Lab 1-Getting Started

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Abstract

The research that needed to be accomplished for this lab was to obtain more information about

Proxmox VE 5.4-6 and the GNU/Linux server named Chewy as well as logging into both

systems. Research relied on internet sources beginning with Virtualization itself and giving a

short background of hypervisors and virtual environments. A condensed description of Proxmox

VE, OpenVZ, KVM, QEMU, GNU/Linux, PuTTY and SSH were attempted. Sources varied and

were from program information pages, specialists, programmers, volunteers, marketing ads about

products as well as technology journalism articles. Logging into Proxmox and Chewy was a

simple process because of the strait-forward instructions supplied by the Professor. Logins were

successful and information was readily available for research. The conclusion was positive as

these programs ran successfully and are working properly for future assignments.

Keywords: Proxmox VE, GNU/Linux, PuTTY, Hypervisor, Virtual Environment,

Virtualization, Host, Guest, Containers, OpenVZ, KVM, QEMU, SSH, Kernel, Operating

System, Debian

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Virtualization, in reference to computers and networking, is referring to the creation of an

alternate or virtual version of a physical component like computer hardware, networking

components or data storage devices. (Wikipedia contributors, 2020) One result of that virtual

component is a virtual environment can be used just as the physical environment counterpart

would be used. A single physical computer or server is now able to run multiple applications

and/or operating systems through virtualization. (Why choose virtualization, 2014) Hypervisors

make virtual environments possible by acting as a controller between the physical hardware and

the virtual environment. (Barrett, 2010) There are two types of hypervisors. Type 1, which are

also called bare metal or native, run directly on the hardware to provide for the virtual

environments that are running on it (called guests). (Sitaram, 2012) Type 2, called Hosted

Hypervisors or host, perform over an already installed operating system like Linux or Windows.

The operating system controls the hardware access. These are easy to install and still give great

overall performance. (Rountree, 2014) Hypervisors create and run virtual machines or virtual

servers.   The virtual environment that will be started during this lab is called Proxmox Virtual

Environment 5.4-6. Access to the GNU/Linux server called chewy will also be accomplished

using PuTTY as a remote terminal emulator.

Proxmox VE hypervisor is based on GNU/Linux (Debian) and is open source. It has a

central web-based management that does not require more installation. (Cheng, 2014) Version

5.4 is built specifically on Debian 9.8 with a "specially modified Linux Kernel 4.15". (Proxmox,

2019) Proxmox is capable of two types of virtualization; OpenVZ and KVM. OpenVZ needs a

patched Linux kernel so Linux guests are the only operating system type that can be created. In

OpenVZ, the guests are called containers because they share the same architecture and kernel as

the host operating system. (Cheng, 2014) KVM (Kernel-based Virtual Machine) is a modified

Linux kernel built with the KVM module so that it can give hardware-assisted virtualization.

Virtualization is performed by a software-based emulator (QEMU) which simulates the

virtualized environment while KVM only exposes the /dev/kvm interface. (Cheng, 2014) "This

converts Linux into a Type 1 (bare-metal) hypervisor." (What is KVM?, 2020) Then QEMU or

the software based emulator will create the virtual machines on top of KVM. (What is KVM?,

2020) ProxMox VE is relatively simple to start working with but can be very in depth as Simon

M.C. Cheng has authored a book called Proxmox High Availability which goes into more detail

when setting up a high availability virtual cluster. (Cheng, 2014)

PuTTY is an SSH client for Windows, Mac and Linux. It has a terminal window for

access to the server used in this lab, the GNU/Linux server named chewy. (How to use PuTTY

on Windows, 2020) SSH is a software package and means Secure Shell. It secures system

administration and file transfers even though the networks are insecure. Tatu Ylonen is the

inventor of SSH and OpenSSH which is an open source SSH program is based off of his free

versions. (SSH(Secure Shell), 2020)

GNU/Linux is an open source operating system that is often referred to as just Linux. In

actuality, Linux is the Kernel and GNU is the rest of the package that makes up the operating

system. It has been open source since 1992. (What is GNU/Linux?, 2013) Debian is another

open source group who develop free software and created another operating system based on the

GNU/Linux operating system. (What is Debian?, 2013)

Objective

The purpose of this lab is to obtain background on the systems being used in the lab and

to connect to the GNU/Linux server named chewy using the PuTTY SSH as well as connect to

ProxMox VE 5.4-6 using the log in information provided by Professor Merante. The computer

that is being used is a 2011 HP Pavillion dv7, i7 quad core processor and 16GB RAM with

Windows10Pro operating system. Google Chrome is the internet browser being used for

connecting to ProxMox and PuTTY 0.73 is already installed for connection to the GNU/Linux

chewy server.

