Linux & Shell Scripting for DevOps

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1. Introduction to Linux in DevOps

- **Why Linux?**
- Most DevOps tools (Docker, Kubernetes, Git, etc.) are optimized for Linux.
- Cloud servers (AWS, Azure, GCP) mainly run Linux.

- Stability, security, and performance.

- **Accessing Linux on Windows (WSL):**

```
wsl --install        # installs Ubuntu by default
wsl --list --verbose
wsl                  # start Ubuntu shell
```

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2. Navigating File System

- **Basic Commands:**

```
pwd                  # show current directory
ls                   # list files
ls -l                # detailed list
ls -a                # include hidden files
cd <dir>             # move into directory
cd ~                 # go home
cd /                 # go root
```

- **File/Directory Management:**

```
touch file.txt       # create empty file
mkdir folder         # create folder
rm file.txt          # delete file
rm -r folder         # delete folder with contents
cp file1 file2       # copy file
mv file1 newloc/     # move/rename file
```

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3. Searching Files

- **find & grep:**

```
find ~/Desktop -name "file1.txt"
grep "hello" file1.txt
```

4. Shell Scripting Basics

- **What?**
- Automates repeated tasks.

- A text file with commands run by the shell.

- **Structure:**

```bash
#!/bin/bash
echo "Hello World"
```

- **Steps:**

```bash
nano script.sh        # write script
chmod +x script.sh    # make executable
./script.sh           # run script
```

5. Variables & Conditions

- **Variables:**

```bash
#!/bin/bash
name="Alice"
echo "Hello $name"
```

- **If Condition:**

```bash
#!/bin/bash
num=5
```

```
if [ $num -gt 3 ]; then
    echo "Number > 3"
else
    echo "Number <= 3"
fi
```

6. Applying in MERN Project

• **Automation Example:** Script to start backend + frontend together (inside project root):

```
#!/bin/bash
echo "Starting MERN app..."
cd server && npm start &
cd ../client && npm run dev
```

• **Use Case in DevOps:**

• Automating build/test commands.
• Setting environment variables.
• Deploy scripts (before CI/CD tools take over).

✅**Summary:** Linux & shell scripting are the base of DevOps.
Commands manage files, scripts automate tasks, and both integrate with MERN workflows for setup and deployment.