ISSN: 2393-8528

IJICSE
Open Access

Contents lists available at www.ijicse.in

International Journal of Innovative Computer Science & Engineering

Volume 2 Issue 1; 2015, Page No.01-04

Green Computing

Neha Tiwari

Assistant Professor

Apex Institute of Management & Science, V.T Road, Mansarovar, Jaipur, Rajasthan, India

ARTICLE INFO

Received 12 Jan. 2015
Accepted 20 March. 2015

Corresponding Author:

Neha Tiwari

1 Apex Institute of Management & Science, V.T Road, Mansarovar, Jaipur, Rajasthan, India

Email: neha.08sep@gmail.com

ABSTRACT

Green computing has been an active research area which studies an efficient use of computing resources. It is a growing import subject that creates an urgent need to train next generation computer scientists or practitioners to think "green." However, green computing has not yet been well taught in computer science (CS) or computer engineering programs (CE) programs, partly due to the lack of rooms to add a new course to those programs. Presented in this paper is an effort to reform core concepts of CS/CE to inculcate green computing in subjects such as algorithms, and operating systems. Green computing refers to the practice of using computing resources more efficiently while maintaining or increasing overall performance. Sustainable IT services require the integration of green computing practices such as power management, virtualization, improving cooling technology, recycling, electronic waste disposal, and optimization of the IT infrastructure to meet sustainability requirements. Recent studies have shown that costs of power utilized by IT departments can approach 50% of the overall energy costs for an organization. Creating the next generation of power-efficient parallel computers requires a rethink of the mechanisms and methodology for building parallel applications. Energy constraints have pushed us into a regime where parallelism will be ubiquitous rather than limited to highly specialized high-end supercomputers. New execution models are required to span all scales, from desktop to supercomputer. IT infrastructure is definitely going green. From significant new regulations for IT equipment disposal to stringent energy-efficiency specifications for PCs and monitors to national standards for data center power savings, Green IT is an "in" topic. But many problems are unsolved. Information and communications technology (ICT) infrastructure accounts for roughly 3 percent of global electricity usage and the same percentage of greenhouse gasses (GHGs), but it seems to have a far greater role in the green debate than that. Many of the solutions being introduced for reducing the carbon footprint via more efficient energy use worldwide are heavily dependent on IT.

INTRODUCTION

The concept of green computing has begun to spread in the past few years, gaining increasing popularity. Besides the widespread sensitivity to ecological issues, such interest also stems from economic needs, since both energy costs and electrical requirements of IT industry around the world show a continuously growing trend [1].Today's computing vision is utility based Consumers only need to pay provider only when and how they access, they need not to invest much and there is no need to develop a complex and costly infrastructure, this model of computing is cloud 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" represents environmentally responsible way to reduce power and environmental e-waste. Virtualization, Green Data Center, Cloud computing, grid computing, Power optimization are the technologies of green computing. Main goals of green computing are to reduce the use of toxic and hazards materials and improve the energy efficiency, recycling of factory waste. Such practice includes the efficient implementation of server and peripherals as well as reduces the power consumption.

Green Computing is defined in various contexts, environmentally, socially and politically with respect to effective and efficient use of energy to achieve competitive advantage in terms of an energy-cost saving strategy, and reduction to carbon emission/footprints, recyclability, biodegradability, and minimal impact to the environment. Green computing represents environmentally responsible way to reduce power and environmental e-waste. Main goals of green computing are to reduce the use of toxic and hazards materials and improve the energy efficiency, recycling

of factory waste. Such practice includes the efficient implementation of server and peripherals as well as reduces the power consumption.[2]

Advantages 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.
4. Green computing even includes changing government policy to encourage recycling and lowering energy use by individuals and businesses.
5. Reduce the risk existing in the laptops such as chemical known to cause cancer, nerve damage and immune reactions in humans [3]

Approaches for green computing

Study shows that most of data centers don't have sufficient cooling capacity this is the cause of environmental pollution. Green computing is deals with concepts reduce energy consumption, recycling eliminate hazardous elements but it also deals with reduce in the business travel sharing the resources (cloud computing) and optimization. There are a lot of fundamental steps that can be taken to significantly decrease the power consumption and impact on environment.

Lower Power hardware: computer systems are made up of hardware i.e. processor onboard graphics, disk, fan etc these hardware should be consumed less power.

Virtualization: It is the use of software to simulate hardware. In the data center stand alone server system replaced with virtual server that run as software on a small number of larger computer via a virtualized server we can efficiently use computer resources.

Cloud computing: It has many benefits it enables anybody to obtain environmental benefits of virtualization It also remove the need for the user to run high power PCs since it provide infrastructure as a service.

