CHALLENGES TO THE SUSTAINABLE GREEN COMPUTING

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ABSTRACT

Green computing is the study and practice of efficient and eco-friendly computing resources, is now under the attention of not only environmental organizations, but also businesses from other industries. It refers to supporting business critical computing needs with least possible amount of power or sustainable computing. Green technology is gaining more and more public attention through the work of environmental organizations and government initiatives. In recent years, companies in the computer industry have come to realize that going green is in their best interest, both in terms of public relations and reduced costs. This paper will provide a review of how IT equipment power consumption across the industry is changing the IT industry priority. It will focus on how equipment power consumption impacts the overall power usage and total cost of ownership and how the power issues may impact what customers may or may not buy and deploy to meet their business needs. It will also briefly cover the general technological trends in the IT industry of what technologies are available in the race to meet green computing requirements. This paper will take a look at several current issues and the challenges that have been raised regarding the initiatives done to implement green computing in the IT industries.

Keywords: Green Computing, Power Consumption, Energy.

I INTRODUCTION

Green computing is the practice of using computing resources efficiently. Modern IT systems rely upon a complicated mix of people, networks, and hardware, as such, a green computing initiative must be systemic in nature, and address increasingly sophisticated problems. Green computing is the utmost requirement to protect environment and save energy along with operational expenses in today's increasingly competitive world. Green computing is very much related to other similar movements like reducing the use of environmentally hazardous materials like CFC's promoting the use of recyclable materials, minimizing use of non- biodegradable components, and encouraging use of sustainable resources.

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. Companies are addressing e-waste by offering take-back recycling programs and other solutions, with lower energy consumption and less wasted hardware. A central point of research is testing and applying alternative nonhazardous materials in the products' manufacturing process.

II IMPACT

Global electricity consumption from the ICT sector has increased drastically in recent years. It is expected to continue to grow in the near future, given increased total Internet and telecommunications traffic as well as increased performance demand.[1] At the same time, improved server efficiency and opportunities for consolidation may drive reduction in energy consumption .[7]The explosion of concern about the environment and the emerging business imperative for companies of all sizes to become sustainable presents a challenge for all managers. When introducing green computing within organizations, managers/leaders must first examine the cost benefits of the technology over the long term.

The impact of face-to-face collaboration involving geographically disbursed individuals and groups is costly from both the financial and environmental standpoints. For example, conventional travel to conferences requires using ground transportation, aircraft, or both, and these involve expensive fossil fuels and provide a massive output of CO2 (thought by a number of researchers in the scientific community to be very dangerous for the environment, and its impact is being investigated in many studies)[8].

III CHALLENGES

The three publics that define the **challenges, and hopefully, the solutions** of green computing are the consumers, regulatory agencies, and manufacturers. These three entities must all do their parts in order to solve the major problems caused by the making, using and disposing of computing devices. Each must cooperate in a global fashion to meet the challenge. According to researchers in the past the focus was on computing efficiency and cost associated to IT equipments and infrastructure services were considered low cost and available[6]. Now infrastructure is becoming the bottleneck in IT environments and the reason for this shift is due to growing computing needs, energy cost and global warming. This shift is a great challenge for IT industry. According to researchers of Green Computing following are few prominent Challenges that Green computing is facing today:

3.1 Return of Investment: The major problem was educating the stakeholders regarding the environmental impact of computers. Also, one drawback with the project is that one cannot demonstrate immediate results. For a project that involves Greening, the returns are generally seen after a long period of time. Hence an important challenge in this project was to show Immediate returns after the successful implementation of Green IT in the computer center. Also, it involved studies to prove that the present infrastructure had inefficiencies and that the environmental impact

of computers was potential. This project involved replacement of heavy and costly devices like printers and processors. Hence, an effective method of replacement and environmental friendly disposal of such systems had to be worked upon.

3.2 Disposal of Electronic Wastes: Reliability about the use of green materials in computer is perhaps the biggest single challenge facing the electronics industry. Electronics giants are about to roll out eco-friendly range of computers (like desktops and laptops) that aim at reducing the e-waste in the environment. They are likely to be free of hazardous materials such as brominates flame-retardants, PVCs and heavy metals such as lead, cadmium and mercury, which are commonly used in computer manufacturing. Replacements like the front-runner, a tin/copper/silver alloy, also require higher melting temperatures,
which can affect chip life.

3.3 Perspective with respect to Indian Scenario : In India, the implement-ability of principle of "Green Computing" is facing a dilemma due to many socio-economic matters and those are linked to be soughed out to pull India in the mainstream movement of "Green Computing". Lack of basic research initiative and congenial infrastructure has resulted in absence of good patents and commercial production of indigenously built equipments. Due to tax relief given by the Government in the last few years for importing computer hardware accelerated the import and resulted in the minimization of the machines, equipments and peripherals. In this situation many small and medium scale industries were induced to start procuring the hardware at low prices and venture into the building of IT infrastructure for the company. But during the activities price was the most important criterion.

3.4 Our leadership in energy efficiency, miniaturization, and integration at the silicon and board level is a testament to VIA's R&D capabilities:

On the design side, ensuring energy efficiency in IC chips requires a keen focus on reducing voltage, while retaining performance and enabling our signature rich-feature integration within ever-smaller packages. This is not a simple process and demands high levels of skilled engineering, which is why, to this day, we can offer the lowest power-consuming embedded, notebook, and desktop processors in the world. Achieving such high levels of energy efficiency and low heat production also allows us to build smaller, which in turn allows our partners to build smaller systems, providing savings for consumers not only in terms of power requirements but also in disposal costs. For portable systems, such as the new generation of ultra-mobile devices, this also means longer battery life, an essential element of ultra-mobility Other companies cannot achieve this, as their chips consume too much power and emit too much heat.

3.5 Increase in energy requirements for Data Centers and growing energy cost : Green computing could actually be quite costly. Given that there has been a green process that the computer will have gone through in order

to make the computer in the first place; there will usually be some kind of added cost when the computer has been finished. Green computing takes a lot of new technology, and hence, you may find that you will have to pay a premium price for your new green computer. A perfect example is that the greenest modern computers today are Mac books and Mac book Pros. These computers are hardly inexpensive - they're actually some of the most expensive computers in the market. . Furthermore, some computers that are green may be considerably underpowered. Some people may need incredibly power-consuming and powerful computers to deal with the tasks that they need them to do. This is another disadvantage that many people who have high-powered computers believe to have with green computers. Another issue would be that powerful and green computers are more expensive. For instance, Apple's powerful range of computers, including their iMacs, is incredibly green but is also incredibly expensive.

IV CONCLUSION

Many governments worldwide have initiated energy-management programs, such as Energy Star, an international standard for energy-efficient electronic equipment that was created by the United States Environmental Protection Agency in 1992 and has now been adopted by several other countries. 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. Surprisingly, standby “leaking,” the electricity consumed by appliances when they are switched off, can represent as much as 12 percent of a typical household’s electricity consumption. So green computing is a mindset that asks how we can satisfy the growing demand for network computing without putting such pressure on the environment. There is an alternative way to design a processor and a system such that we don't increase demands on the environment, but still provide an increased amount of processing capability to customers to satisfy their business needs. Green computing is not about going out and designing biodegradable packaging for products. Now the time came to think about the efficiently use of computers and the resources which are non renewable. It opens a new window for the new entrepreneur for harvesting with E-waste material and scrap computers.

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