Disintegration and Power Load Supply in Cloud

S.P.Audline Beena, C.M.Narmatha, S.Ranjani
Department of Computer Science and Engineering, Sri Muthukumaran Institute of Technology, Chennai, India.

Abstract – At present the energy consumption of the cloud servers are unchecked or undistributed hence it leads to some servers underutilized and some servers being over utilized. To address the energy consumption problem we propose a distribution process which efficiently distributed energy among the underutilized and over utilized servers to make them both to average and turning off the unnecessary servers so that the basic energy consumption of one full server is saved. First the critical points for a server to be classified as underutilized and average performance and over utilized is set, once the virtual machines has been distributed according to the load the distribution algorithm runs to find which servers are underutilized and average performance. Once the servers are identified the virtual machines from underutilized servers are transferred to average performance serers and the underutilized servers are turned off. While the transfer of virtual machine is being done it also makes sure that the average servers are not changed to over utilized servers to save physical damage to the servers.

Index Terms – Power Load, Cloud, Energy, Servers.

1. INTRODUCTION

The demand for cloud services continues to increase at a global scale, so does the energy consumption of the service providers' data centers and, ultimately, their negative impact on the environment. The work load is distributed with little computational modules called as the

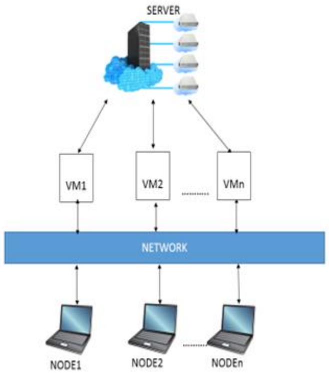
Virtual machines which acts as intermediate to data transfers. The allocation technique here aims to make the allocation of virtual machines into minimum number of servers as possible. To achieve that we move the virtual machine allocation from the underutilized servers to the average servers to reduce the consumption. Thus the underutilized servers can be completely turned off.The moving of virtual machines in large scale and without disconnection still poses as a problem.

2. RELATED WORK

In Cloud computing through VM consolidation is a relatively new research topic, however, it has received extensive attention in the last few years as data center operators struggle to minimize their energy consumption and thereby, their operational costs. In this section, we survey related work in the field of energy-efficient load balancing for private cloud environments so as to appropriately position our approach and its contribution.In their recent work , Sampaio and Barbosa propose a mechanism for the dynamic consolidation of VMs in as few physical machines as possible; the aim is to reduce the consumed energy of a private cloud without jeopardizing the compute nodes reliability. The approach is implemented via a sliding-window condition detection mechanism and relies on the use of a centralized cloud manager that carries out the VM-to-PM mappings based on periodically collected information.The ecoCloud approach, proposed by Mastroianniet al. , is another effort for power-efficient VM consolidation.In ecoCloud, the placement and migration of VM instances are driven by probabilistic processes considering both, the CPU and RAM utilization. ecoCloud enables load balancing decisions to be taken based on local information,although the framework still relies on a central data center manager for the coordination of the VM host servers.Beloglazov and Buyya described the architecture and specification of an energy efficient resource management system for virtualized cloud data centers in their past work The presented system is semi-decentralized as it has a hierarchical architecture, while VM consolidation is performed through a distributed solution of the bin-packing problem. In another, more recent work , Beloglazovet al. present a set of algorithms for energy-efficient mapping of VMs to suitable cloud resources in addition to dynamic consolidation of VM resource partitions. The algorithms are implemented by a Green Cloud computing infrastructure,which introduces an additional layer to the typical cloud architecture. This infrastructure comprises a set of centralized components, i) energy monitor which observes energy consumption caused by VMs and physical machines and ii) VM manager which is in charge of provisioning new VMs as well as reallocating VMs across physical machines on the basis of the information collected by the energy monitor. SCORCH, proposed by Dougherty et al. , is a modeldriven approach for optimizing the configuration, energy consumption, and operating cost of cloud infrastructures.

3. SYSTEM ARCHITECTURE

Client server architecture works when the client computer sends a resource or process request to the server over the network connection, which is then processed and delivered to the client. A server computer can manage several clients simultaneously whereas one client can be connected to several servers at a time,each providing a different set of services.Web server serves many simultaneous users with web page and or website data.



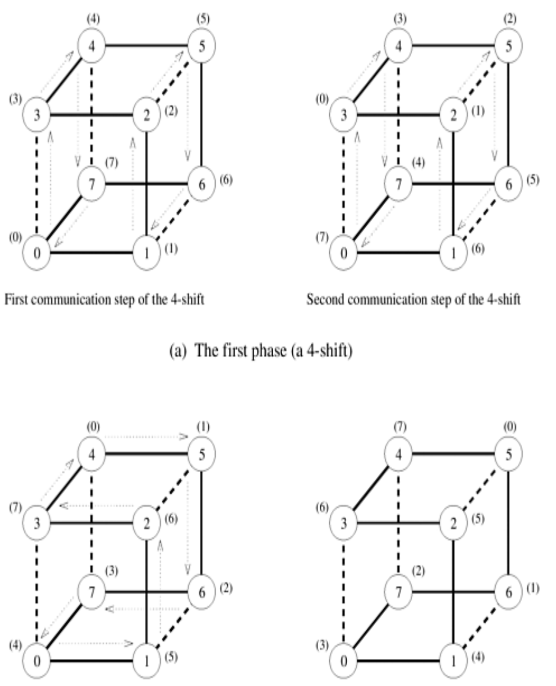
Fig(1)

4. ADVANTAGE

This energy load distribution among nodes increase the lifetime of the server and the automatic on and off of the servers will reduce the heat production and also decreases the power consumption.

