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Title of the Thesis

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que bonitinho...

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"Epigrafe."

Pessoa que falou isso

List of Abrevitations

Abstract

Contents

List of Figures

List of Tables

Motivation

O greenict tem sido muito importatne para o mundo, as empresas, depois da crise economica, comecaram a ver que Ã© importante, pois, reduz muitos custos, alÃ©m de contribuirem apra o meio ambiente. . . bla bla bla

1 Introduction

introduzir a pesquisa e falar porque a gente escolheu cada coisa, explicar, dando um panorama geral

1.1 Definition of the problem

1.2 Solution Strategy

1.3 Structure

2 State of the Art

2.1 Greent ICT

2.2 Devices Consumption

2.3 Measurement Tools

3 Methodology

Write a review point of the problem and the solution I want to achieve...

3.1 Overview

This research was conducted in order to determine how much energy a computer's components, for instance, CPU, Memory and Hard Drives spend and, also, how much it would affect the cost of the Data Center in a whole. Above that, the advantages and disadvantages as well as the reliability of these measures and benchmarks played also an important role in the objectives of this thesis work. With regard to the topic in hand, the analysis was carried on with the help of Softwares, which will be explained in the following sections and analytical measures using an energy measurement device to counterbalance and compare the benchmarking measures obtained from these softwares. Concretely, more than 1000 components were analyzed and categorized in a huge database, which the schema can be seen on Figure **??**. Firstly, it was used the Sandra's database 3.3.1 to collect the components and separate them by categories, with their benchmarks and all data. Secondly, it was used WebSPHINX 3.3.3 for the collection of components and linkage of MPN[1] and the respective component. Thirdly, it was used an analytical method using a energy measurement device 3.3.2 for the comparison and validation of the results given by the other benchmarks.

Finally, these data were all linked in a database for later comparison and choice.

[1]Manufacturer Part Number

3.2 Research Design

3.3 Energy Management and Benchmarking Tools

In order to obtain relevant information about the data required for making the comparison between the components, it was needed to use some energy management and benchmarking tools.

The softwares used, were selected from many of existents softwares in the area for the following reasons:

Size of Database The database of components, in order to get a good result should be considerably big;

Characteristics of Benchmarks The benchmarks provided by the software should provide information about the energy consumed for each component;

Number of Benchmarks The software should have a good database of benchmarks;

Quality of Benchmarks Although, the number of benchmarks should be sufficiently, the quality, precision and relevancy were, also, important in the decision method;

Ease of Use In the sense that, the software should provide an ambient of work that is intuitively and comfortable;

something1 explain ;

something2 explain ;

something3 explain ;

The acquisition of data was made analyzing the results of these benchmarks, making use of their database

3.3.1 SiSoftware SANDRA

SiSoftware Sandra[2] is an information and diagnostic utility. It provides most of the information (including undocumented) one need to know about their hardware, software and other devices whether hardware or software. SANDRA was the main software utilized

[2]The **S**ystem **AN**alyser, **D**iagnostic and **R**eporting **A**ssistant

to benchmark the data in this thesis work. It contains a huge database of components to make sure the benchmarks provided have the best results and accurate comparisons.

The software goes beyond the point of other Windows Utilities, by giving the user, the possibility of benchmarking and comparing at both high and low level the computer devices. Moreover, it is a tool for monitoring the performance on systems and even benchmarking many parts of the computer, this includes, CPU[3], memory, hard disks, CD/DVD ROM, network, PSU[4], etc. For that reason, it is considered one of the most complete benchmarking tools available. Besides the benchmarking, Sandra also provides access to information about the Hardware, including the Motherboard, processor, disks, printers, etc; and Software, such as, key softwares (web browsers, e-mail program, etc.), OS information, processes, memory usage and more.

The detailed list of modules utilized by SiSoftware Sandra can be found in Appendix A.

Furthermore, the Sandra has a great functionality that is a catalog of pricing, which, in addition to the power consumption and other important characteristics, the best combination (which means the most green) of devices can be chosen to the server.

