CONSOLIDATION IT INFRASTRUCTURE FOR UCATOLICA SYSTEMS LABORATORIES THROUGH VIRTUALIZATION WITH VMWARE VSPHERE 5

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Abstract-This thesis presents search strategy in order to make known both to students and teachers of the Catholic University of Colombia the benefits they can gain by using virtualization with VMware. Virtualization is an innovative new technology that allows the creation of multiple software-based computers, which reproduce the atmosphere of a physical machine in aspects of memory, CPU, storage, and input and output devices.

Using virtualization reduces the physical equipment using electricity, maintenance, physical spaces, networks and even qualified for the administration of the same staff, all this and many more elements make virtualization an attraction for environments of information technology coming to optimize services delivered.

As a result of the thesis, a guide virtualization, focused on a university environment, and proactive participation of students and teachers is encouraged in new technology trend revealing tools to promote research and participation is provided.

The overall objective of this study is to design and provide a model for innovation processes virtualization training students of one of the laboratory system of the Catholic University of Colombia and to inform teachers and students the different advantages that can leverage the virtualization environment.

INTRODUCTION

Virtualization is a new technology aimed at allowing the execution of multiple operating systems 32 and 64 bits on a single physical server, you can back up your entire operating system, you can move virtual servers in a data center another. Among The advantages of virtualization are cost reductions, improving the functionality of the technology platform. There are several types of virtualization such as server virtualization, desktop virtualization, and application virtualization.

Server virtualization is a layer of software that provides the ability to expose the physical resources to be made available to one or more different virtual machines simultaneously. With virtualization is much easier to create tests and with this software you can reset the initial configuration of the machine, creating virtual safe environments and opening great possibilities for business continuity.

Virtualization is having a physical server and the multiple virtualized using VMware tools in order to meet several specific tasks depending the needs of each client, all this is achieved by called Hypervisor virtualization software that will optimize and increase the deployment of infrastructure.

This technology helps us to have the software and hardware have a separation, which allows multiple operating systems, applications run simultaneously on a single server. Having a virtual environment can be installed on single files or a disk volume in a storage network.

Being able to have more than one server running inside it, helps to test a number of applications needed today; this and many more benefits that virtualization find both cost reduction, such as reducing servers, increased security and application availability can be exploited in different fields of information technology, from a small development in a computer center to large computer centers distributed around the world.

In the academic area can get testing with different environments from databases, operating systems, application performance with different numbers of processors, RAM, verify that third-party applications or system updates can potentially cause malfunction of our developments in applications.

In the laboratories of the Catholic University of Colombia is evidenced that there are restrictions for both students and teachers and the computer rooms are occupied, there is no software installed on all laboratories are required to work on any matter in particular. With virtualization that is developed in this paper grade is intended that both teachers and students are able to extract the resources that each user requires and when that request.

OBJECTIVES

Develop a proposal in order to publicize the use of resources of the computer center of the Catholic University of Colombia consolidating virtual physical services.

Identify weaknesses that exist in laboratory systems not having a virtualized environment.

Ask the implementation of server virtualization demo for laboratory systems.

Implement the presentation service virtual server systems for the classroom at the Catholic University.

Documenting results and demonstrate cost benefit of managing virtual environments.

VIRTUALIZATION

Virtualization is a technology that uses special software to make the most of the different physical capabilities of computers, saving both cost and offering to meet the needs of users.

The called Hypervisor is the core of some applications of this virtualization software that allows multiple operating systems to access a computer concurrently, as if each were to own coordinating access to and use of its resources.

The virtualization layers can be an application or an operating system directly to isolate virtualized operating systems of the physical system, providing a uniform virtual hardware. Thus the RAM memory, CPUs, hard drives, etc.. Become resources to virtual machines for the use.

I. DEVELOPMENT OF CONTENTS

Virtualization and Its Benefits

Virtualization is the process to submit a subset of physical resources grouped logically, so that may have benefits on initial configurations to meet the needs of large companies and allow ease of access to resources.

The virtualization platform is built on an architecture designed for business, the VMware software is used to transform vSphere Version 5 or virtualize hardware resources of a computer-based x86 (including the CPU, RAM, hard disk and network controller, so you can create a fully functional virtual machine that can run its own operating system and applications as if it were a physical computer

Among the advantages that can be found in a virtualized environment are:

Save space: provides new services in less time.

Ease of Management: increased work capacity, ease of resource reservation and action times.

Quick recovery environment: you can do full backups of virtual server.

Energy conservation: utilization and significantly increases productivity.

Portability: earns hardware independence, agility migration and organized capacity growth.

Saving acquiring and maintaining servers.

