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A Study on Green Computing: Need of Technological World

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ABSTRACT: Green computing refers to supporting business critical computing needs with least possible amount of power or sustainable computing. This is a new paradigm of designing the computer system which considers not only the processing performance but also the energy efficiency. In broader terms, it is also defined as the study of designing, engineering, manufacturing, using and disposing of computing devices in a way that reduces their environmental impact. Green computing aims to attain economic viability and improve the way computing devices are used.In this paper we discuss the steps to utilize the concepts of green computing and show the requirement of green computing with techniques to save the energy by different approaches.

KEYWORDS: green computing, computers, energy star, eco-friendly

I. INTRODUCTION

Green Computing is the emerging technology which is responsible for the manufacturing and use of computer devices by consuming less carbon. The goals are to reduce the use of hazardous materials like cadmium, mercury and other toxic substances, maximize energy efficiency during the product's lifetime, and promote recyclability or biodegradability of defunct products and factory waste. Such practices include the implementation of energy-efficient central processing units (CPUs), servers and peripherals as well as reduced resource consumption and proper disposal of electronic waste (e-waste).

In terms of rising awareness about computing environmental impact, green computing is gaining significant importance. With increasing global warming, energy consumption and e-waste, the idea of green computing is broadly taken into remarkable consideration by both the government and businesses as their contribution in moral practices for sustainable improvement .Green computing is the practice of using computing resources efficiently .The huge amount of computing manufactured worldwide has a direct impact on environment issues, and scientists are conducting numerous studies in order to reduce the negative impact of computing technology on our natural resources. A central point of research is testing and applying alternative non-hazardous materials in the products' manufacturing process. The idea is to make computers from beginning to end a green product.

The Technical processes adopted by the industries creates challenges in the management of the waste. Green computing shows how to use resources efficiently and how to reduce the waste Green computing is the requirement to save the energy with the expenses .Currently the implementation on green computing practice is going on, but firstly we have to know what kind of energy should be gained and how it is achieved. So analysis of the gap what are the resources we have and what we are going to do to achieve the benefits of green computing. "Green computing" represents environmentally responsible way to reduce power and environmental e-waste. Virtualization, Green Data Centre, Cloud computing, grid computing, Power optimization are the technologies of green computing.

II. NEED OF GREEN COMPUTING

In this time computers are used widely in every field to increase the accuracy and speed of work, but the computer is not able to work without power, that's why if the use of computer is increase it leads to increase of power consumption and greater heat generation leads to greater emission of greenhouse gases like Carbon Dioxide (CO2) that has various harmful impacts on the environment and natural resources. the objectives is to decrease the utilization of risky

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materials, expand vitality productivity amid the item's lifetime, and advance the recyclability or biodegradability of outdated items and industrial facility wasteaverage of the outputs of these filters.

Computer systems are made up of hardware i.e. processor onboard graphics, disk, fan etc these hardware should be consumed less power.It is the use of software to simulate hardware. In the data centrestand 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. 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. Sensor employed in different parts area in a data centre to determine the temperature of each area, this will tell which area need to be more cool and where to reduce cooling. Through recycling the waste or equipment we can reduce the environmental pollution.

Researches done in past shows that CO2 and emission of others affect the global climate and responsible for damage of our environment .Preserve the planet is main goal. Planet like earth is rare. Green computing can lead to serious cost savings. Reductions in energy costs from servers cooling and lighting. As the energy demands increasing day by day and supply is declining. Energy efficient system ensures healthy power system. Many industries generate their own electricity which motivates to keep the consumption low. Computing Power Consumption has Reached a Critical Point: Data centres have run out of usable power and cooling due to high densities.

To comprehensively and effectively address the environmental impacts of computing/IT, we must adopt a holistic approach and make the entire IT lifecycle greener by addressing environmental sustainability along the following four complementary paths ,Green use — reducing the energy consumption of computers and other information systems as well as using them in an environmentally sound manner ,Green disposal — refurbishing and reusing old computers and properly recycling unwanted computers and other electronic equipment ,Green design — designing energy-efficient and environmentally sound components, computers, servers, cooling equipment, and data centers ,Green manufacturing — manufacturing electronic components, computers, and other associated subsystems with minimal impact on the environment.

