International Journal of Computer Architecture and Mobility
(ISSN 2319-9229) Volume 5 -Issue 3, March Edition 2017

A literature Review and survey report on Green Computing: The demand of Time

Mr. Wasim Khan
Lecturer Govt. Women's
Polytechnic, College, Indore (M.P)
wasukhan1982@gmail.com

Mr. Narendra Kumar Sahu
Lecturer Govt. Women's
Polytechnic, College, Indore (M.P)
naru_sahu@yahoo.com

Mr. Navnit Choudhury
System analysts. Shri Vaishnav
Polytechnic, College Indore (M.P)
navnit_choudhury@rediffmail.com

Abstract-In datacenters huge amounts of data have become easily available, so that it rises in storing capabilities and ways of data collection. Every single second, more and more data is being created and Furthermore, data has become cheaper to store, so organizations need to get as much value as possible from the huge amounts of stored data. In this modern-day time of globalization, Green computing is the globally likely and eco-friendly use of computers and their assets. To accomplish Green computing, IT industry putting efforts is to in all its sectors. Equipment reusing, saving of paper usage, virtualization, cloud computing, power management, Green manufacturing are the key initiatives towards Green computing. In past few years, computer and IT industry have recognized the significance of successful green, both in terms of environmental issues and minimizing costs which have led to remarkable point in strategies and policies of IT industry. The inspiration behind this change comes from the ever increasing business computing demand, ever growing cost of energy, rising awareness of global warming issues. In this present age of globalization, CPUs play an energetic role in each arena, so the requirements of computers increased day by day and, to full fill these needs, a huge amount of electricity required for engineering of computers purposeful units, such as CPU, memory, monitors and peripheral devices etc. Green Computing has become the need of hour. Great amount of energy is lost at several Data Centers and Data Servers in Cloud. Techniques like Load Balancing, Server Alliance, and VM Migration etc. can be used to employ a more justifiable use of energy. During recent years, consideration in Green Computing has moved research into energy-saving techniques for home computers to enterprise systems Client and Server machines. The publication years range from 2010-2016, with most of the literature focusing on big data and Green Computing ranging from 2012-2016.

Keywords: Green Computing, E-waste, EPA, Recycling. Green Computing, Cloud, Load Balancing,
Server Consolidation, VM Migration, Meta-Heuristic Techniques

Introduction

A green computer or green IT system is one where the complete process from design, production, use, and disposal involves as little environmental impact as possible. A green enterprise is taken in consideration of all surfaces of a computer‘s life, from design to disposal. A green computer will also take into account how it influences the environment during its life. One method to style a green computer reduce its custom impact is to extend its durability. The longer the computer lasts, the less impact it will have on the environment because disposal, normally the greatest important green impact of the computer‘s cycle, will be delayed for a long period of time. To increase a computer‘s longevity, we suggest looking toward upgrades and modularity. Green Computing is the emerging technology which is responsible for the manufacturing and use of computer devices by consuming less carbon. Many computers are produced from many unsafe materials like cadmium, mercury and other toxic substances. While disposing the computers, it will lead to pollution and affect

the environment to great extent. The toxic waste produced by us through throwing our old computers and peripherals lead to land pollution .This is the big challenge, how to minimize the power consumption and thereby reducing the carbon content in the atmosphere. The data centres use a large amount of power/energy and release a lot of amount of heat and gases. In our daily life we use AC's. Refrigerators, inverters, UPS and computers items that take a large amount of energy and evolve heat and gases. These gases are very armful our lives. It has been seen that AC and refrigerators release CFC type gases. Many diseases like causes lungs type cancers, asthma because of the battery of inverters release also harmful chemicals like lead. The goal of green computing is to reduce the use of unsafe resources, exploit energy efficiency during the creation's and production lifetime, and encourage reprocess ability. Green Computing is the name attached to this movement, which represents an environmentally responsible way to reduce power and environmental e-waste [5].The huge amount of computing manufactured worldwide has a direct impact on environment issues, and scientists are conducting frequent studies in order to decrease the undesirable influence of computing expertise on our natural properties. A central point of research is testing and applying alternative non-hazardous materials in the products' manufacturing process.

