A Review on Ecofriendly Green Computing

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Abstract— Green computing is an emergent technology in the field of computer science and engineering which provides green information. It is largely used to protect environment by optimize energy consumption. To increase energy effectively and to reduce the use of hazardous materials are the two main goals of green computing. Green computing is the concept which is trying to confine this by inventing new methods that would reduce energy and making less population. This paper focuses on green computing techniques in order to achieve low power consumptions and power saving.

Keywords — *Energy Consumption; Green Computing; Efficiency; Technology.*

1. Introduction

Green computing is used to denote efficient use of resources in computing. This term generally relates to the use of computing resources in conjunctions with minimizing environmental impact [1]. Green computing is to reduce the environmental hazardous materials and promoting the use of recyclable materials. Electronic Products Environmental Assessment Tool (EPEAT) is an energy star voluntary labeling program that is designed to promote and recognize energy efficiency in materials. Many manufactures and vendors are continuously using dangerous materials and encouraging the recyclability of digital devices and paper [2]. The legislation restricts the use of six hazardous materials used for manufacturing various types of electronic and electrical equipments.

2. Existing System

In the existing system, they use the concept of energy consumption which depends on its capacity rather than its utilization [3]. For an example, a mobile phone contains 500 to 1000 components. Toxic metals such as lead and mercury are very harmful for pregnant women and children's. [4]. It is one of the most appealing reasons to switch to green computing. Actually this process is implemented for rescheduling the services from overloaded cups to under services in order to provide gonad quos to consumer [5]. In undervaluing system cups can automatically under volt the processor, depending upon the workload of this technology. This is called speed step on Intel process.

3. Important facts about Computing

Estimation says desktop computer with a17-inch flat panel LCD monitor requires about 100 watts - 65 watts for the computer and 35 watts for the monitor. Computer which runs consumes electricity adds its computational cost. Nowadays 50% of carbon foot prints are used in intensive organization. Screen savers do not save energy.

3.1 Factors Driving the Adoption of Green Computing

- The rapid usage growth of the Internet and Information and Communications Technology (ICT) applications.
- Increased cooling requirements for equipment.
- Increased equipment power density.
- Increasing energy costs.
- Restrictions on energy supply access.
- Low server utilization rates.

4. Methodology

Green Use: Green use is reducing the energy consumption associated with computing resources and to use them in an environmentally sound manner. Turn off monitor mode allows us to off the monitor, if the system is idle for more minutes. While turning off computer monitor, we can save half of the energy used by the computer. Similarly, standby, sleep, hibernate modes are for better energy efficiency.

Green Design: Green design means planning and energy efficient environmentally sound components, services, cooling equipments and data centers.

4.1 Objectives

Green designing is to guarantee a sustainable future for our society in terms of resources and ecological health.
- Reduce the use of non-renewable resources.
- Manage renewable resources to ensure sustainability.
- Reduce toxic and other harmful emissions.

4.2 Green Computing Manufacturers

Manufacturing Companies today strives to manufacture different electronic components, computers

and others associated subsystems with minimal impact on the environment.

Reasons: Lead is the most significant environmental health threats to the human, especially to pregnant women, infants and children up to six years of age. 40% of the amount of lead in the dumps is from the wastage of electrical and electronics devices. In that, 4% is from printed circuit boards and 36% is from the leaded glasses in monitors and television [6]. Usage of certain perilous substances in electrical and electronics equipment causes significant environmental problems during the waste management phase.

Green Disposal: It deals with the issues of refurbishing and recycling old computers and electronic equipments. Now Organizations adopted a policy of ensuring the setup and operations of information technology which produces the minimal carbon footprint. Many companies have realized the importance of using ecofriendly means in their way of doing business so as to reduce costs, lower emissions and improve their public image[7]. Reduced energy usage from green computing techniques translate into lower carbon dioxide emissions and recycling. So they are buying energy efficient computers and technology sources that includes geothermal and hydroelectric energy. Many governments initiated energy management programs. Green computing is also called green technology which is environmentally sustainable to use computers. Such practices include the implementation of energy efficient central processing to reduce resource consumption, proper disposal of electronic waste organizations and use of the green computing life cycle. Small-business owners can reduce paper consumption and lower energy utilization.

