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A Survey on Efficient Resource Allocation for Virtualized Energy Aware Live Migration in Cloud Computing

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Abstract— *Cloud computing infrastructure, platform, and software (applications) as services, which are made available to consumers as subscription based services. Cloud computing is defined as the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated sub systems such as monitors, printers, storage devices, and networking and communications systems efficiently and effectively with minimal or no impact on the environment. In this new area of technology, cloud computing offers delivery of on-demand computing resources, everything from application to data center over the Internet on a pay for use basis. Cloud computing offers guaranteed services. Cloud computing allows customers to scale up and down their resources based on their dynamic needs. Cloud computing is quite popular among users for providing on demand services. It refers to both the applications delivered as services over the Internet and the hardware and systems software in the data centers that sustain such services. The proposed work is to make a better use of distributed resources, which the massive computers constitute, while offering dynamic flexible infrastructures and Quality-of-Service (QoS) guaranteed service.*

Keywords— *Cloud Computing; IaaS; DVFS; Quality-of-Service; Service level Agreement; Virtual machine Scheduling*

I. INTRODUCTION

Cloud computing is the delivery of computing services over the Internet. Cloud services allow individuals and businesses to use software and hardware that are managed by third parties at remote locations. Cloud computing encompasses virtualization and other associated techniques so as to provide computing as a utility model which facilitates scalability. Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources.

The cloud service models are generalized into three categories: Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS).

Infrastructure as a Service is a Provisioning processing, storage, networks, and other fundamental computing resources means the consumer of those resources does not manage or control the underlying cloud physical infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components. Web hosting is a simple example of Iaas. The cloud deployment models are generalized to four categories: Private Cloud, Public Cloud, Community Cloud, Hybrid Cloud.

Private Clouds : For the purpose of exclusive use by a single organization and typically controlled, managed and hosted in private data centers. The operation of private clouds may also be outsourced to a service provider of third party.

Public Clouds : For the purpose of use by multiple organizations (tenants) on a shared basis and hosted by a service provider of third party.

Community Clouds : For the purpose of use by a group of related organizations who wish to make use of a common cloud computing environment.

Hybrid Clouds – When a single organization adopts both private and public clouds for a single application in order to take advantage of the benefits of both.

Software as a Service model provides cloud user, a ready to use application delivered over the Internet. It is a service where we use a complete application running on someone else's system. The software licence may also limit the number of users and/or devices where the software can be deployed. Software as a Service users, however, subscribe to the software rather than purchase it, usually on a monthly basis. Applications are purchased and used online with files saved in the cloud rather than on individual computers. Examples are Web-based email and Google Documents.

Platform as a service is a cloud computing model that delivers applications over the Internet. In a PaaS model, a cloud provider provides hardware and software tools usually those needed for application development to its users as a service. A PaaS provider hosts the hardware and software on its own organization. PaaS frees users from having to install in-house hardware and software to develop or run a new application. An appropriate example of PaaS is Google AppEngine, App Engine will scale your application automatically in response to the amount of traffic it receives so you only pay for the resources you use. Just upload your code and Google will manage your app's availability. There are no servers for you to provision or maintain. It is a service where we develop applications using Web-based tools so they run on systems software and hardware provided by another company.

II. LITERATURE SURVEY

2.1 Predictive Control for Energy_Aware Consolidation in Cloud Datacentres.

The widespread diffusion of Infrastructure-as-a-Service and cloud computing paradigms requires large-scale data centers with thousands of running nodes and high energy demands, thus causing relevant economical and environmental costs. In this perspective, the paper presents an energy-aware consolidation strategy based on predictive control, in which virtual machines are migrated among nodes to reduce the number of active units. To describe a general cloud infrastructure, a discrete-time dynamic model is presented together with constraints. The migration strategies of virtual machines are obtained by solving finite-horizon optimal control problems involving integer variables. To reduce the computational effort, approximate solutions are searched for via Monte Carlo optimization. Besides power savings, the proposed method allows one to reduce violations of the service level agreement and aggressive on or off cycles of nodes. To showcase the effectiveness of the proposed approach, preliminary simulation results are provided.

2.2 Energy Efficient Resource Management in Virtualized Cloud Data Centers

Rapid growth of the demand for computational power by scientific, business and web-applications has led to the creation of large-scale data centers consuming enormous amounts of electrical power. We propose an energy efficient resource management system for virtualized Cloud data centers that reduces operational costs and provides required Quality of Service (QoS). Energy savings are achieved by continuous consolidation of VMs according to current utilization of resources, virtual network topologies established between VMs and thermal state of computing nodes.

We present first results of simulation-driven evaluation of heuristics for dynamic reallocation of VMs using live migration according to current requirements for CPU performance. The results show that the proposed technique brings substantial energy savings, while ensuring reliable QoS. This justifies further investigation and development of the proposed resource management system.

