Linux Training

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Volansys Technologies

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History

Version	Author	Date	Comments
1.0	Kavan & HK	21-Dec-2012	First version

Objective

- To be well-versed with Linux operating systems concepts
  - Shell, Shell scripts
  - File handling
  - Task control & User management
  - System & Network administration
  - Redirection, Pipes
  - Command line editors
- At the end of training, trainee should be able to use Linux operating system comfortably

Total Duration:

- 5 working days

Total Points:

- 170
- Minimum 120 points are required to clear this training

Instructions:

- Use Linux OS(Ubuntu 10.04 LTS)
- Write answers to questions asked in each exercise in a separate word document
- Use Reference book
  - Linux_Unleashed (Third edition)
  - command_memento
  - vi_editor_memento
  - Introduction to Linux-A Hands on Guide-Machtelt Garrels

Evaluation criteria for exercise set 1 to 5

- Every command demo to Mentor (20 points)
- Question & Answer session with Mentor (10 points)

Evaluation criteria for exercise set 6

- Successful completion of every exercise as per problem statement (2 * 8 = 16 points)
- Question & Answer session with Mentor (4 points)

List of Exercises

Exercise Set#1
Refer: Ch 6, 7, 11, 12, 13 of Linux_Unleashed
Duration: 1 day

Shell
Explore and Understand the below topics:

1. **Understanding the Shell**
   a. What is "Shell" in Linux?
   b. What are the different types of "Shells" available?
   c. Find out the supported shell file in the Linux file structure.
   d. Which Shell are you using?
   e. Switch to some another shell.

2. **Understanding the Environment variables**
   a. What are "environment variables" in Linux?
   b. What are the common "environment variables"?
   c. Display the environment variable of your system using <env> or <printenv> command
   d. Explore the different variables printed by the above command
   e. Learn more about the "PATH" variable. What is the role of PATH variable?
   f. Display the current path settings using the <echo> command and the "PATH" variable
   g. Make a "bin" directory in the /home folder. Add the path of this folder to the "PATH" variable using the <export> command OR the "PATH" variable
   h. What is the validity of the settings of environment variables done in this fashion?

3. **Login, logout processes**
   a. Find out which files are being executed once the user log's in the system and when the user logs out of the system; e.g. If it is an bash shell then look for ".bash_profile" user login profile and ".bash_logout" logout profile.
   b. Analyze the contents of the login profile, logout profile.
   c. Make a new folder in "/home".
   d. Edit the login profile to add the new folder path in the login profile.
   e. Logout and login again and the check the environment path. The new folder path which was added should be reflected in the PATH variable.
   f. What is the difference between "/etc/profile" and "~/.bash_profile"?

4. **Aliases**
   a. What are "aliases"?
   b. Analyze the shell rc file; e.g. In case of bash shell the shell rc file is ".bashrc".
   c. Edit the shell rc file to add one alias to any command.
   d. Execute the added aliases and check if the operation is successfully completed.

Exercise Set#2

Refer: command_memento.pdf, man pages, Ch 3 Introduction to Linux
Duration: 0.5 day

File Handling

The Objective is to learn basic file handling commands. Explore the commands for the below subtopics.

1. **Command helps and Command manuals**
   a. Learn how to get the help for any command using the –h OR --help option (e.g. ls --help).
   b. Learn how to use the <man> command i.e. manual for any keyword.
   c. Learn different levels of man command
   d. Apropos

2. **Handling files and directories**
   a. Listing the files <ls> with all the options. Study the details listed by <ls -l>.
   b. Printing the current working directory <pwd>
   c. Changing the current directory <cd>
   d. Creating a directory <mkdir>
   e. Removing directory <rmdir>
   f. File copy command <cp>
   g. Rename/Moving a file <mv>
   h. Removing files <rm>