III. TECHNOLOGY USED TO MAINTAIN GREEN COMPUTING

- 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
- Solar Computing: The venture of VIA technologies and Mo-tech industries to develop fully solar power devices that are non-polluting and highly reliable .
- Energy efficient computing: VIA is taking a initiative for the development of energy-efficient platform for low-power small form factor (SFF). VIA introduced in 2005 the VIA C7-M and VIA C7 processors that have a maximum power consumption of 1W. This processor produced over four times less carbon during their operations and can be efficiently embedded in solar devices

IV. APPROACHES TO GREEN COMPUTING

(1)US Environmental Protection Agency's project 'Energy Star' is a program that is designed to promote and identify energy-efficiency in climate control equipment, monitors and other technologies Energy Star reduces the amount of energy consumed by a product by automatically switching it into ―sleep mode when not in use or reducing the amount of power used by a product when in ―standby mode.

(2) Dell's Plant a Tree for Me project allows customers to offset their carbon emissions by paying an extra 120 rupees to 240 rupees, depending on the product purchased silicon-on-insulator (SOI) technology in its manufacturing, and strained silicon capping films on transistors (known as ―dual stress liner technology), have contributed to reduced power consumption in its products.

(3) VIA Technologies, a Taiwanese company that manufactures motherboard chipsets, CPUs, and other computer hardware, introduced its initiative for "green computing" in 2001. Solar cells fit VIA's power- efficient silicon, platform,

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and system technologies and enable the company to develop fully solar-powered devices that are nonpolluting, silent, and highly reliable.

(4) HP's Planet Partners recycling service or recycling facilities helps in recycling discarded computers. Thus reducing the amount of discarded computers in landfill and thus in tern reducing toxin metal and other harmful emissions to be released in the environment .

(5) Electronic Product Environmental Assessment Tool registered products are promoted by nonprofit Green Electronics Council help institutional purchasers evaluate, compare and select desktop computers, notebooks and monitors based on environmental attributes by providing a clear, consistent set of performance criteria for the designing of products Recognize manufacturer efforts to reduce the environmental impact of products by reducing or eliminating environmentally sensitive materials, designing for longevity and reducing packaging materials

IT vendors also are applying green standards to their own operations.
The reasons are :

- New revenue opportunities
- Fear of a customer backlash
- Desire to act like good corporate citizens.

V. 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 — is believed to be responsible for Earth's increasing temperature, which could lead to severe floods and droughts, rising sea levels, and other environmental effects, affecting both life and the world's economy.

One way is to plant trees that absorb CO2 as they grow, in the region in which the processors were purchased.

(1) Wetlands also provide a great service in sequestering some of the carbon dioxide emitted into the atmosphere
(2) Solar computing is an effective technique to utilize green computing technique
(3) Green-computing initiative is the development of energy-efficient platforms for low-power, smallform-factor (SFF) computing devices.
(4) One should reduce the paper consumption by recycling paper regularly, using both sides of the paper, using smaller fonts and margins, and selectively printing required pages and use services like emailing and electronic archiving to minimize paper wastage.
(5) People must switch off their computer at night so it runs only eight hours a day- it will reduce energy use by 810kWh per year and net a 67 percent annual savings.
(6) Flat screen monitors use less energy and such monitors are not as hard on our eyes as CRT'S.
(7) Unplug the electronic if not in use.
(8) A small monitor- a 14-inch display uses 40 percent less energy than a 17 inch one.
(9) Enable sleep/ stand mode is an effective way to conserve battery in a laptop computer.
(10) Power off your monitor when you are not using it instead of using screen savers.
(11) Buy vegetable or non-petroleum-based inks—they are made from renewable resources require hazardous solvent.
(12) Recycling of Electronics Waste is more effective because recycling process is more environmentally friendly than the process of making new stuff because it can reduce the use of new raw materials, land degradation, pollution, and energy usage .
(13) Use network printer in a business organization to save the paper and energy.

VI. CONCLUSION

By adopting green computing practices, business leaders can contribute positively to environmental stewardship— and protect the environment while also reducing energy and paper costs. Adopting Green Computing Strategies make sense not only from an ethical, or moral stand-point, but from a commercial stand-point. There are many business benefits achievable through the implementation of a green computing strategy such as cost savings, resilience, disaster recovery, business continuity planning and of course public relations. This paper is a brief study about a green computing .The

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study will also tells the approaches of green computing. What and how much work done in green computing and how the power consumption is reduced through different approaches . The concept of green computing is popularized in the past few years. Green computing presents a responsible way to address the issue of global warming. Whilst the performance and the breadth of application of computers is increasing, so too is our awareness of the cost and scarcity of the energy required to power them.

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BIOGRAPHY

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KHUSHALI GOHAR was born in Mhow,Madhya Pradesh,India,25 February 1998.She has done her schooling from Kendriyavidyalaya no. 1 ,Indore and currently pursuing bachelor of engineering from shrigovindramseksaria institute of technology and science Indore, Madhya Pradesh in branch Information Technology . She is a voracious reader and a erratic writer .she retains her name in her aura.

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