failover recovery there is BID(Backup Id of VM) is searched and restore backup to another VM using precopy and postcopy image.

IV. RESULT AND ANALYSIS

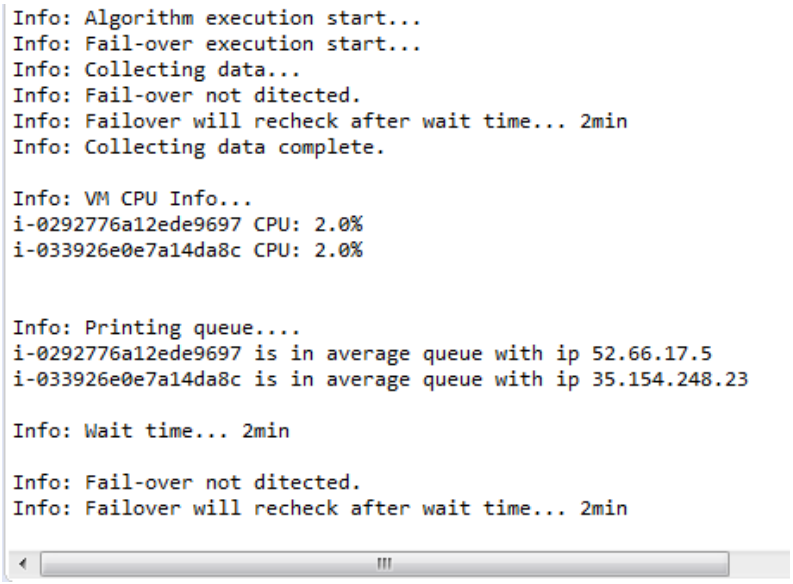

Figure 2. Console output-1

V. CONCLUSION

Dynamic resource allocation is widely used in VM migration. It can reduce server demand, use minimum energy consumption and give optimize performance. In this proposed architecture VM failover is included for better resource management. Through live VM migration energy can be saved and achieve good performance.

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