Reliable and Energy Aware Next Generation Operating Systems

Austin Ross and Evan Jenkins

Abstract **- As our technology becomes more and more advanced, we must acknowledge the tradeoffs that come with each supposed "improvement". In some areas of OS (operating systems) we are already doing this. Take modern computing, for example. Modern operating systems already have procedures in place that allow them to monitor things such as the CPU (central processing unit), memory usage, storage, etc. We already know the impact that these things have on computers, and because of this our operating systems are designed to handle any potential issues that arise. Another resource that needs to be accounted for is energy usage, or power consumption. The amount of energy that a system is often overlooked, but still extremely important. This research paper will seek to outline the effects that rising power consumption will have on our technology as products become more and more advanced, as well as discuss ways that the coming generations of operating systems can minimize the impact.**

Index Terms - Operating System (OS), CPU (central processing unit)

I. Introduction

Before we dive into ways that we can account for rising energy usage by our products, we must first look at how energy requirements can vary between circumstances. One contributor to these requirements is the purpose of use. Your personal computer at home does not require the same resources as a workstation at a large technical company. Another contributing factor is the energy source. Assuming both of the computers mentioned above are desktops, they draw power from an outlet that they are plugged into, but what about a mobile device? Now we have switched the source from the outlet to a battery, introducing a whole slew of other factors to be concerned with. Battery size and the expected duration of use are two such factors that go hand in hand. Take for example, mobile phones. We have come to expect our mobile phones to last us all day (at least), but there are very clear and obvious size constraints for a battery in a device that we carry around in our pockets all day [1]. Increasing the physical size of the battery is simply not an option in this scenario, so instead *efficiency* is the core focus of innovation.

Efficiency is at the heart of this discussion. As manufacturers deal with constraints when it comes to the source of power for their products, they must look to other means of achieving their goals. Creating a more efficient application or operating system allows for reallocation of resources away from strictly providing power to a system, and rather to areas that give us as consumers more tangible benefits. Another thing to consider is cost. Sure, you could always add more power to a system in order to meet your thresholds, but the price on this could add up in a hurry. A better, more **efficient**, way to get the power you need? Decrease the usage of the operating system or an application in use, and utilize those saved resources wherever else they may be needed.

REFERENCES

[1] (Waitz, *Accounting and control of power consumption in energy-aware operating systems*)