

TACKLING TOOLS ON GREEN COMPUTING

GOPALAKRISHNAN.S¹, SANTHOSH.N², GANAPATHY RAM.N³

ASSISTANT PROFESSOR¹, STUDENT², STUDENT³

DEPARTMENT OF COMPUTER TECHNOLOGY

SRI KRISHNA ARTS & SCIENCE COLLEGE, COIMBATORE, TAMIL NADU, INDIA

ABSTRACT:

Green computing is the study and development of efficient and eco-friendly computing. Green computing is also known as green technology. The concept behind energy efficient coding is to save power by getting software and to make less use of the hardware, more than continuing to run the same code on hardware that uses less power. Green computing is the environmentally responsible use of computers and also resources related to the computers. Such practices also include the implementation of energy efficient central processing units (CPU) servers and the peripherals as well as that reduced resource consumption and proper disposal of the electronic waste (e-waste). Green computing is also important for the future generation. This process includes the use of green computing in today's world and how the environmental problems can be reduced using green computing and how to safe guard the future by using the green computing technology.

1. INTRODUCTION:

Green computing is also called as the green information technology (green IT). The Green computing is the environmentally responsible and eco-friendly to use of the computers and their resources. In another terms, it is also unowned as the study of designing, manufacturing and engineering, using and disposing of computing devices in a way which helps us to reduces their environmental impact. It is the study and practice of the environmentally sustainable computing which is also called as IT. San Murugesan states that this can also include "designing, manufacturing using, and disposing of computers, servers, and associated subsystems example monitors, printers, storage devices, networking and communications systems efficiently and effectively with minimal impact on the environment. The goals of green computing are similar to that of the green chemistry. It also reduces the use of hazardous materials, maximize energy efficiency during their product's lifetime, and also promotes the recyclability or biodegradability of products and factory waste. It was primarily addressed by enhanced research and development efforts to reduce the power usage, heat transmission, cooling and needs of hardware devices, in particular processor chips using extensive hardware controls. Green computing is necessary for all classes of systems and ranging from handheld systems to the largescale data centres.

2. HISTORY:

In the year 1992 The U.S. Environmental Protection Agency launched Energy Star a voluntary labelling program which is designed to promote and recognize the energy-efficiency in the monitors, climate control equipment, and other technologies. This resulted in the widespread adoption of the sleep mode among the consumer electronics. Continuously, the Swedish organization, TCO Development launched the TCO Certification Program which promotes low magnetic and electrical emissions from the CRT-Based computer displays; this program was later expanded to include criteria on energy consumption and the ergonomics and the use of hazardous materials in the construction.

3. NEED FOR GREEN COMPUTING

The main goal of Green computing is to reduce the use of hazardous materials and to maximize the energy efficiency during the product's lifetime, and to promote the recyclability or biodegradability of products and also for the factory waste. We use Green Computing for following needs

- 1) Using ENERGY STAR qualified products which help in the conservation of energy.
- 2) To choose the green products The Climate Savers Computing Initiative (CSCI) catalogue can is used.
- 3) instead of the regular monitors Organic light-emitting diodes can be used.
- 4) Surge protectors provides the benefit of the green computing by cutting off the power supply to peripheral devices when the computer is turned off.
- 5) The rate of e-waste creation can be reduced by Donating your old computers and other peripherals
- 6) It was expected that computers would help to reduce the paper wastage. However, even today wastage of paper still remains major issue in the industries
- 7) The device should be used only if it is necessary.

8) The manufacturing of disks and boxes needed for the video games contain lot of resources. Video game manufacturers can offer their games in online for easy download, which leads to the reduction in e-waste. This move can reduce the transportation/shipping cost.

9) Usage of the 'Local Cooling' software can help in monitoring and bringing down the energy consumed by computer. This "Windows" program makes adjustments to the power options of computer and helps in minimizing the energy consumption

4. APPROACHES TOWARDS GREEN COMPUTING

4.1. Virtualizing

The Computer virtualization is referred as the abstraction of computer resources, such as the process of running two or more logical computer systems with the help of one set of physical hardware. The concept originated from the IBM mainframe operating systems in the 1960s, but was commercialized for x86-compatible computers in the year 1990s. With virtualization, a system administrator would combine several physical systems into virtual machines on one single, powerful system, thereby unplugging the original hardware and also reducing the power and cooling consumption. Virtualization can be done in distributed work, so that servers are either busy or put in a low-power sleep state.

4.2. Terminal Servers

Terminal servers have also been used in green computing. While using the system the user at a terminal connects to a central server. Mostly all of the actual computing has been done on the server, however the end user experiences the operating system on the terminal. These can be combined with the clients which use up to 1/8 the amount of energy provided by normal workstation, resulting in the decrease of energy cost and consumption.

4.3. Power Supply

Desktop computer power supplies (PSU) are in general 70–75% efficient, assuming the remaining energy as heat. A certification program known as 80 plus certifies the PSU that are at least 80% efficient. But these models are drop-in replacements for older, less efficient PSU of the same form factor. As of July 20, 2007, all new Energy Star 4.0-certified desktop PSU must be at least 80% efficient.

4.4. Video Card

The fast GPU may be the largest power consumer in the computer.

Energy-efficient display options included.

- No video card - uses a shared terminal, shared light client or desktop sharing software if the display is required.
- Use the motherboard video output typically low 3D performances and low power supply.
- Select a GPU based on low idle power with average wattage, or performance per watt.