Wireless Network Sensor: Sensor employed in different parts area in a data center to determine the temperature of each area, this will tell which area need to be more cool and where to reduce cooling.

Recycle: Through recycling the waste or equipment we can reduce the environmental pollution [4

Figure 1: Virtualization Environment

Virtualization is the abstraction of an OS and applications running on it from the hardware. Physical resources can be split into a number of logical slices called Virtual Machines(VMs).Each VM can accommodate an individual OS creating for the user a view of a dedicated physical resource and ensuring performance and failure isolation between VMs sharing a single physical machine. The virtualization layer lies between the hardware and OS and; therefore, a Virtual Machine Monitor (VMM) tacks control over resources and has to be involved in the system's power management in order to provide efficient operation.

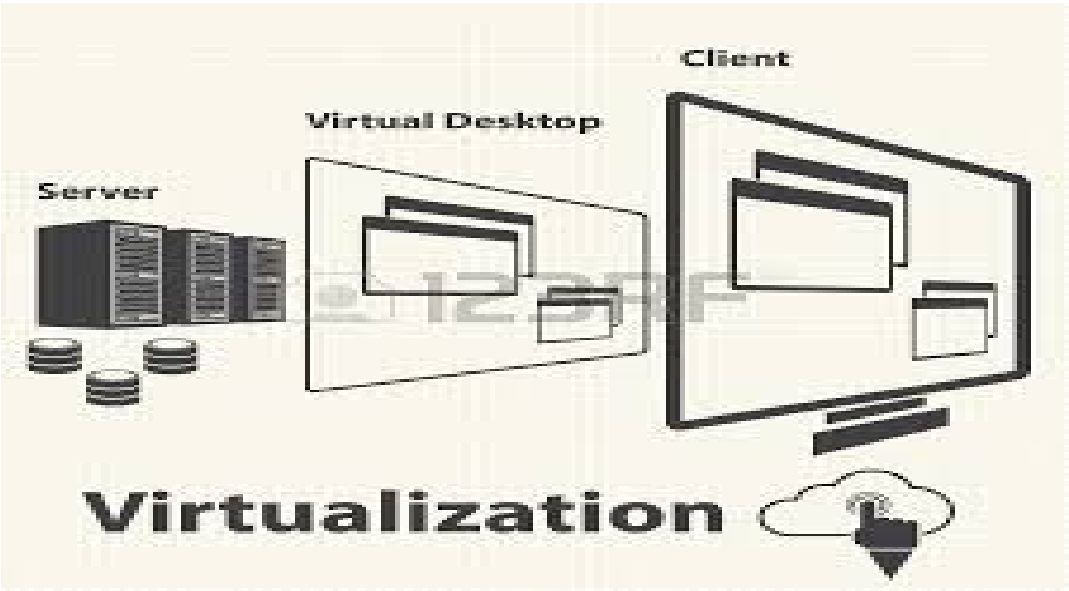

Figure 2: Virtualized Layer

Server Virtualization

(i) Server virtualization offers a way to consolidate servers by allowing you to run multiple different workloads on one physical host server. A "virtual server" is a software implementation that executes programs like a real server. Multiple virtual servers can work simultaneously on one physical host server. Therefore, instead of operating many servers at low utilization, virtualization combines the processing power onto fewer servers that operate at higher total utilization.

(ii) Virtualization improves scalability, reduces downtime, and enables faster deployments. In addition, it speeds up disaster recovery efforts because virtual servers can restart applications much more rapidly than physical servers. With virtualization, you can move entire systems from one physical server to another in just a few seconds to optimize workloads or to perform maintenance without causing downtime. Some virtualization solutions also have built-in resiliency features, such as high availability, load balancing and failover capabilities.

(iii) Due to these benefits, virtualization has become commonplace in large data centers. A 2011 survey of over 500 large enterprise data centers found that 92% use virtualization to some degree.[5]Of those, the ratio of virtual servers to physical host server averaged 6.3 to 1 and 39% of all servers were virtual.

(iv) However, virtualization is less common in small data centers. A 2012 NRDC paper entitled *Small Server Rooms, Big Energy Savings*[6] included an informal survey of 30 small businesses (ranging from 3 to 750 employees) and found that only 37% used virtualization.

