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High Performance Computing Lab

Experiment1–FamiliarizationwithLinuxCommands

Objective:

To familiarize with basic Linux commands that are essential for operating within a High-Performance Computing (HPC) environment. The goal is to understand file system navigation, process monitoring, file manipulation, and basic shell scripting — all foundational skills for working on clusters such as *Paramrudra*.

1. Navigation Commands

Command	Description
<code>pwd</code> <code>ls</code>	Prints the current working directory
<code>cd</code> <code>ls</code>	Lists files and directories in the current path
<code>-a</code> <code>cd</code>	Changes the directory
<code>..</code>	Lists all files, including hidden ones
	Moves one level up in the directory structure

2. File and Directory Operations

Command	Description
<code>touch file.txt</code>	Creates an empty file
<code>mkdir new_folder</code>	Creates a new directory
<code>rm file.txt</code>	Deletes a file

<code>rm -r folder_name</code>	Deletes a directory and its contents
<code>cp source.txt destination.txt</code>	Copies a file
<code>cp -r src_folder/ dest_folder/</code> <code>mv oldname.txt newname.txt</code>	Copies an entire directory
	Renames or moves a file

3. Permission Management

Command	Description
<code>chmod 755 file.sh</code>	Changes file permissions
<code>chown user:group file.txt</code> <code>ls -l</code>	Changes file ownership
	Displays detailed information (permissions, owner, size, etc.)

4. Text Processing Commands

Command	Description
<code>cat file.txt less</code>	Displays file content
<code>file.txt file more</code>	Views content page by page
<code>'pattern' grep file.txt</code>	Another pager for text viewing
<code>awk '{print \$1}' file.txt</code> <code>sed 's/old/new/g' file.txt</code>	Searches for a specific pattern
	Prints the first column of each line
	Substitutes text globally in a file

5. System Monitoring Commands

Command	Description
<code>top ps</code>	Displays running processes in real-time
<code>aux df</code>	Shows active processes
<code>-h</code>	Displays disk usage in human-readable format
<code>du -sh folder_name</code>	Displays folder size summary

6. Networking Commands

Command	Description
<code>ping google.com</code>	Checks network connectivity
<code>ifconfig</code>	Displays network interfaces (deprecated)
<code>ip addr</code>	Displays network information (recommended)
<code>netstat -tuln</code>	Displays active network connections
<code>ssh user@hostname</code>	Connects remotely to another system

7. Shell Scripting Basics

Example:

```
#!/bin/bash
echo "Hello, World!"
read name
if [ "$name" == "Satya" ]; then
    echo "Welcome, Satya!"
else
    echo "Welcome, $name!"
fi
```

```

foriin {1..5}; do
    echo "Count: $i"
done

whiletrue; do
    echo "Looping..."
    break
Done

```

8. Practical Exercise Summary

Task	Command Used
Show current directory	<code>pwd ls -a cd .. mkdir</code>
List hidden files	<code>projects touch</code>
Move up one directory	<code>file.txt rm</code>
Create a directory	<code>sample.txt cp</code>
Create a file	<code>report.doc backup/</code>
Remove a file	
Copy file to backup folder	
Move data to <code>/tmp/</code>	<code>mv data.csv /tmp/</code>
Change script permission	<code>chmod 700 script.sh</code>
Change ownership	
	<code>chown john document.txt</code>
Search for “error”	<code>grep 'error' system.log</code>
Replace “foo” with “bar”	<code>sed 's/foo/bar/g' textfile.txt</code>
Show disk usage	<code>df -h</code>

Display folder size	<code>du -sh .</code>
Ping a host	<code>ping www.example.com</code>
Display IP details	<code>ip addr</code>
Remote connection	<code>ssh alice@example.com</code>

9. Conclusion

This assignment provided a strong foundation in basic Linux command-line operations crucial for working efficiently in an HPC environment. Mastering these commands will simplify file management, job submission, debugging, and system monitoring while working on clusters like Paramrudra.