4.5. Display

CRT monitors mainly use more power than the LCD monitors. They also contain significant amounts of lead. LCD monitors commonly use the cold-cathode fluorescent bulb which provides light for the display. Some newer displays use an array of light-emitting diodes (LEDs) in place of the fluorescent bulb, which also reduces the amount of electricity which is used by the display. Fluorescent back-lights also contain mercury whereas the LED back-lights do not contain the mercury.

4.6. Cloud Computing

Cloud computing addresses two important ICT challenges which are related to the Green Computing energy usage and the resource consumptions. Virtualization, Dynamic provisioning environment, multi-tenancy, green data center approaches are enabling the cloud computing to have lower carbon emissions and the energy usage up to a great extent. Large enterprises and the small businesses can reduce their direct energy consumption and also the carbon emissions by up to the average of 30% and 90% respectively by moving the certain on-premises applications to the cloud.

5. IMPLEMENTATION OF GREEN COMPUTING

5.1. Blackle

Blackle is a search-engine site which is powered by the Google Search Engine. Blackle came into being based upon the concept that when a computer screen is white, presenting an empty word or the Google home of your computer consumes 74W. And when the screen is black it consumes only 59W. Based on this theory if everyone switched from the Google to the Blackle, mother earth would be able to save 750MW each year. This was a really good implementation provided by the Green Computing.

The principle behind Blackle is based upon the fact that the display of different colours able to consumes different amounts of energy on the computer monitors.

5.2.Zonbu Computer

The Zonbu is a new, very energy efficient and most powerfull PC. The Zonbu contains only one third of the power of a typical light bulb. The device runs In the Linux operating system using the 1.2 gigahertz processor and 512 MB of RAM. It also contains no moving parts, and it also contain a fan .

5.3. Sunray Thin Client

Sun Microsystems is reportedly increased the customer interest in its Sun Ray, a thin desktop client, as the electricity prices climb. Thin clients like the Sun Ray consumes the very less electricity than that of the conventional desktops.

6.Future of Green Computing

As the 21st century belongs to the computers, gizmos and electronic items, energy issues will get a serious works in the upcoming days, as the public debates on the carbon emissions ,The global warming and climate change gets more hotter . The plan towards green IT must include new electronic products and the services with optimum efficiency and all the possible options towards the energy savings. The Companies are laying emphasis on moving towards the eco-friendly components in the computers. The use of eco-friendly sustainable components will become the norm rather than the exception in the future . Taking into consideration the popular use of information technology such as the industries, it has to lead a revolution of sorts by turning green in to a manner, no industry has never done this before. Opportunities in green technology lie like never before in the history and organizations are seeing it as a way to create a new profit centers while trying to help the environmental cause. The plan towards green IT should include the new electronic products and also to provide services with optimum efficiency and all possible methods towards energy savings . Faster processors mainly uses more power. Power supplies are notoriously very bad, generally as little as about 47% efficient. And therefore everything in a computer runs off the power supply, nothing can be efficient without the help of good power supply. Recent inventions of power supply are helping to fix this by running at 80% efficiency or more than that .

6. CONCLUSION

The green technology doesn't include the green computing only but also focuses on the components and materials that are used in the computer. As, energy star is used nowadays to focuses on the computer that does not affect the environment. Sustainable computing must be considered. Green computing represents ate responsible way which allows to address the issues of global warming. By adopting green computing practices, business leaders can also able to contribute positively to the environmental stewardship and protect the environment also by reducing energy and paper costs. Nowadays, every computer manufacturing company is focusing upon the green IT concepts. It can be seen that the people are moving towards the green technologies day by day. New green materials are developed every year and many toxic ones have been already being replaced by them. Environmentally it is not a good thing that most of the PCs especially in companies have typically entered a landfill after only a few years of service. This reality does at least means that a widespread mind set already exists for both adapting to and paying money for the new computer hardware based upon the regular basis.

7. REFERENCES:

- [1]http://en.wikipedia.org/wiki/Green_computing
- [2]http://www.greencompute.com/green_computing.html.
- [3]<http://www.scribd.com/doc/91046429/green-computing-Report>
- [4]<http://thefutureofthings.com/articles /1003 /green-computing.html>
- [5]<http://www8.hp.com/us/en/hpinformation/index.html>
- [6]<http://timesofindia.indiatimes.com/topic/Green-computing>
- [7]http://www.studyhelpline.net/hot_it_topics/green_computing/future.aspx
- [8] <http://www.wisegeek.com/what-is-green-computing.html>
- [9]http://ito.hkbu.edu.hk/eng/user/if_energy-saving-green.html
- [10]<http://greencomputingisgood.blogspot.in/2011/03/benefits-of-green-computing.html>
- [11] <http://www.epa.gov/>
- [12]<http://www.ncomputing.com/company/green-computing/>
- [13] Green Computing: Tools and Techniques for Saving Energy, Money, and Resources by Bud E. Smith
- [14] The Green Computing Book: Tackling Energy Efficiency at Large Scale by Wu-chun Feng

- [15] Y. Navneeth Krishnan, VipinDwivedi, Chandan N Bhagwat, "Green Computing using Graphical Processing Units", April 2012.
- [16] JyotiTayade, "Green Computing- Need of Today", April 2012.
- [17] Mózner, Zsófia Vetóné. "A consumption-based approach to carbon emission accounting—sectoral differences and environmental benefits." *Journal of Cleaner Production* 42 (2013): 83-95.

