Linux Fundamentals

Lesson 8 Standard I/O and Pipes

Lesson Objectives

In this lesson, you will learn:
- Basics of Standard IO
- Redirecting output to file
- Pipe operator
- Redirecting input from file

Basics of Standard IO

Most Linux command read input from file or keyboard and write output to screen or other file.

Linux provides three I/O channels to Programs

- Standard input (STDIN) - keyboard by default
- Standard output (STDOUT) - terminal window by default
- Standard error (STDERR) - terminal window by default

Linux accordingly associates three files for these channels to provide input output operations.

Every Linux command has access to one of these special files, i.e standard input, standard output or standard error.

Shell can redirect i/p, o/p or error to any physical file using meta characters "<", ">", "2>".

Redirecting Output to a File

STDOUT and STDERR can be redirected to files:

command operator filename

Supported operators include:
- \> Redirect STDOUT to file
- 2> Redirect STDERR to file
- &> Redirect all output to file

File contents are overwritten by default.

\>> operator can be used to append.

Redirecting Output to a File

Few more Examples:

This command generates output and errors when run as non-root:

$ find /etc -name passwd

Operators can be used to store output and errors:

- $ find /etc -name passwd > find.out
- $ find /etc -name passwd 2> /dev/null
- $ find /etc -name passwd > find.out 2> find.err

Redirecting STDOUT to a Program (Piping)

Pipes (the | character) can connect two or more commands.

- Ex: *command1 | command2*

Sends STDOUT of command1 to STDIN of command2 instead of the screen. i.e O/p of first command is written into pipe and is input to the second command.

STDERR is not forwarded across pipes.

Pipes are used to combine the functionality of multiple tools.

- *Ex: command1 | command2 | command3*... Etc

Ex:

- $ who | wc -l
- $ ls | wc –l
- $ ls | wc -l > fcount

Redirecting STDIN from a File

Redirecting standard input can be done with '<'.

Some commands can accept data redirected to STDIN from a file:

- Ex: $ tr 'A-Z' 'a-z' < .bash_profile
- This command will translate the uppercase characters in .bash_profile to lowercase.

Equivalent to:

- $ cat .bash_profile | tr 'A-Z' 'a-z`

➤ Ex: $cat file1.txt | wc –l   (To display number of lines in file file1.txt)

Summary

In this lesson you have learnt
- Basics of Standard IO
- Redirecting output to file
- Pipe operator
- Redirecting input from file

Review Questions

Question 1:Input redirection can be done using ____ symbol.

Question 2: ____ operator is used to combine multiple commands.

Questions 3: standard error by default redirects output to _____ .