Results and Analysis[1]

Process 1.2: Introduction to Virtual Lab Environment.

Google browser is opened and the following site is visited.

https://cs.utica.edu/vle

The Proxmox login page loads.
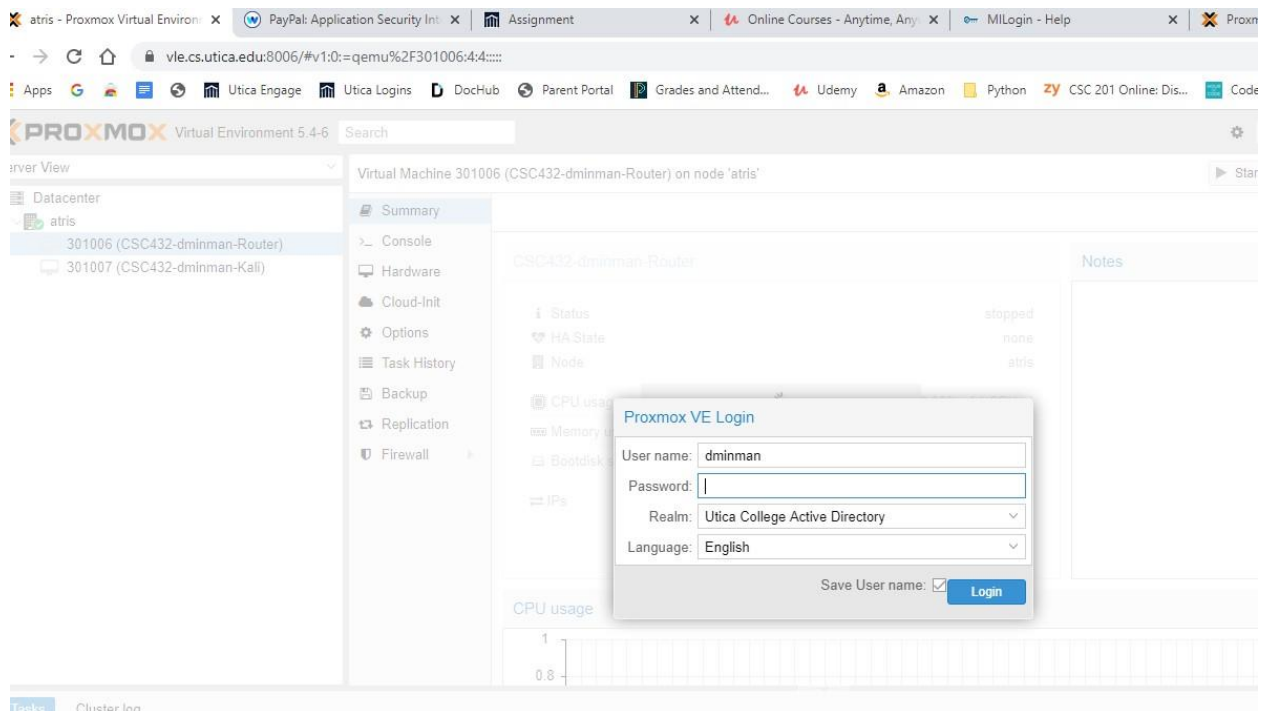
Figure 1:Proxmox login

