

Energy management in Mobile devices with the cinder operating system

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Abstract- We argue that controlling energy allocation is an increasingly useful and important feature for operating system, especially on mobile devices. We studied two new low level abstractions in cinder operating system, reserves and taps, which store and distribute energy for application use. We identify three key properties of control-isolation, delegation, and subdivision – and show how using these abstractions can achieve them. We also studied how the architecture of the HiStar information-flow control kernel lends itself well to energy control.

Index Terms- energy, mobile phones, power management.

I. 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

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 [4]. 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 [5].

Energy management in mobile phones 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

fulfill the demands of resources from various processes and I/O devices [1].

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 [2].

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 [3].

of main thing is to understand how much resources are

demanded by user at the given time in order to manage them efficiently [6].

Some of the main responsibilities of power management system in context of mobile operating system are, i.e., control the power requirement of hardware devices, increase the life time of battery component is that device can be used between recharges, and increase the user's perception of mobile phone's operation [7],[8].

In this paper, several new approaches of mobile operating system will be discussed.

II. RELATED WORK

An energy efficient mobile device, i.e., smart phones is the requirement of time. It is the main characteristic of any mobile device now days. Operating system will reduce energy consumption by

knowing how many resources are demanded by user, and by manage power of mobile device, since it is essential to know the demands of user in order to manage energy efficiently [9]. Heng Zeng [10] 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 [11] 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 Int. J. Advanced Networking and Applications 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 [12] 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. Narseo Vallina-Rodriguez [13] presented an energy aware operating system, i.e., *ErdOS*. It is user-centered energy aware operating system that increases the battery lifetime of mobile device by managing resources in a proactive manner. They also used opportunistic access to resources in neighboring mobile devices using social connection with users. They claim that Wifi and GSM consume most power in mobile devices, i.e., 720mW and 620mW respectively. ErdOS manager is embedded into Android mobile OS in order to manage resource. Arjun Roy [14] proposed a Cinder Operating system for mobile devices and handsets. This will enable the user to manage energy resources efficiently. The taps and reserves work as resource containers, provide a platform for resource consumption. Cinder uses software based model for

energy consumption in mobile devices. The performance of Cinder OS is tested on HTC.

III. CONCLUSION

Energy is a most important resource in mobile devices. In order to reduce battery consumption, it is important to done resource management especially energy management. Many energy aware mobile operating systems have been developed by researchers. In this paper a literature review of these energy efficient mobile operating systems has been discussed. Several energy efficient techniques used by mobile OS also discussed and analyzed. In future, this work will be extended for upcoming smart phones using different operating systems.

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