International Journal of Innovative Research and Advanced Studies (IJIRAS)
Volume 4 Issue 5, May 2017

ISSN: 2394-4404

A Review Paper On Green Cloud Computing Environment- A New Systematic Efficient Approach

Neeraj Singla
PhD Student, Guru Kashi University

Dr. Vijay Laxmi
Dean, UCCA, Guru Kashi University

Abstract: ***In cloud computing environment all the services are delivered to users. Now a time Cloud users are increased day by day which has compelled the cloud service provider it companies or telecommunication companies to open more data centers for hosting their services very efficiently or effectively so all the users accessed it without facing any difficulty. As we are seen the growing demand of Cloud computing has increased so the energy consumption of cloud data centers also increased. High energy consumption not only increases the operational cost but also reduces the profit margin of cloud service providers companies and affects the environment in the form of its carbon emission which is released from the it companies. So, in order to make cloud computing an eco friendly technology some new energy-efficient methods are necessary to save the environment. Hence, this paper motivated the generation to focus on green computing.***

Keywords: VPN, ICT, GREEN COMPUTING, DATA CENTERS

I. INTRODUCTION

Cloud computing applied the virtualization concept for the efficient using the hardware and software. Its main purpose is to provide ease to its end users with the help of on demand self-service which is as per the user requirement like broad network access, resource pooling and measured performance. In cloud computing resources like hardware or software are made available by many companies. These resources can be used by different users on the paid basis services by it or telecommunication companies. These services provided by cloud computing are broadly classifies as in following types -Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS). Cloud service providers companies such as Amazon, Sales force, Microsoft, Google, IBM and Sun-Microsystems has established many new data centers for hosting cloud applications as per seen the demand of users. Because at that time all the users used business application, gaming portal and social networking sites. The cloud computing provide financial benefits but its power consumption and carbon emission has became a major environmental issues which effected on environment very badly so saving the environment is very necessary. All these major problems are resolved by using green computing. Green computing efficiently manages its resources by keeping environment at center.

II. EVOLUTION OF CLOUD COMPUTING IN ENVIRONMENT AFTER GRID COMPUTING

The origins of the clouds in this environment are come from the mainframe computing from the previous time. Mainframe systems provide the central storage for all the software under which data is present. As computing technology are going became smaller, cheaper. The computing power began to decentralize itself. Hence there was a need to raise of Personnel computers in the present environment. J.C.R. Licklider brought ARPANET which has come in environment on the basis of todays. In ARPANET all multiple systems are connected in a network and data is transferred through the circuit switching technique. With the increase in demand of internet it used at various stages in life. So all the telecommunication companies has started to providing the virtualized private network under which many users were sharing same physical infrastructure at different platforms

.This VPN gives the proper bandwidth utilization under Internet technology which has come from the shared web hosting which was considered as most economical web hosting in the system. It was evolved into virtual server where a single server is partitioned into multiple servers. In 2000s automated computing came in the form of Grid computing technology. At the present time it came with full infrastructure demand, multi-tenancy like cloud computing. This utility based computing is known as cloud computing. We also introduce the green computing in the present environment which is necessary to save the environment.

III. GREEN COMPUTING - A NEW SYSTEMATIC APPROACH

It is defined as the process of designing, manufacturing, and disposing computer devices which will not affect environment. Now a time it is noticed that it industry produces more bad effect on environment in the form of carbon emission which is released from industry servers. Now a day's all the Information and Communication Technologies industry generates about 2% of the total global CO2 emissions. Most of the IT companies have realized that by using green computing we will not only save environment but will also cut the overall cost of the system. The core green computing technologies are: Virtualization, Green Data Center, Green Cloud Computing, Power Optimization and Grid Computing. This technology is beneficial because

- ✓ Energy consumption should be reduced by using green computing.
- ✓ Energy should be saved during its idle state by using green computing.
- ✓ Ozone layer stops to deplete by using the green computing.
- ✓ Reduces harmful effects of computing resources.
- ✓ Reduce computing wastes.

