School Of Engineering

Linux Programming
Assignment-5

Name: Neehara Lakshmi
USN No: ENG24CY0138
Roll No: 55
Section: B (CyberSecurity)
Semester: 3rd

Q1. What is a shell in Linux OS? How many categories of shell is currently exists in Linux? Why bash shell is very popular in Linux distribution?

Ans: A shell in Linux is a command-line interpreter that acts as an interface between the user and the operating system kernel, allowing users to execute commands and interact with the system.

Shells in Linux are mainly categorised into two types:

1. Bourne-style shells
2. C-style shells

Bash shell is particularly popular because:

- It comes as the default shell in most Linux distributions.
- It supports advanced features like command history and tab completion.
- It maintains compatibility with the original Bourne shell scripts.
- It offers powerful scripting capabilities for automation,
- It has extensive community support and documentation.

Q2. What does the ls -Z command display?

Ans: The ls -Z command displays the SELinux security context of files and directories.

It shows:

SELinux user

SELinux role

SELinux type

SELinux level/range

Q3. Write a command to list all hidden files in the current directory

Ans: Command to list all hidden files in the current directory:

Example Code:

1. ls -a | grep "^\."
2. ls -d .*
3. ls -A
4. ls -la | grep "^-.*\."

Q4. Explain the difference between hard links and soft links (symbolic links) in Linux.

Ans:

Hard Links:

- A hard link is a direct reference to the file's physical location on disk.
- All hard links are equal which means no primary or secondary distinction.
- Deleting the original file doesn't affect other hard links.
- Cannot link across different filesystems or to directories.

- All links share the same file permissions and metadata.
- **Example Code:** ln original.txt hardlink.txt

Soft Links (Symbolic Links) :

- A soft link is a shortcut that points to another file by name/path.
- It's a separate file that contains a path reference.
- If the original file is deleted, the soft link becomes broken.
- Can link across different filesystems and to directories
- Has its own file permissions.
- **Example Code:** ln -s original.txt softlink.txt

Q5. A file has permissions -rwxr-x--x. Explain who can read, write, and execute it.

Ans: The file permissions `-rwxr-x--x` means:

- **‘ - ’:** Indicates the file type. A hyphen (‘-’) means it is a regular file.
- **‘ rwx ’:** Represent the permissions for the owner or user of the file, where owner can read, write(w) and execute(x) the file as a program or script.
- **‘ r-x ’:** Represent the permissions for the group associated with the file, where group can only read(r) and execute(x) the file as a program or script.
- **‘ --x ’:** Represent the permissions for others or everyone else, where others can only execute(x) the file as a program or script.

Q6. Write the command to change the group ownership of a file data.txt to group staff.

Ans: Example Code: chgrp staff data.txt

Q7. Why is it dangerous to give 777 permissions to a file? Explain with an example.

Ans:

Breaking Down 777 Permissions (‘rwxrwxrwx’):

- ‘rwx’: Represent the permissions for the owner or user of the file, where owner can read(r), write(w) and execute(x) the file as a program or script.
- ‘rwx’: Represent the permissions for the group associated with the file, where group can read(r), write(w) and execute(x) the file as a program or script.
- ‘rwx’: Represent the permissions for others or everyone else, where others can read(r), write(w) and execute(x) the file as a program or script.

777 is dangerous because:

- Every user on the system can read, modify, and execute the file
- Any user can delete or corrupt the file
- Malicious users can insert harmful code into scripts
- Attackers can replace system files with trojans
- No security that is complete open access to everyone

Example Code: chmod 777 script.sh

Q8. What is he difference between apropos (i.e., man -k) and whatis (i.e., man -f)?

Ans: 'whatis' (man -f):

- Shows one-line description of exact command
- Quick reference for known commands

Example Code: whatis ls

list directory contents

'apropos' (man -k):

- Searches manual pages by keyword/topic
- Finds commands when you don't know the name

Example Code: apropos directory

shows all directory-related commands

Q9. Write a command to redirect the error output of a command to a file named error.log.

Ans : Command to redirect error output to error.log:

Example Code: ls /nonexistent_directory 2> error.log

This will:

- Save any error messages to 'error.log'
- Display normal output on screen.
- Keep the error log file empty if no errors occur.

Q10. How can you use the tee command to append output to a file instead of overwriting it?

Ans: To use the tee command to append output to a file instead of overwriting it, we can use the `-a` option.

Example Code: ls -l | tee -a file_list.log

This will:

- Display the output on screen
- Append the output to the existing `file_list.log` file
- Preserve any existing content in the file.

The '-a' flag stands for "append" and prevents overwriting the existing file content.

THANK YOU