Using U.C. login information, the student logs in.
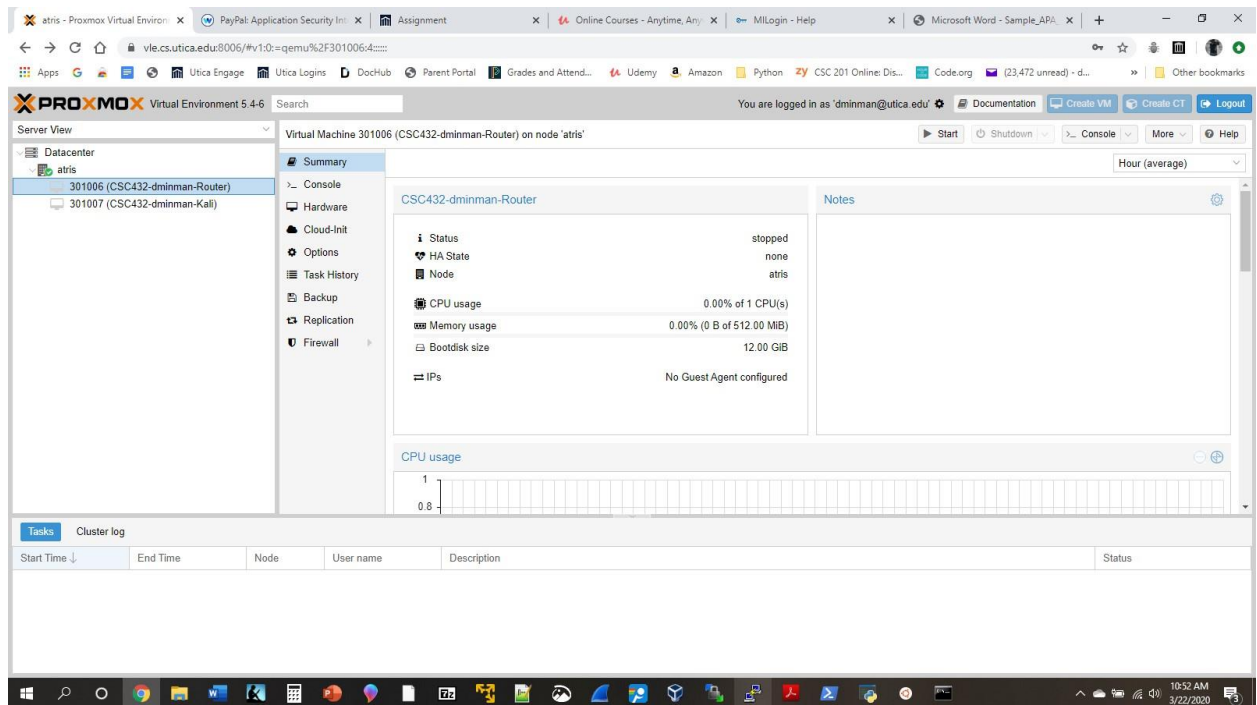
Figure 2:Proxmox original state of machines at login

Since the status of these two machines is currently stopped, the student starts them by

clicking on the start button on the right-hand side of the screen for each one. The console button

is also clicked so that what is happening with the virtual machine can be seen on the screen. The

final screenshot is of both machines running. This can be seen under the Tasks menu at the
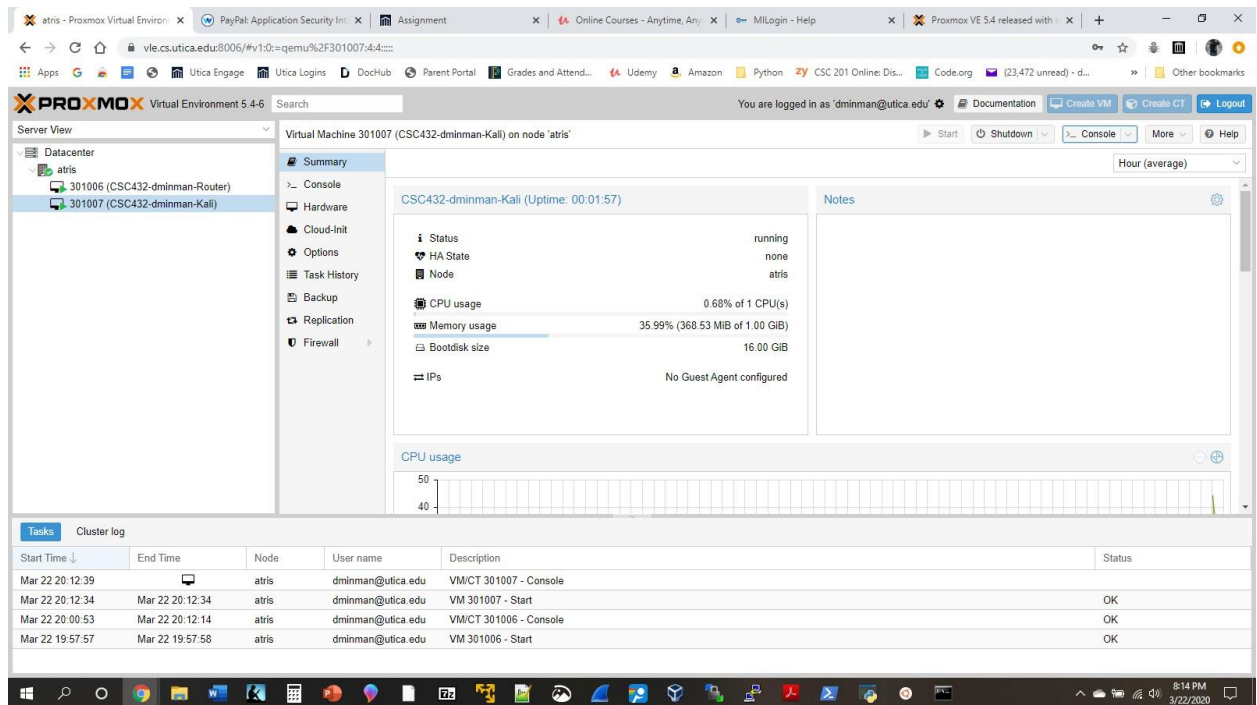
bottom of the screen.