Various energy effective strategies should be implemented in data centers to make an eco-friendly data center. Green computing is to be added in government policies to improving recycling and lowering energy use by individuals and business.
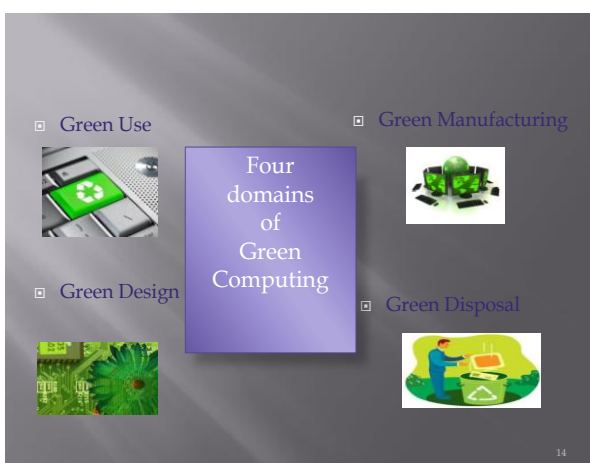

Fig.1: Green Computing Process

4.3 Benefits of Green Computing

Benefits of green computing are huge. Not only consumer, or business, or country's viewpoint, it provides global benefit. This reduces energy demands, waste and cost of the resources. Finally, the usage of technology will positively effects the environment.

Green computing allows companies of all sizes to reduce cost improve services and manage risk. Reduced energy usage will translate into lower level of carbon dioxide emissions. Green computing or green technology is environmentally sustainable.
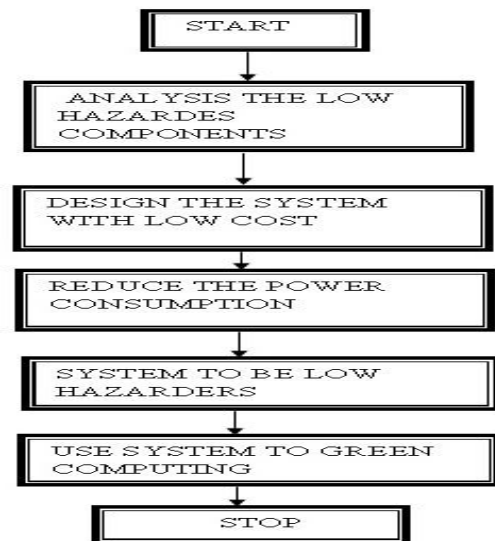

Fig.2: Implementation of Green Computing

5. Virtual Green Manufacturing

Virtual Green Manufacturing (VGM) is a modern manufacturing model that takes environmental impact and resource consumption into account and its goal is to bring down the negative impact on ecological environment, maximum resource utilization in entire product life cycle such as designing, manufacturing, packaging, and transportation. Based on three-dimensional modeling software, virtual reality modeling language, simulation analysis and calculation can be established by virtual green manufacturing. The VGM is used to develop each stage from conceptual plan of assembly products to dynamic reproduction and recycling.

5.1 Green Disposal and Recycle

Disposal provides a flexible and audit-managed solution for the collection and re-processing of redundant computing equipment and computer recycling. 'Go green' is easy to think. Positive environmental impact with computer recycling and disposing of unwanted computers and computing equipments with green computing disposal,

is even easier to collect and process unwanted items at absolutely no cost. Since Carbon Dioxide (CO2) increase overall temperature and lead to global warming , Minimizing CO2 emissions and controlling processing costs gives the potential to generate a revenue return. If the equipment is still functional, the best way is to continue to be used by someone else, until such time as it fails or it no longer is in use. Many organizations would like to have their old equipment reused or resold to realize a disposal value, but don't have the time or expertise to organize this.

6. Conclusion

The largest benefit of green computing is that it can saves money. The power saving and environment saving gives the benefit like saving money and reduction in energy consumption. Green computing is also   save the environment from pollution. Effective energy strategies should be employed in data centers to build an eco-friendly data centers. The increase in green computing over the years has direct impact on environmental issues. The future green computing technology holds big advancements in shaping energy efficiency. The Desktop computer manufactures reusing or recycles every single part of old computers leaves zero waste.

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