Linux Programming Assignment:5 (20-9-2025)

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Section C

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

- Shell is a command-line interface that offers users an access to the services of the operating system. Shell serves as an interface between the users and the kernel, which interprets the commands and carries them out.

Types of shells in Linux:

- Bourne Shell (sh) - Traditional Unix shell Bash
- (Bourne Again Shell) - Improved version of Bourne shell
- C Shell (csh) - Based on C-like syntax
- Korn Shell (ksh) - Mixture of Bourne and C shells
- Z Shell (zsh) - Powerful shell with lots of features
- Fish Shell - Friendly interactive shell

How Bash is popular:

Built-in shell in the majority of GNU/Linux distributions

Rich set of features with extensive scripting capabilities

Backward compatible with Bourne shell

Good set of features such as arrays, functions, and advanced redirection Strong history and command-line editing

2. What does the ls -Z command display?

-The ls -Z command prints SELinux security contexts for directories and files. It prints the security label containing the user, role, type, and level data employed by SELinux for mandatory access control.

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

- ls [options][directory_or_path]

Option:

-a shows all files, that will include hidden files that start with a dot (.).

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

Hard Links:

- Refer directly to the inode of the original file
- Have the same data blocks as the original file
- Can't reference directories or files on a different filesystem
- Deletion of original file doesn't impact the hard link

Soft Links (Symbolic Links):

- Refer to the pathname of the original file
- Are independent files with the path to the target
- Can link to directories and files across different filesystems
- Become broken if the original file is deleted

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

- Owner (rwx): Can read, write, and execute
- Group (r-x): Read but do not execute; do not write
- Others (--x): Only able to do but not read and write

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

-command:

chown [options]staff data.txt

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

777 permissions give read, write, and execute access to owner, group, and others.

- **Security risk**: Anyone on the system can modify or delete the file
- **Accidental modification**: Users might unintentionally change critical files
- **Malware vulnerability**: Malicious programs can easily modify executable files

Example: If /etc/passwd had 777 permissions, any user could modify it to gain root access or delete user accounts.

8.What is the difference between appropos (i.e., man –k) and whatis (i.e., man –f)?

apropos (man –k):

- Key-word search of description from the manuals.
- Returns all man pages containing the keyword.
- Example: apropos password shows all commands related to passwords.

whatis (man -f):

- Shows a short description of a single command.
- Displays only matches that exactly inclue the command name.
- Example: whatis ls only depicts the description of the ls command.

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

- command 2> error.log

The 2> redirects stderr to the specified file.

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

command | tee [options] file_name

The [options] with tee appends the output to the file instead of overwriting it. The tee command writes output to both screen and a file.