Figure 3: Proxmox-both machines started and running

This concludes the Proxmox portion of the lab.

To log into GNU/Linux server (CentOS Linux shell server) from Windows, SSH is

needed. PuTTY will be used, and is already installed on the machine, however, for future

reference, it can be downloaded for installation from

https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html.
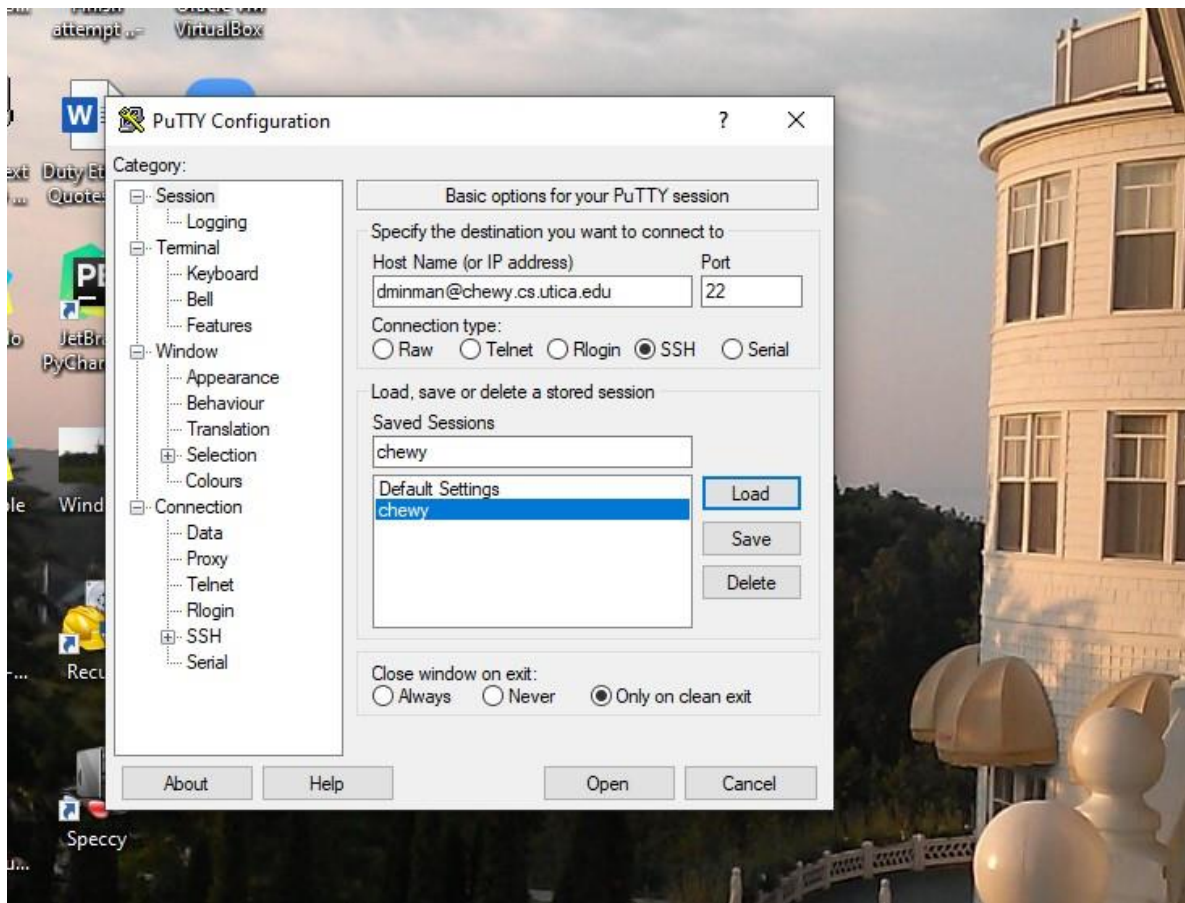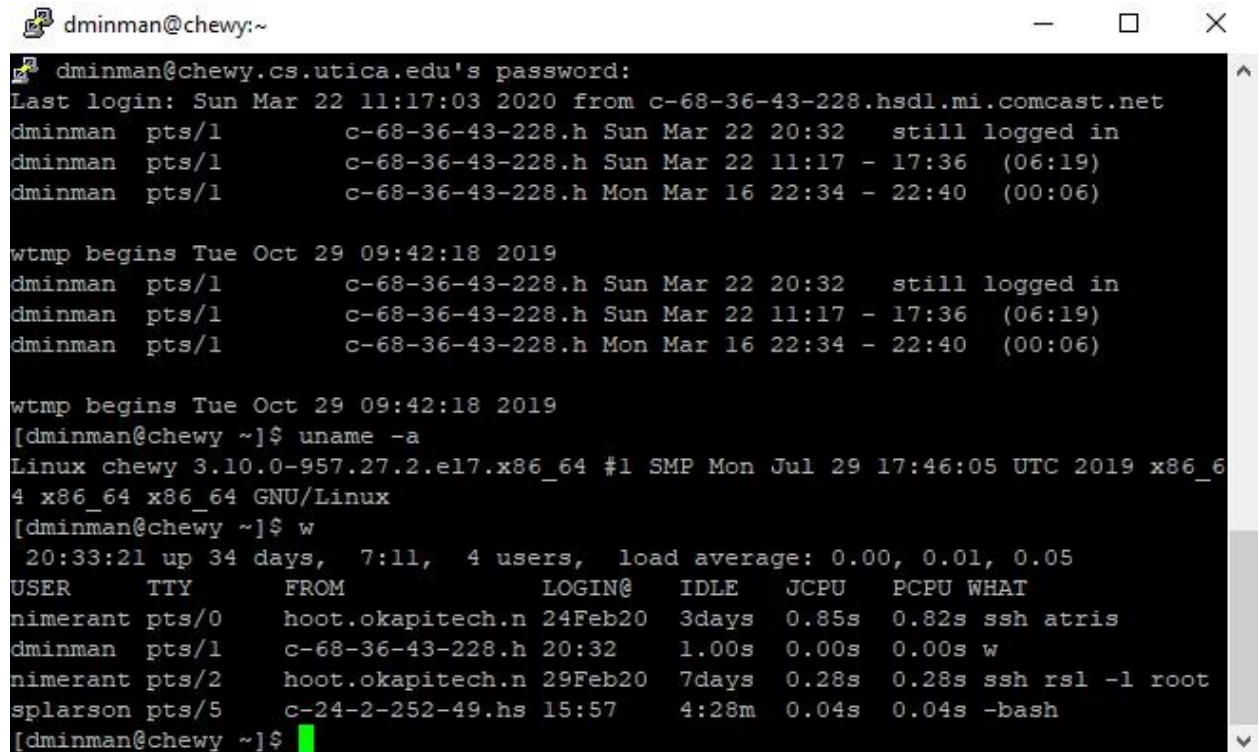
Log into PuTTY using U.C. credentials.

Figure 4:logging into PuTTY and saving settings

The host name, port and session have been saved as chewy for easier future loading.

Once logged in, the output of the following commands was obtained:

uname -a

w

Figure 5:Results of uname-a and w on the command line of Chewy

This concludes the GNU/Linux/Chewy portion of the lab.

Conclusion.

The objective for the lab was met as background information on the tools being used for

the lab was obtained and logins of both Proxmox and Chewy (GNU/Linux server) were

successful. In addition, the student turned on the virtual machines inside Proxmox so they are

ready for use during the next lab. The software being used during this lab are very powerful and

the depth of these programs wasn't even touched during this lab. Learning and using these

programs is looked forward to with earnest. It is hoped that these programs will be used in the

future for employment as they would not only be excellent during this time of isolation, but also

something the student truly enjoys.

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