2.3 Energy Conscious Dynamic Provisioning of Virtual Machines using Adaptive Migration Thresholds in Cloud Data Center.

The fast growing demand for computational power utilized by modern applications with rapidly changing Cloud computing technology have directed to the foundation of large-scale virtualized data centers. Such data centers consume massive amounts of electrical energy resulting in high operating costs and carbon dioxide (CO2) emissions. Dynamic consolidation of virtual machines (VMs) using Dynamic migration and switching off idle nodes to the sleep mode provide better optimized resource usage, lower energy consumption, which provides high performance & better quality of service. However incompatibility between specification of physical machine and user requests in cloud, leads towards problems like poor load balancing, energy-performance trade-off and large power consumption etc. Also the VM placement should be optimized continuously in an online manner because of fast varying workloads in current application.

To understand the inferences of the online behaviour of the problem, we conduct competitive analysis of optimal online deterministic & Adaptive Migration Thresholds based algorithms for the single VM migration and dynamic VM consolidation problem. Concentrating at this issue, this paper presents an energy conscious, power aware load balancing strategy based on adaptive migration of virtual machines (VMs).

This strategy will be applied to virtual machines on cloud, considering higher and lower thresholds for migration of virtual machines on the servers also here we consider RAM & Bandwidth for better performance & load balancing. If the load is greater or lower then defined upper & lower thresholds, VMs will be migrated respectively, boosting resource utilization of the cloud data center and reducing their energy consumption. To reduce number of migration we integrate minimum migration time policy which is capable of reducing the number of migration and the energy consumption of virtual machine migration also achieves load balancing and meet service level agreement (SLA) requirements.

2.4 Energy Aware Resource Allocation in Cloud Datacenter.

The greatest environmental challenge today is global warming, which is caused by carbon emissions. Energy crisis brings green computing, and green computing needs algorithms and mechanisms to be redesigned for energy efficiency. Green IT refers to the study and practice of using computing resources in an efficient, effective and economic way. Currently, a large number of cloud computing systems waste a tremendous amount of energy and emit a considerable amount of carbon dioxide. Thus, it is necessary to significantly reduce pollution and substantially lower energy usage.

The proposed energy aware resource allocation provision data center resources to client applications in a way that improves energy efficiency of the data center, while delivering the negotiated Quality of Service (QoS). In particular, in this paper we conduct a survey of research in energy-efficient computing and propose: architectural principles for energy-efficient management of Clouds; energy-efficient resource allocation policies and scheduling algorithms considering QoS expectations and power usage characteristics of the devices. It is validated by conducting a performance evaluation study using CloudSim toolkit.

2.5 Energy-Performance Trade-offs in IaaS Cloud with Virtual Machine Scheduling.

In the cloud data centers, how to map virtual machines (VMs) on physical machines (PMs) to reduce the energy consumption is becoming one of the major issues, and the existing VM scheduling schemes are mostly to reduce energy consumption by optimizing the utilization of physical servers or network elements. However, the aggressive consolidation of these resources may lead to network performance degradation.
In view of this, this paper proposes a two-stage VM scheduling scheme:

(1) We propose a static VM placement scheme to minimize the number of activating PMs and network elements to reduce the energy consumption;

(2) In the premise of minimizing the migration costs, we propose a dynamic VM migration scheme to minimize the maximum link utilization to improve the network performance.

This scheme makes a tradeoff between energy efficiency and network performance. We design a new two stage heuristic algorithm for a solution, and the simulations show that our solution achieves good results.

III. CONCLUSION

Efficient Resource Allocation has reduced the energy consumption in datacenters by the use of Dynamic Voltage and Frequency Scaling (DVFS) technique along with partial job migration from one virtual machine to another virtual machine under the constraint that migrated job should be completed within the stipulated deadline in an efficient manner. Resource allocation and Efficient energy consumption techniques also implemented in cloud datacenter. In the current situation the default governor in DVFS and Live Migration must be described. The proposed work is to make a better use of distributed resources, which the massive computers constitute, while offering dynamic flexible infrastructures and Quality-of-Service (QoS) guaranteed service. In future it will be overcome all the governors and migration can be implement along with other techniques to improve the energy efficiency.

REFERENCES

[1] Mauro Gaggero and Luca Caviglione, "Predicitive Control for Energy Aware Consolidation in Cloud Datacenters" IEEE Tranctions on Control Systems Technology, 1063-6536, 2015.

[2] Christine Mayap kamga, "CPU frequency emulation based on DVFS" IEEE/ACM Fifth International Conference on Utility and Cloud Computing, 367 – 374, 2012.

[3] Seyed Mohammad Ghoreyshi, "Energy-Efficient Resource Management of Cloud Datacenters Under Fault Tolerance Constraints" International Green Computing Conference, 1-6, 2013.

[4] Rodrigo N. Calheiros, Rajiv Ranjan, Anton Beloglazov, C esar A. F. De Rose, Rajkumar Buyya, "CloudSim: a toolkit for modeling and simulation of cloud computing environments and evaluation of resource" John Wiley & Sons, Ltd., 23-50, 2010.

[5] Kyong Hoon Kim,Anton Beloglazov,Rajkumar Buyya, "Power-Aware Provisioning of Cloud Resources For Real-Time Services" ACM, 978-984, 2009.