Cost Reduction: this results in a reduction in space and power consumption that contributes to the environment.

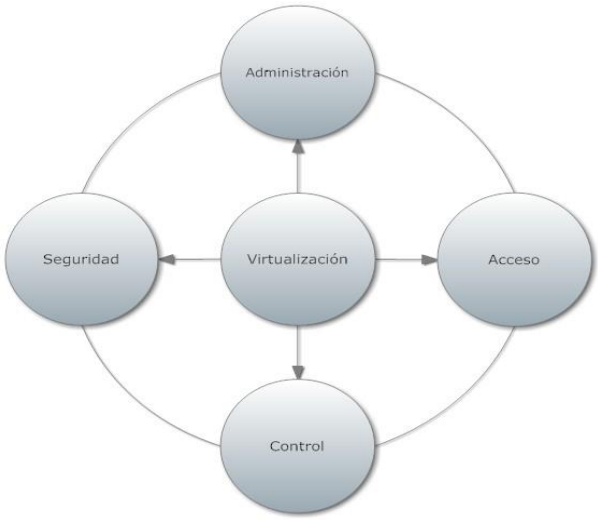
Dynamically allocate resources to a service based on the needs of users.

Have a computer to perform the practices that users require.

Increases security and application availability.

Involve teachers and university to new technologies of information and communication students.

The most common advantages of virtualization include reduced hardware costs and improved utilization rates of servers. There is no doubt that the main factor driving the move to virtualization is server virtualization. With the rising cost of energy, more and more organizations feel the need to move to a green data center, one that will use a small amount of space, a reduced amount of power and cooling to accommodate a smaller number of physical servers; this can be achieved by using virtualization technologies in the data center level servers, workstations and applications.



Virtualization success story.

- ✓ Virtualization Pilot Colombia University

A proposal to reduce costs and consolidate their information systems so sought in 2011 was chosen to VMware which sought to implement a flexible and scalable platform. Today it has more than a dozen groups of servers in the cloud. In late 2011 a high investment consisting of 38 computer rooms and 3 with virtual desktops that have enabled the availability and speed of the resources that each client requests are made is increased.

The benefits achieved by implementing VMware is to have a flexible and scalable

platform for fast and effective solutions are seen.

Virtualization on IBM labs

In 2006 one of the laboratories of IBM had to face a great challenge, many of the servers there handled using multiple operating systems installed on the same hardware and can be affected security and information. IBM unfurled a system virtualization servers laboratories thus can capture the complete state of a test environment and redeploy these tests on other machines; virtualization with this implementation the number of servers was reduced, the time spent on the test run was decreased, reducing costs and significant savings in electricity is conducted.

Methodology

In the time that students of different faculties have been taking classes in the respective laboratories systems area of the Catholic University of Colombia and teachers unable to find the necessary tools in all laboratories have found problems like only to perform tests on desktop computers, have limited access to the technological tools as some rooms have computing software installed in others there, not being able to work on web servers, databases and operating systems.

In this context is the need to publicize the virtualization process and seek new technological strategies for training and development of our students in order to facilitate learning because the growing number of students and teachers, come increasing difficulty of access to laboratories and tools that everyone needs to work on different matters that require the use of a laboratory.

With virtualization the reliability and availability of the tools, information, resources occurs; thus providing better performance and ease for students and teachers of the Catholic University of Colombia.

It aims to provide a tool that should be appropriate for the environment in the university applied to increase the availability of computers for all students and that they may have at their disposal all the resources that each user requires.

VM	DNS Name	CPUs	Memory
DC	DC.UCCVIRTUAL.LOCAL	1	1.024
T_LINUX	Redhat	1	1.024
T_ORACLE_SOLARIS	Oracle	1	1.024
T_WIN_3.1	n/a	1	16
T_WIN2008	WIN2008.UCCVIRTUAL.LOCAL	1	1.024
T_WIN2008DB	WIN2008DB.UCCVIRTUAL.LOCAL	1	1.024
T_WIN7	win7-PC	1	1.024
T_WIN98	n/a	1	256
VCENTER	VCENTER.UCCVIRTUAL.LOCAL	2	5.120

Methodology Employed.

To run a demo optimal virtualization take into account that will be developed with only twenty users in computer labs at the Catholic University of Colombia, it is necessary to perform different procedures from hardware, software, installation and configuration platform as described below where we can see the information of the virtual machines that we use in the implementation.

Implementation.

To implement the virtualization project laboratories of the Catholic University of Colombia VMware vsphere 5.5 tool was used because it has easy access to the installation media and supports many operating systems.

