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THE RISING ERA OF GREEN COMPUTING

Richa Pandey [1]

richapandeydnp@gmail.com

Kavita Rawat [2]

kavitait28@gmail.com

Komal Kirola [3]

komalkirola998@gmail.com

Lalit Mohan [4]

mlalit156@gmail.com

Computer Science Department, Graphic Era Hill University

Abstract: Green computing is sustainable computing or IT for environment. It is the eco-friendly use of computers and their resources. It is defined as the study of designing manufacturing and decomposing the parts of computer in that way so that it does not effect the environment. The development of environmentally sustainable production of particles, energy efficient computers and better disposing of recycling products. Growing energy use has increased IT costs.

Green computing is the study in which discarding, recycling and building of computers and electronic items is noticed. The goal of green computing is to lessen down the use of hazardous materials, maximize energy efficiency and biodegradability or recyclability of out-dated products and factory waste of the computer factory. In this paper we discuss the wastage of energy and to find the difference in cloud computing.

Keywords: Green Computing, Electronics etc.

I. Introduction

A. Green Technology

Green technology consist the study of advanced materials to be used in this technically advanced environment. The aim of green technology is to reduce the environmental impact of industrial processes with the growth in population resulting in new technologies. The efficient use of computers and its effect is the main concern of this paper. The bottom line considers social responsibility, economic viability and the impact on the environment. The point of research is testing and applying alternative nonhazardous materials in the products' manufacturing process.

B. Cloud computing

Cloud computing is defined as the internet based computing where resources are utilize in the internet. Cloud computing lower the cost of computers for users, it have lower maintenance cost.

C. Types of cloud

Cloud Computing is classified into three types:

- 1. Public cloud :** Cloud that can be accesed by everyone from everywhere. Services may be offered on pay by usage mode. Example of public clouds is IBM's blue cloud.
- 2. Private cloud:** Private cloud are built for the exclusive use of one client, providing the control over data, security and quality of service.
- 3. Hybrid cloud:** It includes both public and private clouds with multiple providers.

II. Steps that can be taken to reduce carbon footprint and to utilize green computing techniques

An increase in the concentration of the main greenhouse gases — carbon dioxide, methane, nitrous oxide, and fluorocarbons i responsible for Earth's increasing temperature due to which global warming is increasing as a result severe floods and droughts, sea tides and other environmental effects have an adverse affect on the living human as well as other living beings. After the year 1997 Kyoto Protocol for the United Nations Framework Convention on Climate Change the world has finally taken the initial step in reducing emissions in the environment.

- (1) Reducing carbon dioxide can be achieved in different ways. One way is to plant trees that absorb CO₂ in the region in which the processors are purchased.
- (2) Solar computing is an effective technique to utilize green computing technique for sustainable environment.
- (3) Green-computing's initiative is the development of energy-efficient platforms for low-power, small-form-factor (SFF) computing devices.
- (4) Paper composition should be reduced so as to have a environment friendly place.
- (5) Power management feature should be enabled as it allows monitors and computers to enter low-power states when sitting idle. Turn off the computer when it is of no use.
- (6) Organic light-emitting diodes should be used instead of the regular monitors.
- (7) The manufacturing of disks and boxes needed for video games takes lot of plastic and material. Video game manufacturers can upload their games online for download, leading to reduction in e-waste.

- (8) Data centers should gradually improve their energy and space efficiency
- (9) Undervolting should be used. It is a process in which the amount of heat and electricity consumed is managed manually by the user..
- (10) There should not be screen saver. Instead switch off the computer and restart it.

III. Companies using Green Computing Technology

- (1) Dell is known for its free worldwide product-recycling program.
- (2) VIA C7-M and VIA C7 processors work on the concept of quiet computing that have a maximum power consumption of 20W at 2.0GHz and an average power consumption of 1W. These consume less carbon for energy.
- (3) Intel, the world's largest semiconductor maker uses **virtualization software**, a technique that enables Intel to combine several physical systems into a virtual machine resulting in energy saving.
- (4) Google Inc. has been able to reduce its energy consumption to 50% of that of the industry average. It has self cooling technology.
- (5) Advanced Power Management which is a joint venture of Intel and Microsoft allows a computer's BIOS to control power management functions in a computer.
- (6) Blackle: Blackle is a search-engine site powered by Google Search. Blackle came into being based on the concept that when a computer screen is white, presenting an empty word or the Google home, your computer consumes 74W. When the screen is black it consumes only 59W. Based on this theory if everyone switched from Google to Blackle, mother earth would save 750MW each year[1]

IV. Recent Advancement

Cloud computing is the latest trend in the emerging field of green computing. Cloud computing does away with the hardware servers and uses virtual servers also called servers in the cloud. Hence cloud computing will help the companies to get rid of their bulky servers that consume a lot of energy [14]. In coming time cloud computing will be used in areas such as networking, data storage and operating systems. In this manner of working it will save a lot of time and energy by switching to cloud computing architecture for the internet

Cloud computing can be used for various computing techniques. It can be used as energy saving by using power management. Many operating system use the power management scheme for power saving. There are many products e.g. surge protectors that can save energy. The protectors will detect when a computer is switched off and they will then automatically switch off any peripheral devices such as scanners and printers for energy saving.

Green computing can also be used in other areas such as saving paper by sending email. You can even implement other practices such as printing your content in smaller fonts. Teleconferences

and telecommuting can indirectly save a lot of carbon dioxide emissions in the environment. Hence help in saving the environment.

V. Challenges in Green Computing

According to researchers of Green Computing following are few prominent challenges that Green computing is facing today [15]:

- Equipment power density / Power and cooling capacities.
- Increase in energy requirements for Data Centers and growing energy cost.
- Control on increasing requirements of heat removing equipment, which increases because of increase in total power consumption by IT equipments.
- Equipment Life cycle management – Cradle to Grave.
- Disposal of Electronic Wastes.

VI. Conclusion

Green computing is the trend by which we can save the earth by sustainable use of the resource. Various methods are taken into consideration for saving the energy which can be followed by everyone so that our nature is not affected.

Global warming is the burning issue now days and we can help the earth to be safe after using the resources efficiently. The performance and application of computers is increasing, so the awareness of the cost and scarcity of the energy is needed. By adopting green computing practices, business leaders can contribute positively to environmental degradation and save the tress by reduction the use of paper. Cloud computing also plays a vital role as it reduce the hardware and other hardware equipments.

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