3. **Displaying, Searching, Sorting and comparing files**
   a. Displaying contents of a file <cat>
   b. Display the disk usage <du> and disk free <df>
   c. Searching a string in files <grep>
   d. Sort the lines in a file <sort>
   e. Finding/locating files <find>, <locate>
   f. Comparing files/dirs <diff>, <meld>
   g. Extracting field/character <cut>

4. **Symbolic and hard links**
   a. Understand how to identify the symbolic links to files/dirs
   b. What is a Soft link and Hard link?
   c. Creating symbolic link <ln>
   d. Removing a link <rm>

5. **File Access Rights**
   a. Using the <ls –l> command display the details of a particular directory/file
   b. Understand the various details displayed for the files/dir i.e. the access rights, access levels, group the file belongs to, owner of the file etc
   c. Create a new directory and a file in that directory and change the permissions of the file using the <chmod> command

6. **File Compression and Archiving**
   a. Compressing files or directories <gzip>, <bzip2>
   b. Uncompress a file <gunzip>, <bunzip2>

    c.   Creating a compressed archive <tar>

    d.   Extracting the contents of compressed archive <tar>

    e.   Creating zip archives <zip>

    f.   Extracting zip archives <unzip>

7. Linux file system structure

    a.   Read about the basic Linux file structure.

    b.   Understand the root </> directory structure and the requirement of the subdirectory within the root directory i.e. /dev, /mnt, /tmp etc.

Exercise Set#3

Refer: command_memento.pdf, man pages, Ch 10 Introduction to Linux

Duration: 1 day

Management and Administration basics

The Objective is to learn all process, display, control, basic system and network administration commands.

1. **Job/Process control commands**
   a. Show all running process <ps>
   b. Get the overview of the systems memory <free>
   c. Learn how to run a process in background
   d. List the background process <fg>
   e. Utilization of the processor <top>
   f. Killing a particular process <kill>

2. **User management controls**
   a. List users logged onto the system <who>
   b. Display more information about the user <finger>
   c. Display what you are logged into as <whoami>
   d. Understand what a Super user is. Switch to Super User <su>
   e. Create a user, delete a user <useradd, userdel>

3. **System administration command**
   a. Change the owner and group of the directory and all its contents <chown>
   b. Check the system kernel version <uname>
   c. Mount a formatted partition of windows onto Linux <mount>
   d. Unmount the partition <umount>
   e. Creating a particular filesystem <mkfs.>
   f. Shutting down the system <shutdown> (Caution: This command will shut down your system thus use with care).
   g. Change password of a user<passwd>
   h. File system check with <fsck>
   i. Displaying and changing partition using <fdisk> (Caution: If used without care, it can corrupt existing partition and you may not able to boot next time)

4. **apt-get installation**
   a. How does apt-get works?
   b. What steps are followed when we install/remove any package from system
   c. Install iperf application in your system (If iperf is already installed removed it and then install) <apt-get>
   d. Check if ncurses library is installed in your system, if not installed the appropriate ncurses package for your system. <aptitude>
   e. Uninstall iperf application previously installed <apt-get>

5. **Network administration command**
   a. Displaying and configuring the network interface <ifconfig>

b. Test networking with another machine <ping>
c. Defining a default gateway <route>
d. Checking the host name of your system <hostname>
e. Checking the status of the port <netstat>
f. Capturing a interpreting a network packet <tcpdump>
g. List series of host through the packet is routed <traceroute> OR <tracepath>
h. List info about machines that respond to SMB name queries on a subnet <findsmb>
i. Bringing the network interface UP or DOWN using <ifconfig>
j. How to configure network interface for DHCP or have static IP address?
k. How to specify gateway, dns for accessing other networks?

Exercise Set#4

Refer: command_memento.pdf, man pages, Ch 10 Introduction to Linux, Ch 15, 43 Linux_Unleashed

Duration: 1 day

Redirections, Pipes, services & Advance file-system mounting

The Objective is to learn basic redirection symbol and usage of pipe to redirect standard output of one command to standard in of other command.