Admission to the manufacturer's website Vmware is done with a single user registration via mail, proceed to download the installation media Hypervisor ESXi 5.5. This is recorded on a CD-ROM to boot from the DVD drive, it followed the operating system installation is performed on the IBM x3400 server. It is important to note that you can easily recognize some of the components of the server while installing the Hypervisor is done because with this ensures they are in top

condition for operation after the network configuration server is done, that we allowed to have a connection to access Hypervisor virtualization services, using static IP addressing.

To avoid having to make no changes in the production environment, specifically in the domain controller of the Catholic University of Colombia; a virtual machine is created from an environment. iso image with the Windows 2008 operating system.

VCenter server is a server that applications and services are designed by VMware which will take care of the larger process of virtualization management, allowing functions such as cloning, creating templates, access to the virtual platform from multiple devices, security levels permissions to the platform and many more.

For the results of surveys conducted by both students and teachers.

Student survey

Question	Respondents	Results
1.¿Do you know any virtualization tool that is used in the university throughout his career? Yes No	30	A percentage of 80% of students do not know any virtualization tool used in college
2. Do you Considers Laboratories college systems have all the tools necessary for their work. Yes No	30	A 90% of respondents did not have access to the tools necessary to complete work.
3. Do you Have access to the resources whenever you need it and when you request. Yes No	30	A 90% of respondents did not have access to the resources necessary to complete work; either at the time that each request
4. If there are virtual environments available on the University, its decision to select a workspace would be: a. Virtual environment b. Laboratories	30	A 80% of respondents prefer a virtual environment and to have access to the resources and the time when required and 20% prefer laboratories.

Teacher's survey

Satisfaction survey conducted with teachers after running the tool show and giving them to know the benefits using virtualization.

Question	Respondents	Results
1. Rate from 1 to 5 the following, with 5 being the highest rating and 1 is the lowest rating. *a. Graphic interface* *b. Access Speed* *c. Portability (use laptop, phone, tablet, etc.)* *d. Ease of use* *e. Ease of access to servers*	14	A 100% of the respondents would like access speed, ease of use, graphical interface, and access to the servers. As this has a facility to work.con los estudiantes.
2. Of the following means of access, which was the most likes? *a. computador de escritorio* *b. Tablet* *c. Laptop computer* *d. Smartphone*	14	A 40% of respondents would like to work on your smartphone, 30% on your tablet, 20% in their notebooks, and 10% on your computer desktop.
3. Do you Believes that this project will help improve the dynamics of teacher education - student *a. low* *b. medium* *c. high*	14	100% of the teachers surveyed assist them in working with their students using a virtualization tool.
4. If there are virtual environments available on the University, its decision to select a workspace would be: *a. Virtual environment* *b. laboratory*	14	90% of respondents prefer to work as a virtual environment can have easy access to the resources needed
5. Thinking about the cost benefit in managing virtual environments versus laboratory The University considers relevant resources invested in virtualization *Yes No*	14	100% agree that the university invests in technology to facilitate their work and their interaction with students

II. CONCLUSIONS

Because the results obtained throughout the research project we have shown that virtualization is a useful tool to implement in the Catholic University of Colombia and that makes work easier for teachers tool, and students will have availability of resources when they request in general are numerous advantages as the cases that have shown success in the project, as it is a key technology for scalability, stability, adaptability, efficiency and safety.

With surveys students became evident lack of use virtualization because students may not have the resources they require for optimal work.

If virtual infrastructure can be implemented to fit any need, are created with a configuration under the responsibility of the administrator or teacher.

Can be demonstrated with ease VMware tool used to create virtual machines, the administration thereof and where the immediate availability thereby ensure safety and efficiency to the work of each user.

REFERENCES

[1] ANDRADE, Gustavo Alessandro, Data Center virtualization fundamentals, Indianápolis Edición Septiembre 2013 ISBN 13:978-1-58714-324-3

[2] DAN Kusnetzky, virtualization A manager Guide Edition 2011 printed in the sates of America ISBN 978-1-449-30645-8

[3] GONZALEZ B Erika, gestor de Máquinas Virtuales, Diciembre 2010. Trabajo de Grado (facultad de ingeniería de Sistemas).Universidad de Mendoza, p. 50-51

[4] RUEST Danielle y Ruest Nelson, Virtualization A Beginners Guide. Edición 2009. P 3, 4. ISBN: 978-0-07-161402-3

[5] VMWARE infrastructure Architecture Overview https://www.vmware.com/pdf/vi_architecture_wp.pdf [citado 2006 Vmware].

[6] VILLAR, Eugenio, Gómez Julio, Introducción a la virtualización. Edición 2010 ISBN 892-0-04-231692-1