5. LOAD BALANCING

Load can be balanced by sharing or distributing the workload among the nodes in a hyper cubical format. The workload can be distributed from over utilized node to under utilized and average utilized nodes to reduce the high power consumption and to increase the lifetime of the server by automatic off of the under utilized nodes.



(a) The first phase (a 4-shift)

(b) The second phase (a 1-shift)

(c) Final data distribution after the 5-shift

Fig(2)

6. CONCLUSION

We presented a fully decentralized approach for managing the workload of large ,enterprise cloud data centres in an energy efficient manner.Our approach comprises a hypercube overlay for the organisation of the data centers compute nodes,and a set of distributed load balancing algorithms, which relay on live VM migration to shift workload between nodes.

7. FUTURE WORK

In future work, we plan to implement and integrate our decentralized wokload manager in an open-source cloud operating system, such as e.g., OpenStack or OpenNebula . Such implementation will also allow us to experiment with real-world use cases, although such experimentation is likely to be carried out at a smaller scale than our simulations, due to lack of access to large-scale physical resources. Furthermore, we would like to expand our model in order to consider the power consumptions inflicted by other resources of the data center, such as the compute nodes disk, RAM memory, and network, even though those are usually overruled by the CPU power consumption.Along the same line, we plan to investigate ways to introduce additional parameters into our load-balancing algorithms, so as accommodate less homogeneous settings where, on the one hand, the compute nodes offer different hardware and/or software resources, while the VM instances pose different hardware requirements too.Communication-aware VM scheduling approaches such as the one proposed by Guan et al. could also be effectively combined with our load-balancing scheme to allow for a more fine-grained selection of the VM instances to be migrated.Finally, we are interested in incorporating appropriateVM and VM migration power–metering techniques and mechanisms that will allow us to assess the efficacy of our approach on the basis of more accurate and pragmatic power metrics.

REFERENCES

[1] M. Armbrust, A. Fox, R. Griffith, A. D. Joseph, R. Katz,A. Konwinski, G. Lee, D. Patterson, A. Rabkin, I. Stoica, andM. Zaharia, "A view of cloud computing," Commun. ACM,vol. 53, no. 4, pp. 50–58, 2010.

[2] R. Buyya, C. S. Yeo, S. Venugopal, J. Broberg, and I. Brandic,"Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the 5th utility," Future Generation Comput. Syst., vol. 25, no. 6, pp. 599–616, 2009.

[3] L. A. Barroso and U. H€olzle, The Datacenter as a Computer: An Introduction to the Design of Warehouse-Scale Machines, 1st ed. San Rafael,CA, USA: Morgan and Claypool Publishers, 2009.

[4] L. A. Barroso and U. H€olzle, "The case for energy-proportional computing," IEEE Comput., vol. 40, no. 12, pp. 33–37, Dec.2007.

[5] A. Kulkarni, "Dynamic virtual machine consolidation," Google Patents, US Patent App. 13/604,134, Sept. 5, 2012.

[6] A. Roytman, A. Kansal, S. Govindan, J. Liu, and S. Nath,"PACMan: Performance aware virtual machine consolidation," in Proc. 10th Int. Conf. Autonomic Comput., Jun. 2013, pp. 83–94.

[7] T. C. Ferreto, M. A. Netto, R. N. Calheiros, and C. A. De Rose,"Server consolidation with migration control for virtualized data centers," Future Generation Comput. Syst., vol. 27, no. 8, pp. 1027–1034, 2011.

[8] W. Shi and B. Hong, "Towards profitable virtual machine placement in the data center," in Proc. 4th IEEE Int. Conf. Utility Cloud Comput., Melbourne, Australia, Dec. 2011, pp. 138–145.

[9] C. Clark, K. Fraser, S. Hand, J. G. Hansen, E. Jul, C. Limpach, I.Pratt, and A. Warfield, "Live migration of virtual machines," in Proc. 2nd Symp. Netw. Syst. Design Implementation, May 2005, vol.2, pp. 273–286.

[10] K. Tsakalozos, V. Verroios, M. Roussopoulos, and A. Delis, "Timeconstrained live VM migration in share-nothing IaaS-clouds," in Proc. 7th IEEE Int. Conf. Cloud Comput., Anchorage, AK, USA, Jun.2014, pp. 56–63.

[11] W. Voorsluys, J. Broberg, S. Venugopal, and R. Buyya, "Cost of virtual machine live migration in clouds: A performance evaluation,"in Proc. 1st Int. Conf. Cloud Comput., Beijing, China, Dec.2009, pp. 254–265.

[12] T. Hirofuchi, H. Nakada, S. Itoh, and S. Sekiguchi, "Reactive consolidation of virtual machines enabled by postcopy live migration," in Proc. 5th Int. Workshop Virtualization Technol. Distrib.Comput., San Jose, CA,USA,Jun. 2011, pp. 11–18.