1. **Redirection**
   a. Use ls –l command to redirect the standard output, using " '>', '>>' " symbols
   b. Difference between '>' and '>>'
   c. Use the <tee> command to send the standard output to t he screen and to a file simultaneously.
   d. Can we have redirection in form of '<'? If yes give some example

2. **Pipes**
   a. Use combination of two commands to learn how "|" symbol can be used.
   b. <more> and <less> command.
   c. <head> and <tail> command.

3. **Services**
   a. What are services and various services?
   b. What are SSH, NFS, TFTP, and service?
   c. After you are comfortable about the different services choose one service to experiment on it using the below instructions
   d. Check if desired service is available in your system? If not install and configure that service for your system
   e. Check the status of all the service with appropriate option to <service> command.
   f. Check the status of individual NFS service <service>
   g. Stop the NFS service if it is running <service>
   h. Start the service again <service>
   i. Restart the service <service>
   j. Change the runlevel of a service. Learn how to permanently change the runlevel of a service
   k. What is "xinetd"? Identify one of the service which runs under xinetd
   l. What is SSH? Why is it required?
   m. Learn how to login to remote machine via SSH
   n. Copy a directory from a remote machine to a local machine using ssh

4. **Advance file-system mounting**

   Samba
   a. What is samba server and samba client?
   b. Check if samba service is installed in your system, if not installed it
   c. Start the samba services if not started
   d. List the contents of a Remote Windows machine shared folder on your Local Linux command prompt using <smbclient>
   e. Connect to the Remote Windows machine shared folder <smbclient> and <get> and <put> file to and fro.

    f. Mount a Remote Windows machine shared folder on to your local Linux Machine using samba file system mount <mount>

NFS

    g. Check if NFS service is installed on your system? If not installed and configure NFS for your system
    h. Start the NFS service if not started
    i. Make one directory in local remote machine
    j. Via NFS mount make this remote directory shared between remote machine and your machine.

Exercise Set#5

Refer: vi_memento.pdf, Ch 16 of Linux_Unleashed
Duration: 0.5 day

The Vi editor

The Objective is to understand the vi editor to write a small C program

a. Open a ".c" file using the <vi > text editor command.
b. Enter the "command mode" <esc>
c. Issue a command to enter the "edit mode" using <i>. Look for the various editing mode commands.
d. Write a small "c" program to print "Hello World" and write few lines of code using "C" language.
e. Save the file without exiting.
f. Copy the "printf("Hello World");" line and paste it to another line.
g. Copy 5 lines at once and paste it at another location
h. Delete the 5 lines copied recently by single command
i. Delete the 1st "printf("Hello World");"
j. Save the current file contents
k. Search the string "printf" in the file; find the next occurrence of the string.
l. Delete one occurrence of "printf" using the "delete current word command". And insert "print" at its place.
m. Use the replace command to replace "print" by "printf".
n. Save the file and quit "vi"
o. Open multiple files in vi, copy 5 lines from one file to another file
p. Open same file in vi in multiple windows
q. Tag the source directory and trace function calls <ctags>

Exercise Set#6

Refer: Ch 14 of Linux_Unleashed
Duration: 1 day

Shell Exercise

 a. Write a single line command(s) which changes to a "foo" directory, command should take care that even if directory does not exist, it should create it and then change to that directory

 b. Write a single line command(s) which checks if "foo" process is running, if running then kill that process

 c. Write a single line command(s) which recursively searches for a "foo" file and delete it

 d. Write a single line command(s) which recursively list all files in directories except for "foo" file

Shell Script Basics

 e. What is shell script, its purpose?

 f. Write shell scripts for following:

  1. To add multiple numbers

  2. Modify above script in such a way that it adds all numbers provided to it as command-line argument

  3. To give sum of a digits of number

  4. To run all executable files in a directory, and provide each executables timing information