IV. CLOUD EMPOWERING GREEN COMPUTING TO MAKE IT SAFE FOR ENVIRONMENT

Cloud Infrastructure is concerning with environment regarding the energy consumption and carbon emission which is released from the it companies. Cloud computing used the virtualization concept that is provides a subset of computing resources so that they can be accessed in the proper way so that it give benefits over the original configuration in cloud computing environment.

The following factor has enabled the Cloud Computing to lower energy usage and carbon emissions from ICT:

- ✓ *Task Allocation Dynamically:* IT companies deploy far more infrastructure than the requirement and guarantees the availability of services to maintain certain level of service but under cloud computing this provision not give, it monitors and predict the demand and allocates resources according to the demand which is given by the user. So the datacenters always maintain the active servers according to demand, which results in low energy consumption and low carbon emission.
- ✓ *Followed Multi-tenancy Approach:* Cloud computing infrastructure reduces overall energy usage and carbon emissions. The SaaS providers serve same infrastructure and software to multiple users in the system. This approach is very energy efficient because there is no need of multiple software's to be installed on different infrastructure, which can minimize the need of extra infrastructure so it reduce the carbon emission.
- ✓ *Followed Server Utilization Technique:* By using virtualization technology, multiple applications can be hosted and executed on the same server; server running at higher utilization can process more workload with similar power usage. So green computing play a very important role in computing environment.
- ✓ *Followed Datacenter Efficiency Technique:* The power efficiency of datacenters has major impact on the total energy usage of Cloud computing. By using the most energy efficient technologies, cloud providers can significantly improve the Power Usage Effectiveness of their datacenters. By using different load balancing techniques a highly loaded datacenter can transfer its load to free data centers.

V. RESEARCH FIELDS UNDER GREEN CLOUD COMPUTING

It is seen that the environmental footprint from data centers will going to be triple between 2002 to 2017, which is currently 7.8 billion tons of CO2 per year. There are many reports on Green IT analysis of Clouds and datacenters that shows that Cloud computing is "Green computing", while others show that it will lead to alarming increase in Carbon mission. In order to make cloud computing a green computing we need to work on certain areas such as:

- ✓ To enable the green Cloud datacenters, the Cloud providers need to understand and measure existing datacenter power and cooling designs, power consumptions of servers and their required cooling level, and its equipment resource utilization to achieve maximum efficiency.
- ✓ All available resources should be utilized efficiently but set up new infrastructure for global coverage, service offering, and competitiveness should not be there.
- ✓ It is the responsibility of to both service providers and customers to make sure that new technology should not produce any health hazard to human society.
- ✓ Used only those technologies which make the environment good.

VI. CONCLUSION

In this paper, I discussed a brief introduction of cloud; how it has evolved from shared web hosting .This paper has also explained the concept of green computing where all the available resources should be utilized in an efficient and eco-friendly manner. Some of the characteristics of cloud computing make it as a green computing. The technologies which are discussed in the paper which will not only reduce

overall power consumption at cloud data centers but also reduce CO2 emission. This Green cloud computing will be beneficial for service providers companies as well as for the environment.

REFERENCES

[1] Saurabh Kumar et.al "Green cloud computing and environmental sustainability.", pp-315-340, Harnessing Green IT: Principles and Practices, Wiley Press, UK, October 2012.
[2] Sindhu S. Pandya "Green Cloud Computing", International Journal of Information and Computation Technology, ISSN 0974-2239 Volume 4, pp. 431-436, 2014.
[3] Rivoire et.al "A balanced energy-efficiency benchmark", in Proc. ACM SIGMOD International Conference on Management of Data, pp 365-376, USA, 2014.
[4] L. Barton Browne et.al "Experimental Analysis of Insect Behaviors", Springer Science & Business Media, Germany, 2012.
[5] A. Beloglazov et.al "Energy-aware resource allocation heuristics for efficient management of data centers for cloud computing," Future Generation Computer Systems, vol. 28, no. 5, pp. 755–768, 2012.
[6] G. S. Akula et.al "Heuristics for migration with consolidation of ensembles of virtual machines," Proc. Communication Systems and Networks, 6th Int. Conf., pp.1-4, 2014
[7] J. Whitney et.al "Data Center Efficiency Assessment." Natural Resources Defense Council, USA, 2014.