3.3.2 Energy Measurement Instrument

Figure 1: Energy Measurement Instrument

[3]Central Processing Unit
[4]Power Supply Unit

The device, which can be seen on Figure 1, was used for comparing and validating with the results of the benchmarks given by Sandra.

After the result of the benchmark was obtained from the SiSoftware Sandra, this equipment that was connected to the computer read how much energy it was consumed and it was inserted in the database.

3.3.3 WebSPHINX - A Personal, Customized Web Crawler

WebSPHINX[5] is a Java class library used for web crawling. It provides a way to browse and process web pages automatically.

This piece of software was used to establish the pricing, linking it with the MPN[6], and, afterwards, composing the database explained in 4.1.

3.3.4 CPU-Z

CPU-Z detects information about the CPU, RAM Memory, motherboard, chipset and more. That program was used to complete the database with missing information about the components.

3.3.5 PlateSpin - Recon

This software did not compose the ones used for doing this thesis. Yet, it is important to notice this, because it is almost the same of Sandra, but it provides a more incisive work on Data Centers in general. It provides workload profiling, analysis and planning of complex server consolidation, disaster recovery, capacity planning, asset management and green data center initiatives. It also provides forecasting for optimizing the data center by collecting hardware, software and services inventory for all server workloads. Furthermore, it results an statistics work for the server workloads running on data center and how their resources are being used.

For the reason that it was needed to compare the components, in order to draw a picture of the most suitable components to be used. It was chosen Sandra, which has a great database of components.

[5]Website-Specific Processors for HTML Information Extraction
[6]Manufacturer's Part Number

3.4 Data Processing and Analysis

4 Analysis and Results

4.1 Analysis

here it is explained the database, how it was built, the database schema and etc...

4.2 Results

Conclusions

Perspectives and Future Developments

Suggestions for future developments, there are

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-
-
-
-

References

APPENDIX A – List of SiSoftware Sandra Modules

Here is the list of principal modules used in this research work.

•System Summary

•Mainboard/Chipset/System Monitors Info

•CPU/BIOS Info

•APM & ACPI (Advanced Power Management) Info

•PCI(e), AGP, CardBus, PCMCIA bus and devices Info

•Video Information (monitor, card, video bios, caps, etc.)

•OpenGL Information

•Keyboard Info

•Windows Memory Info

•Windows Info

•Font (Raster, Vector, TrueType, OpenType) Information

•Modem/ISDN TA Information

•Network Information*

•IP Network Information*

•WinSock & Internet Security Information

•Drives Information (Removable Hard Disks, CD-ROM/DVD, RamDrives, etc.)

•Ports (Serial/Parallel) Info

•Remote Access Service Connections (Dial-Up, Internet)*

•OLE objects/servers Info*

•Processes (Tasks) & Threads Info

•Modules (DLL, DRV) Info

•Services & Device Drivers (SYS) Info*

•SCSI, SAS Information*

•ATA, ATAPI, SATA, RAID Information

•Data Sources Information*

•CMOS/RTC Information*

•Smart Card & SIM Card Information*

List of Benchmarks

•Arithmetic Benchmark (including SSE2, SSSE3)

•Multi-Media Benchmark

•Multi-Core Efficiency Benchmark

•Power Management Efficiency Benchmark

•File System (Removable, Hard Disks, Network, RamDrives) Benchmark

•Removable Storage/Flash Benchmark

•CD-ROM/DVD Benchmark

•Memory Bandwidth Benchmark

•Cache & Memory Bandwidth Benchmark

•Network/LAN Bandwidth Benchmark

•Internet/ISP Connection Benchmark

•Internet/ISP Peerage Benchmark

Applications and Usage

- •Hardware Interrupts Usage*
- •DMA Channel Usage*
- •I/O Ports Usage*
- •Memory Range Usage*
- •Plug & Play Enumerator*
- •Hardware registry settings
- •Environment settings
- •Registered File Types
- •Key Applications* (web-browser, e-mail, news, anti-virus, firewall, etc.)
- •Installed Applications*
- •Installed Programs*
- •Start Menu Applications*
- •Installed Web Packages* (ActiveX, Java classes)
- •System Event Logs*

* Commercial version only

APPENDIX B