(v)

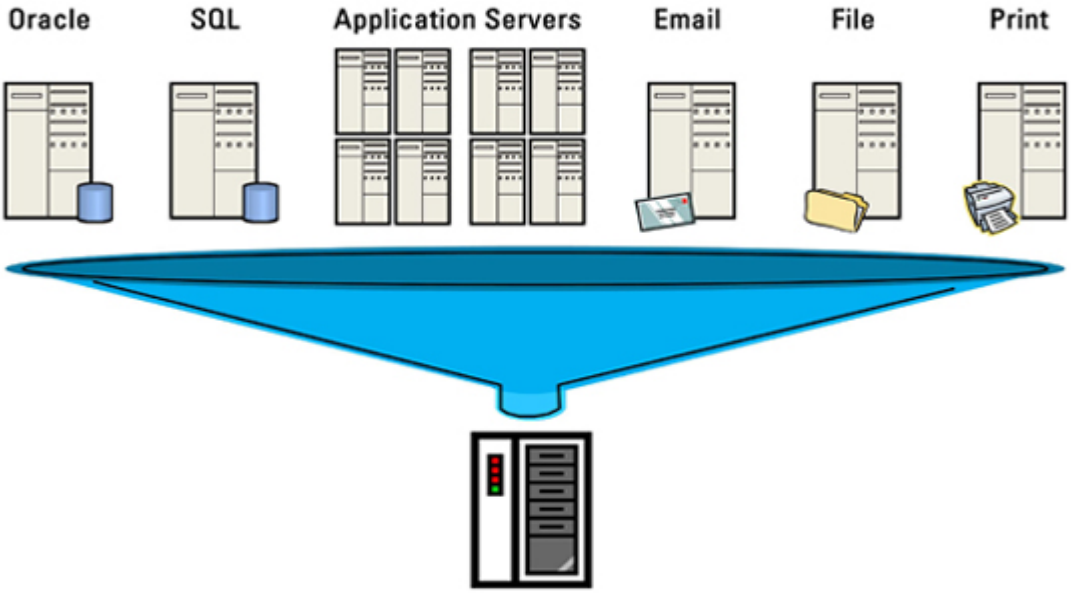

Figure 3: Server virtualization in Data Centers

Cloud Computing:

Cloud computing name comes from the cloud shaped symbol in which the complex infrastructure is hidden as it contain in its system diagram. Cloud computing delivered the computing resources as a service over the internet. Cloud computing provide user's data, software remotely End user can use the cloud services or cloud application through a web browser or a mobile app while the software and user's data is stored on remote data server. As well as Cloud computing allows companies to avoid infrastructure cost, and focus on projects that differentiate their business. Cloud computing allows enterprises to get their application up running faster with improved man power and less maintenance and enable IT to more rapidly adjust resources to meet the unpredictable business demand.

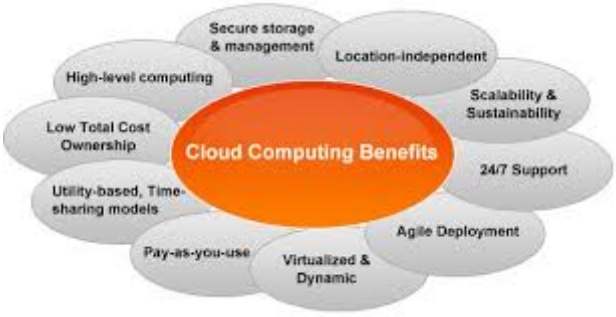

Figure 4: Cloud Computing

CONCLUSION:

Green computing, the study and practice of efficient and eco-friendly computing resources, is now under the attention of not only environmental organizations, but also businesses from other industries. In recent years, companies in the computer industry have come to realize that going green is in their best interest, both in terms of public relations and reduced costs.[5]There is a compelling need for applications to take environmental factors into account in their design, driven by the need to align with organizational environmental policies, reduce power and infrastructure costs and to reduce current or future carbon costs. The potential reduction in energy and emissions footprint through good architectural design is significant. The move to more environmentally sustainable applications impacts software and infrastructure architecture. Use of toxic materials like lead can be replaced by silver and copper making recycling of computers (which is expensive and time consuming at present) more effective by recycling computer parts separately with a option of reuse or resale.[6]

REFERENCES:

1. Green Computing and Communications (GreenCom), 2011 IEEE/ACM International Conference.
2. A Study about Green Computing" Pushtikant Malviya, Shailendra Singh, International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 6, June 2013.
3. Sonu Choudhary / (IJCSIT) International Journal of Computer Science and Information Technologies, Vol. 5 (5) , 2014, 6248-6252
4. Malviya et al., International Journal of Advanced Research in Computer Science and Software Engineering 3(6), June - 2013, pp. 790-794
5. Malviya et al., International Journal of Advanced Research in Computer Science and Software Engineering 3(6), June - 2013, pp. 790-794
6. Maulik R. Kamdar Department of Biotechnology, Indian Institute of Technology, Kharagpur Whilst submitting research documentation for the ITC 'Networking for Green Earth' Competition