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REVIEW OF REDUCED ENERGY CONSUMPTION THROUGH OPERATING SYSTEM

Review of Reduced Energy Consumption through Operating System

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Abstract – Energy management is the responsibility of both applications and operating systems. Operating system's main component, i.e., resource manager will handle it with the collaboration with hardware. One of main thing is to understand how much resources are demanded by user at the given time in order to manage them efficiently.

Keywords: Energy Management, Energy Consumption, Operating System

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1. INTRODUCTION

Resource management is one of the essential tasks of operating system. Operating system must able to manage resources in an efficient manner. The correct and complete knowledge of each and every task running inside the computer system is mandatory to fulfill the demands of resources from various processes and I/O devices (Heiser, *et al.,* 1993). Now days, mobile devices are become common, and one of the major resource in these devices is its power or energy. So, efficient management of power of mobile devices is still a research problem. Since the role of power in any operating system is restricted to two main tasks, i.e., control the hardware power requirement, and increase the lifetime of battery (Waldspurger, 2002). Mobile operating systems are just started with the advent of mobile phones and smart phones in the market. Some of the mostly used mobile operating systems are, i.e., Symbian, Android, Microsoft Window Mobile OS, Blackberry OS, and Linux mobile OS. These and many other monile OS can be installed on any device having updates as well (Zhang, 2010). Resources are playing an important role in the performance of mobile operating system. Many mobile operating systems manage their resources, i.e., battery, GPU, Memory, Storage etc. (Sharif, *et al.,* 2012). Power consume by mobile functions is one of the most important resource for mobile devices because these devices are known as power hungry devices. Symbian OS used a distributed method with each layer is responsible to handle mobile power. Android says that CPU can't consume power if there is no application consuming power (Heiser, 2011).

2. REVIEW OF LITERATURES:

Energy conservation has become a major challenge in system design. Most existing techniques focus on individual layers: devices, circuits, architecture, or software. Conserve energy through a collaborative and coherent approach across different layers. In the hardware layer, special registers report cumulative energy consumption of different hardware modules. These registers are called energy counters, similar to performance counters in modern processors. Operating systems use the information from energy counters and follow a set of accounting rules to determine the amount of energy consumed by each process. These processes can adjust their behavior to use energy efficiently. For portable systems powered by batteries, some processes may off-load computation to a remote server that is grid-powered. A programming environment will be developed to assist programmers in improving energy efficiency.

Heng Zeng (Zeng, 2002). Proposed a Currentcy model that manages energy through energy accounting for various hardware devices, and made fair allocation of energy to all of mobile devices. They have used a linux version for mobile devices, i.e., ECOSystem in order to support their model. ECOSystem will incorporate their model and perform energy management at operating system level. The main purpose is to manage the battery lifetime of mobile device. Results have shown that their system will reduce the power consumption to 0.02W.

Athanasios E (Papathanasiou, Scott, 2003). Analyzed the benefits of burstiness of disk usage in order to disk power management policy more energy efficient. They suggested using the aggressive prefetching and

delay of low-priority requests to increase the length of idle phase. They also presented a method to share the accesses of several running tasks so those requests of disks are arrive at same time. They proposed to enhance their work in network interfaces in future.

Rolf Neugebauer (Neugebauer, McAuley, 2001) proposed a mechanism to add energy as a resource in Nemesis operating system. They also proposed economic model for CPU resource management. Energy accounting is used to observe the level of energy used by each application. They applied for energy management, i.e., it charges each process at energy consumption, and not gives more energy if the demand of energy exceeds the battery time limit.

3.   GREEN APPROACH FOR REDUCING ENERGY CONSUMPTION

Green Computing is the practice of using computer resources efficiently (Jadhwani, *et al.*). Another definition is the one which defines green computing as the study and practice of efficient and eco-friendly computing resources and the environmentally responsible use of computers and related resources. The primary goals of green computing are to reduce the use of hazardous materials and to maximize the energy efficiency during the product's lifetime (Computing, 2012). Green computing is concerned with reducing the environmental impact of Information Technology before IT devices are purchased, during their lifetimes and after we have finished with them. A good number of manufacturers are improving their processes at the different levels of the product life to minimize harm as they are using the materials which are usually eco-friendly, renewable or might use less energy (Chakraborty, *et al.,* 2009). Various campus and universities are trying to implementing the following strategies to decrease environmental impact of computers during their use; when IT devices are not in use they are put in sleep mode, computer systems are switched off when not in use, sharing documents and files on the screen or use FTP servers and only print on demand and where necessary, using virtualization software instead of physical machines/servers, printing less etc. Old system scan be donated to charity institute which might boost the product life (Tebbutt, *et al.,* 2009).The above are some of the step made in ensuring green computing for sustainable environment. This research paper is concerned with conducting a research on electricity consumption of lab of computer science in our College and approaches for reducing energy.

4.   CONCLUSION:

Energy is an important resource in mobile computers now days. It is important to manage energy in efficient manner so that energy consumption will be reduced. Developers of operating system decided to increase the battery life time of mobile phones at operating system level.

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