

Study Of Energy And Time Optimization Using Green Computing In Cloud Environment.

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Abstract: *Cloud computing is widely used in business and IT companies. It allows to host the application from consumers, scientists and various domains on payments basis. However data centres hosting cloud computing applications consume huge amounts of energy, contributing to high operational costs and evolution of carbon to the environment. The data centres or clouds have high capacity of data storage and processing. As per the features provided it requires huge amount of power supply and resources. Global warming is current issue which everyone is facing. Also the energy shortages and global climate change leading our concerns these days, the power consumption of data centers has become a key issue. The area of Green computing is also becoming increasingly important in a world with limited energy resources and an ever-rising demand for more computational power. Therefore, we need green cloud computing solutions that can not only save energy, but also reduce operational costs. In Cloud computing high performance cloud servers are used for advance computational needs. Due to these computational unit executions, a large amount of power consumed, on the other hand the effect is that some harmful gases are also released in a similar amount of energy. Green Computing is the concept which is trying to confine this procedure by inventing new methods that would work efficiently while consuming less energy and making less population. This paper focuses on approaches to Green computing techniques, in order to optimize energy and time consumptions.*

Keywords - *Cloud Computing, Green Computing, Virtualization, Energy Efficiency, Resource Management*

I. INTRODUCTION

Cloud computing delivers infrastructure, platform, and software (applications) as services, which are made available to consumers as subscription-based services under the pay-as-you-go model. Clouds aim to drive the design of the next generation data centres by architecting them as networks of virtual services. So that users can access and deploy applications from anywhere in the world on demand at competitive costs depending on their requirements. Cloud computing offers significant benefits to IT companies by freeing them from the low-level task of setting up basic hardware and software infrastructures and thus enabling focus on innovation and creating business value for their services. As computer system increasing so the amount of energy conservation and the carbon contents are increasing in atmosphere. Measure being taken to reduce the problem superficially called "green computing". Green Computing is practice of designing manufacturing, using and disposing of computer server and associated sub system such as monitors, printer's storage devices networking and communication system efficiently and effectively with no impact on environment Green Computing is defined as the study and practice of using computing resources efficiently through a methodology that combines reducing hazardous materials, maximizing energy efficiency during the product's lifetime, and recycling older technologies and defunct products. Green Computing enables companies to meet business demands for cost-effective, energy-efficient, flexible, secure & stable solutions while being environmentally responsible. Every data center transaction requires power. Efficiency, equipment disposal and recycling, and energy consumption, including power and cooling costs, have become priority for those who manage the datacenters that make businesses run.

II. BENEFITS OF GREEN COMPUTING

- 1.Reduced energy usage from green computing techniques translates into lower carbon dioxide emissions, stemming from a reduction in the fossil fuel used in power plants and transportation.
2. Conserving resources means less energy is required to produce, use, and dispose of products.
3. Saving energy and resources saves money during idle operations.
4. Green computing even includes changing government policy to encourage recycling and lowering energy use by individuals and businesses and thus uses eco- friendly sources of energy.
5. Reduce harmful health effects and the risk existing in the laptops such as chemical known to cause cancer, nerve damage and immune reactions in humans.

III. APPROACHES TO GREEN COMPUTING

Green computing can be achieved by different approaches.

Software and deployment optimization: An approach to Green Computing.

- i) Algorithmic efficiency
- ii) Resource allocation
- iii) Virtualizing
- iv) Terminal servers

i) Algorithm Efficiency: Algorithmic efficiencies are the properties of an algorithm which relate to the amount of computational resources used by the algorithm. An algorithm must be analyzed to determine its resource usage. Algorithmic efficiency can be thought of as analogous to engineering productivity for a repeating or continuous process. An algorithm is considered efficient if its resource consumption (or computational cost) is at or below some acceptable level. It should run in a reasonable amount of time on an available computer. There are many ways of measuring resource utilization of an algorithm. The two major components to be considered are time and memory space required for its execution.

Analyse the algorithm, typically using time complexity analysis to get an estimate of the running time as a function as the size of the input data. The result is normally expressed using (Order of) Big O notation. This is useful for comparing algorithms, especially when a large amount of data is to be processed. More detailed estimates are needed for algorithm comparison when the amount of data is small (though in this situation time is less likely to be a problem anyway). It is concerned with the use of main memory (often RAM) while the algorithm is being carried out. There are up to four aspects of memory usage to consider: The amount of memory needed to hold the code for the algorithm, the amount of memory needed for the input data , the amount of memory needed for any output data and the amount of memory needed as working space during the calculation

ii) Resource allocation: In cloud computing, Resource allocation is the process of appointing available resources dynamically to the required cloud applications. In cloud the resource allocation is based on the infrastructure as a service (IaaS) and it provided provision use resource which can include in operating systems and applications to the consumer. Resource allocation techniques should be optimized to avoid resource contention, resource fragmentation, over provisioning of resources emerge in cloud. There might be situation that two applications try to access the same resource at the same time and some case appear when there are limited resources and the demand for resources is high. Resource allocation techniques should satisfy multiple applications which need different types of resources such as CPU, memory, I/O devices

iii) Virtualization: Computer virtualization refers to the abstraction of computer resources dynamically based on the application request. With virtualization, a system administrator could combine several physical systems into virtual machines on one single, powerful system, thereby unplugging the original hardware and reducing power and cooling consumption. Several commercial companies and open-source projects now offer software packages to enable a transition to virtual computing. Intel Corporation and AMD have also built proprietary virtualization enhancements to the x86 instruction set into each of their CPU product lines, in order to facilitate virtualized computing. Virtualization in which computing components running on a virtual basis rather than real, so that management and optimizes resource utilization. It is the concept used to attain maximum utilization with limited fixed resources. Virtualization technology can enlarge the capacity of the hardware by simple software re-configuration process and intends are to totally utilize the expensive mainframe resources. Load balancing of the entire system can be managed dynamically by using virtualization technology where it becomes feasible to remap virtual machines (VMs). However, in order to get the best performance, the virtual machines have to totally utilize its resources by modifying cloud computing environment dynamically.

iv) Terminal Servers: Terminal servers have also been used in green computing methods. Terminal Services for Windows and the Aqua Connect Terminal Server for Mac, both deliver operating systems to end users. Using this method user's terminal in to a central server. All of the computing is done at the server level but the end user experiences the operating system. There has been an increase in using terminal services with thin clients to create virtual labs. Thin clients use up to 1/8 the amount of energy of a normal workstation. Using thin clients with a terminal server delivers the Windows or Mac operating system to end users while also decreasing energy costs and consumption.

IV. CONCLUSION

In this paper, we analyze techniques for managing power and energy in computing system. Also we have studied about efficiency of energy using virtualization. It also gives the benefits of using green computing technology in cloud computing. The major issue of pollution caused in environment is due to evolution of heat

and residue generated from electrical operations. This paper focuses on how to control the pollution . Energy and time can be reutilized and optimized by using combination of green computing in cloud

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