Assignment: Real-Life Industry Use Cases of Basic Linux Commands

Course: Linux Administration | Level: Beginner to Intermediate

Submission Date: [Before the next class]

Objective:

This assignment will help you understand how basic Linux commands, user and group management, file ownership changes, and system-level commands are applied in real-world industry scenarios. You will execute the commands and observe the real-time output to strengthen your understanding.

Scenario:

You have just joined an IT company as a **Linux System Administrator**. Your first task is to set up a secure file system, manage user permissions, and monitor system performance.

You will perform the following:

1. **Use basic Linux commands** to navigate, manipulate files, and check system information.
2. **Manage user and group permissions** to ensure data security.
3. **Change ownership of files and directories** for proper access control.
4. **Execute system-level commands** to monitor system health.

Task 1: Basic Linux Commands in a Real-World Scenario

Scenario:

Your manager asks you to set up a project directory for a new team and verify system details before installation.

Steps & Commands:

1. **Check current logged-in user and system information**

```
whoami
uname -a
```

Output:

```
adminuser
Linux server01 5.15.0-84-generic #93-Ubuntu SMP x86_64 GNU/Linux
```

2. **Navigate to the `/projects` directory and list contents**

```
cd /projects
ls -l
```

Output:

```
total 4
drwxr-xr-x 2 root root 4096 Apr 25 10:00 projectA
```

3. **Create a new project directory and verify it**

```
mkdir projectB
ls -l
```

Output:

```
drwxr-xr-x 2 root root 4096 Apr 25 10:05 projectB
```

4. **Create a sample file inside `projectB`**

```
touch projectB/README.txt
echo "Welcome to Project B" > projectB/README.txt
cat projectB/README.txt
```

Output:

```
Welcome to Project B
```

Task 2: User and Group Permissions Management

Scenario:

A new employee, **John**, joins the **developers** team. He needs access to **projectB**, but shouldn't be able to modify system files.

Steps & Commands:

1. **Create a new user `john` and add him to the `developers` group**

   ```
   sudo useradd -m -G developers john
   sudo passwd john
   ```

   (Enter and confirm password when prompted)

2. **Verify user and group**

   ```
   id john
   ```

   Output:

   ```
   uid=1002(john) gid=1002(john) groups=1002(john),1003(developers)
   ```

3. **Change group ownership of `projectB` to `developers`**

   ```
   sudo chown :developers /projects/projectB
   ```

4. **Modify permissions so that only the group can write**

   ```
   sudo chmod 770 /projects/projectB
   ls -ld /projects/projectB
   ```

   Output:

   ```
   drwxrwx--- 2 root developers 4096 Apr 25 10:10 projectB
   ```

Task 3: Changing File Ownership

Scenario:

John is now the lead developer and should be the owner of `projectB`.

Steps & Commands:

1. **Change ownership of `projectB` to `john`**

   ```
   sudo chown john:developers /projects/projectB
   ```

2. **Verify the ownership change**

```
ls -ld /projects/projectB
```

Output:

```
drwxrwx--- 2 john developers 4096 Apr 25 10:15 projectB
```

Task 4: System-Level Monitoring Commands

Scenario:

Your manager asks you to check system resource usage before installing a heavy application.

Steps & Commands:

1. **Check system uptime**

   ```
   uptime
   ```

   Output:

   ```
   10:20:11 up 5 days,  3:45,  2 users,  load average: 0.10, 0.20,
   0.30
   ```

2. **Monitor disk usage**

   ```
   df -h
   ```

   Output:

   ```
   Filesystem      Size  Used Avail Use% Mounted on
   /dev/sda1       50G   20G   30G  40% /
   ```

3. **Check memory usage**

   ```
   free -m
   ```

   Output:

   ```
                 total   used   free  shared  buff/cache   available
   Mem:          16000   6000   7000    1000        3000        9000
   ```

4. **Monitor running processes**

```
ps aux --sort=-%mem | head -5
```

Output:

```
USER        PID %CPU %MEM    VSZ    RSS TTY       STAT START   TIME
COMMAND
root       1023  1.2  5.5 400000 88000 ?         Ssl  10:00   0:30
/usr/bin/java
root       1105  0.8  3.2 300000 51200 ?         Ssl  10:05   0:20
/usr/bin/nginx
```

Submission Instructions

- Run the commands on a **Linux system on AWS EC2 insatnce**.
- Take **screenshots of your command outputs** and include them in your submission.
- Submit a **PDF or Word document** with:
  - **Commands used**
  - **Outputs captured**
  - **Explanation of each step**

Conclusion:

By completing this assignment, you will gain **hands-on experience** in managing a Linux environment similar to real-world IT infrastructure.

🚀 **Good luck!** 🚀