Need of Green Computing

We have seen in every field computers are used widely and it increase the correctness and quickness of work, but the computer is not capable to work without power, that's why if the use of computer is increase it leads to Green Computing is the developing expertise which is responsible for the manufacturing and use of computer devices by consuming less carbon. Many computers are produced from many hazardous materials like cadmium, mercury and other toxic substances. Current developments in communication and digital technology are causing major growth demands in the field of Information Technology. Datacenters provide safe, clean and stable environment for servers to be online 24/7, more trades and companies need to provide or store data for their customers. As a result, the needs of data storing and processing are increased rapidly. While disposing the computers, it will lead to pollution and affect the environment to great extent. Many IT manufactures and vendors are continuously investigating in designing energy efficient computing devices, reducing the use of dangerous materials and encouraging the recyclability of digital devices and paper. EPA a voluntary labeling program that is designed to promote and recognize energy efficiency in monitors, climate control equipment and other technologies. Carbon Dioxide (CO_2) that has various harmful impacts on the environment and natural resources, it increase power consumption and greater heat generation leads to greater emission of greenhouse gases. Many of the people are not aware that the CPU and fan consume power; screen savers consume power even when the system is not in use. Insufficient power and cooling capacities can also results in loss of energy. This all become responsible for the polluted environment.

Effective steps to maintain Green Computing-

When Computers are not in use it seeing the preserving of energy and the computers can be activated in "Stand-by" mode. Therefore it can be reduced the energy consumption by 80%. On "deep sleep like hibernate" mode can reduce the energy consumption by 96% as offering greater savings. Do you know the desktop computer uses six times more energy than laptop as much as 80% less? In case of when we consider monitors, large Cathode Ray Tube (CRT) monitors and high resolution models use more energy than small ones. The Liquid Crystal Displays (LCDs) which are used in laptop computers are more energy efficient and

also the use 10% - 20% of power.

By identifying the power management techniques as more, it can be categorized some tips which are helpful to conserve energy when we are accessing computers.

- Turn off the computer when you are finished.
- Set the shortest possible time that is acceptable before the computer automatically powers down.
- Turn off the monitor whenever you will be away from the computer.
- Do not turn on the printer until you are ready to print.
- Enable energy management setting on the computer.
- 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.
- Conserving resources means less energy is required to produce, use, and dispose of products.
- Saving energy and resources saves money.
- Green computing even includes changing government policy to encourage recycling and lowering energy use by individuals and businesses.
- Reduce the risk existing in the laptops such as chemical known to cause cancer, nerve damage and immune reactions in humans.

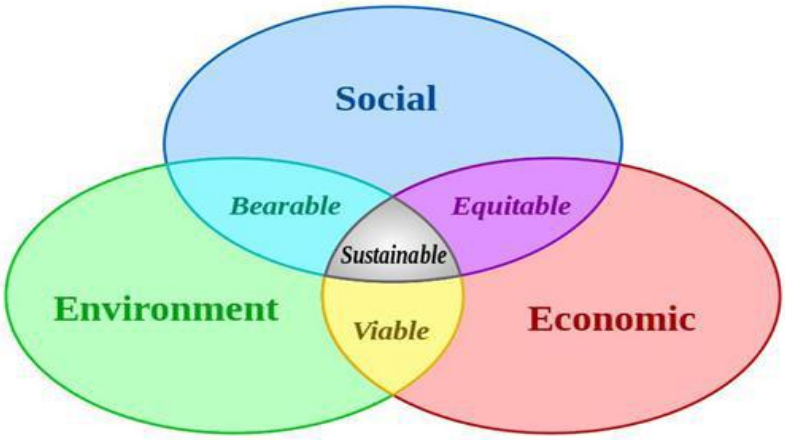
Green Computing key points

a. **Sustainable Environment** – this make sure of productivity and diversity of biological system through minimizing the undesirable production process effects, starting with product design then green manufacturing and ending with safe disposal. Moreover, it is not just take care of environment, it also ensure the social and economic sustainability as shown in figure.

b. **Resource utilization** - green computing is instigate the designers in order to utilize the recourses in an environmental friendly ways, for instances, datacentres, computer, smart phones, light, heat, electrical powers etc.

c. **Falling Cost**– there is a significant saving in the product costs by utilizing resources efficiently through green computing.

d. **Healthier Commercial and Public Image** – Green computing is provide a grate help for the businesses to improve their corporate reputation by meeting regulatory requirements and compliance. It also offers a better way for meeting customers and employees sustainability demands



Technologies used to maintain Green Computing

Carbon free computing-Green computer strategies can reduce carbon emissions by using virtualization to reduce number of servers, using virtualization to reduce power

and disposal requirements of desktops, replacing paper systems with on-line communication systems, and reducing travel requirements of staff, customers and suppliers. Let's discuss these strategies separately.

Solar Computing: The venture of VIA technologies and Mo-tech industries to develop fully solar power devices that is non-polluting and highly reliable

Using virtualization to reduce number of servers In traditional model, there were dedicated servers to specific computing functions such as file servers, e- mail servers, database servers, and so on. With the large expansion of server system has provided many problems.

