CS 4400 System Administration

Project 1: Getting started with Linux

Description:

Since more than 2/3 of the servers running on the Internet are Linux-based, it is time to get yourself familiar with Linux layout and administration. This project will be divided into main steps:

1. Install Ubuntu server in your virtual folder on vSphere, and configure it so that it has access to the Internet. (If you've already installed Ubuntu server before, I suggest picking Debian to do something different.)
2. Answer questions about how to administrate your Linux install below.

Before you begin, create a new Google Document for this project using the project template in your Google Folder. Remember, I expect a lot of documentation to prove to me you understand what you are doing (and to build your final deliverable). This project is worth 1 point.

Step 1 – Install Linux

Follow the directions Dr. Diesburg gives you for creating a new virtual machine that boots from iso. (If you want to install something else other than Ubuntu server, you will probably need to upload your iso file into the correct area on vSphere.) Start the virtual machine to start the Linux installation process.

Note: There is limited hard drive space on vSphere, so that means you must be stingy with your own hard drive sizes! In this class, you'll likely set up 5-8 machines. A 60GB hard drive size should be more than enough for most Linux and Windows virtual machines. Anyone caught with machines over this limit will be made to reinstall.

Note: Just as we have limited hard drive space, we also have limited CPUs and memory (RAM). Each machine must be configured with only 2 CPUs and 8GB of RAM. If a particular machine has trouble running with these limited specs (such as Windows Server), you may update only that machine to 4CPUs and/or 16GB of RAM. Anyone caught with machines over this limit will incur my wrath.

(Know that virtual machines are often configured with much lower specs than real machines. Depending on your cloud platform, your business will be **paying extra** given the hard drive size, number of CPUs, and RAM per month or cycles used!!! Minimum cloud configurations are an art form your next boss will appreciate, and you will get experience here.)

As part of your install, you will need to configure your install to connect to the Internet. Remember, **there is no dhcp server yet to automatically give you an IP address.** (Later on in the semester, you will configure one.) Instead, you will need to manually input values for IP address, netmask, gateway, and DNS servers. Once you find out what these values are, you ***must*** record them in your documentation, as well as the steps you took to get the networking to work.

Step 2 – Answer System Administration Questions

Log into your Ubuntu Server machine through vSphere. Create a new Google Document for this project, and using the resources linked at the bottom of the page, answer the following with as much detail as possible:

1. What are the /home, /var/www, /var/log, and /etc directories used for in Linux distributions? Please list and describe each directory separately.

2. Open a terminal, go to your home directory, and use the "ls -a" command on the command line to show all files. (What does that flag –a mean?) Hidden files are files that begin with a "." Please list your hidden files and give me an in-depth description of why they are there and what they do.

3. Linux package managers are important. Ubuntu is a Debian-based distribution, so it uses the "apt" repository system with the "dpkg" package manager. (Yes, it also uses snap, but please ignore that for now.) Please answer the following questions:

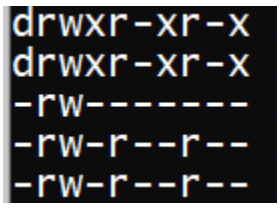
- How do you look for packages to install?
- How do you install a package?
- How do you see what packages are already installed?
- How do you remove a package?

4. Linux uses a service called cron to run needed scripts over certain time intervals. Please describe the cron jobs your server is running and when those jobs occur. How would you add a new cron job?

5. How do you add users to a Linux system through the command line? How do you remove users through the command line?

6. Take a look inside of /etc/rc[number].d/. All of the rc[number].d directories contain start up and shut down scripts for services, where S="start" and K="kill" or "shutdown". List and describe 5 different services that start up in the /etc/rc2.d/ directory when the OS boots.

7. File permissions are important. If you run the command “ls –la” in any directory on the command line, you will see a string of permissions for files and directories like this (here are 5 random ones from my system):



Please tell me (1) what the permissions mean, (2) how you change them, and (3) what this permission string means: “drwxr-xr-x”.

Resources:

- Chapter 1 (ULSAH): Where to Start
- Basic Unix Commands (start here if you don't know how to use a terminal). http://linuxcommand.org/index.php
- Common Linux shell command cheat sheet: https://www.cs.uni.edu/~diesburg/courses/cs3430_sp20/recitations/r01/linux_commands.pdf
- Run Levels (rc directories) - http://www.cs.uni.edu/~diesburg/courses/cs3430_sp19/sessions/s03/s03_genesis.ppt (look at slides 15-18)
- Cron - https://www.linux.com/tutorials/scheduling-magic-intro-cron-linux/
- Using apt - https://itsfoss.com/apt-command-guide/
- File and directory permissions - https://www.guru99.com/file-permissions.html