Replacing paper systems with on-line communication systems

Reducing any purchasing can be minimized carbon footprint because in every manufacturing and supplying process of products and services typically carry high levels of carbon emissions. We can reduce paper usage in different ways as given bellow.

- Moving customers and suppliers onto on- line systems e-billing and e-purchasing.
- Setting up paper recycling process.
- Reducing Printing and instead of that encourage employees to use email.

Carbon free computing: Due to increase in (CO2), Methane, and Nitrous oxide are the reason for earth increasing temperature which leads to global warming, serve floods and drought. So to overcome this, VIA technologies works with environment expects to calculate the electricity used by the device over its lifetime generally three years. From this data, one can conclude how much carbon dioxide the device will emit in to the atmosphere during its operation.

Virtualization and Cloud Computing

In existing infrastructure of cloud computing and virtualization noticeable attention that the cloud computing provides the services and solutions by having full use of the resources, it is contributing of the Green Computing. It is the greenest option to think about other's server when there is need of purchasing your specific server arises . Cloud computing is in concept of virtualization and for the virtualization technologies; companies like VMware are struggling and progressing towards the green concept in the daily computing requirements. Hence the more virtualization and cloud shift paradigms are adopted, more we will follow the green path as it will reduce the energy till up to 80%

Conclusion

In this paper it is analyzed that the main motive of Green Computing is the low amount of power consumption to save time and money. There some IT industries those are working on this concept. Presently we have to move and focused on some technologies and procedures to make the Green Computing effective. So Green Computing is the emerging technology which is more over like aid and need to sustain the ecofriendly environment. Computer virtualization is helping to make large strides in green computing technology. Green Computing is not only a new trend; to become better corporate image to environmentally friendly; it is also a means to cost reduction in an ever inflating IT budget. New and improved ways of using this technology seem to appear every day. The important key to remember is that while all of these technologies are beneficial in some way, the most helpful to current concerns are those that openly affect their procedures , technique and infrastructures of IT. Reducing the number of servers using virtualization is a great way to consolidate but in order to get the supreme advantage the corporation must reorganize its datacenter infrastructure and in addition, reconsideration processes and techniques that utilize these resources from the user's stand point. When using a terminal server, you are connected to a central terminal where all the computing is done. The operating system is experienced by the end

user on the terminal. These terminals can be matched up to thin clients who depend on the server to do most of their computing. This type of green computing setup typically consumes as little as one eighth of the energy of a conventional workstation.

References

[1].PrashantGarg, Sanjay Bhatnagar, Deepali, "Green Computing", An International Journal of Engineering Sciences,Vol.3, Issue(Dec 2014), PP 81-84.

[2].A.Mala, C.UmaRani, L.Ganesan, "Green Computing: Issues on the Monitor of Personal Computers", Research Inventy: International Journal of Engineering and Science, Vol.3, Issue 2(May 2013), PP 31-36.

[3].JamshedSiddiqui, "Green Computing: Protect Our Environment from Computer and its Devices", An International Journal of Advanced Computer Technology, Vol.2, Issue 12(Dec 2013)

[4].PriyaRana, "Green Computing Saves Green", International Journal of Advanced Computer and Mathematics Sciences, Vol.1, Issue 1(Dec 2010), PP 45-51.

[5].Vijay A Tathe, Deepavali P Patil, "Green Computing", International Journal of Emerging Technology and Advanced Engineering, Vol.2, Issue 4(April 2012).

[6]. Mrs. SharmilaShinde, Mrs. SimantiniNalawade, Mr.AjayNalawade, "Green Computing: Go Green and Save Energy" , International Journal of Advanced Research in Computer Science and Software Engineering, Vol.3, Issue 7(July 2013).

[7].Fanara A., "Report to Congress on Server and Data Center Efficiency: Public Law 109-431, U.S. Environment Protection Agency: Energy Star Program, February 2015, PP 133.

[8]. V Chithra, K.Jayasree, Mr.E.S.K, Vijay Anand, " A Study of Green Computing Techniques",International Journal of Computer Science and Information Technology Research, Vol.2, Issue 2(April 2014),PP 238-242.

[9]. Michigan State University Board of Trustees, 2004, Green Computing Guide, viewed 9th August 2010

[10]. Schmidt,K, Härder, T, Klein,J, Reithermann,S, Green Computing – A case for Data Cashing and Flash Disks, viewed by 20th September 2010,

[11]. Architecture Team – Microsoft, Green Computing, The Architecture Journal, viewed 24th September 2010, http://research.microsoft.com/pubs/78813/AJ18_E N.pdf

[12]. HP-United States, HP corporate information, viewed 12th August 2010, http://www8.hp.com/us/en/hp-information/index.html