

Linux Commands Assignment 14_2

Report

Assignment: 14_1

Objective

The goal of this assignment is to simulate real-world administrative tasks for managing files, users, permissions, and system resources for a web development team working on **ProjectX**.

Task 1: Basic Linux Commands

Scenario:

Set up a working directory and files for the ProjectX web application.

Step 1: Create project directory and navigate into it

Command:

```
mkdir /var/www/ProjectX
```

```
cd /var/www/ProjectX
```

Explanation:

- Creates a project directory and enters it.

Step 2: Create files for frontend and backend

Command:

```
touch index.html app.py README.md
```

Explanation:

- Creates empty files for frontend, backend, and documentation.

Step 3: Check current working directory

Command:

`pwd`

Expected Output:

`/var/www/ProjectX`

Explanation:

- Displays the full path of the current directory.

Step 4: List files with details

Command:

`ls -l`

Explanation:

- Shows detailed info (owner, permissions, size, timestamp) for each file.

Step 5: Display system disk usage

Command:

`df -h`

Explanation:

- Displays disk space usage in human-readable format.

Step 6: View file content

Command:

`echo "Welcome to ProjectX" > README.md`

`cat README.md`

Explanation:

- Writes to and displays content of README.md.

Screenshot:

```
ubuntu@ip-172-31-89-120: /v X + v
ubuntu@ip-172-31-89-120:~$ mkdir /var/www/MyProject
mkdir: cannot create directory '/var/www/MyProject': Permission denied
ubuntu@ip-172-31-89-120:~$ sudo mkdir /var/www/MyProject
ubuntu@ip-172-31-89-120:~$ sudo su
root@ip-172-31-89-120:/home/ubuntu# exit
exit
ubuntu@ip-172-31-89-120:~$ cd /var/www/MyProject
ubuntu@ip-172-31-89-120:/var/www/MyProject$ touch index.html app.py README.md
touch: cannot touch 'index.html': Permission denied
touch: cannot touch 'app.py': Permission denied
touch: cannot touch 'README.md': Permission denied
ubuntu@ip-172-31-89-120:/var/www/MyProject$ sudo touch index.html app.py README.md
ubuntu@ip-172-31-89-120:/var/www/MyProject$ pwd
/var/www/MyProject
ubuntu@ip-172-31-89-120:/var/www/MyProject$ ls -l
total 0
-rw-r--r-- 1 root root 0 May  6 17:06 README.md
-rw-r--r-- 1 root root 0 May  6 17:06 app.py
-rw-r--r-- 1 root root 0 May  6 17:06 index.html
ubuntu@ip-172-31-89-120:/var/www/MyProject$ df -h
Filesystem      Size  Used Avail Use% Mounted on
/dev/root        6.8G  1.7G  5.1G  26% /
tmpfs            479M   0  479M   0% /dev/shm
tmpfs            192M  876K  191M   1% /run
tmpfs            5.0M   0   5.0M   0% /run/lock
/dev/xvda16      881M   79M  741M  10% /boot
/dev/xvda15      105M   6.1M   99M   6% /boot/efi
tmpfs            96M   12K   96M   1% /run/user/1000
ubuntu@ip-172-31-89-120:/var/www/MyProject$ echo "Welcome to MyProject" > README.md
-bash: README.md: Permission denied
ubuntu@ip-172-31-89-120:/var/www/MyProject$ sudo echo "Welcome to MyProject" > README.md
-bash: README.md: Permission denied
ubuntu@ip-172-31-89-120:/var/www/MyProject$ sudo su
root@ip-172-31-89-120:/var/www/MyProject# sudo echo "Welcome to MyProject" > README.md
root@ip-172-31-89-120:/var/www/MyProject# exit
exit
ubuntu@ip-172-31-89-120:/var/www/MyProject$ cat README.md
Welcome to MyProject
ubuntu@ip-172-31-89-120:/var/www/MyProject$
```

Task 2: User and Group Permission Management

Scenario:

Create developer accounts and assign permissions to the project directory.

Step 1: Create group and users

Command:

```
groupadd devteam
```

```
useradd bhatti
```

```
useradd malik
```

```
usermod -aG devteam bhatti
```

```
usermod -aG devteam malik
```

Explanation:

- Creates a group devteam and adds users to it.

Step 2: Assign group ownership to project

Command:

```
chgrp -R devteam /var/www/ProjectX
```

Explanation:

- Changes group ownership of the directory recursively.

Step 3: Set directory permissions

Command:

```
chmod -R 770 /var/www/ProjectX
```

Explanation:

- Grants read/write/execute to owner and group, denies access to others.

Step 4: Verify permissions

Command:

```
ls -ld /var/www/ProjectX
```

Expected Output:

```
drwxrwx--- 2 root devteam 4096 Apr 26 10:00 ProjectX
```

Explanation:

- Confirms directory permissions and group ownership.

Step 5: Check group membership

Command:

```
groups bhatti
```

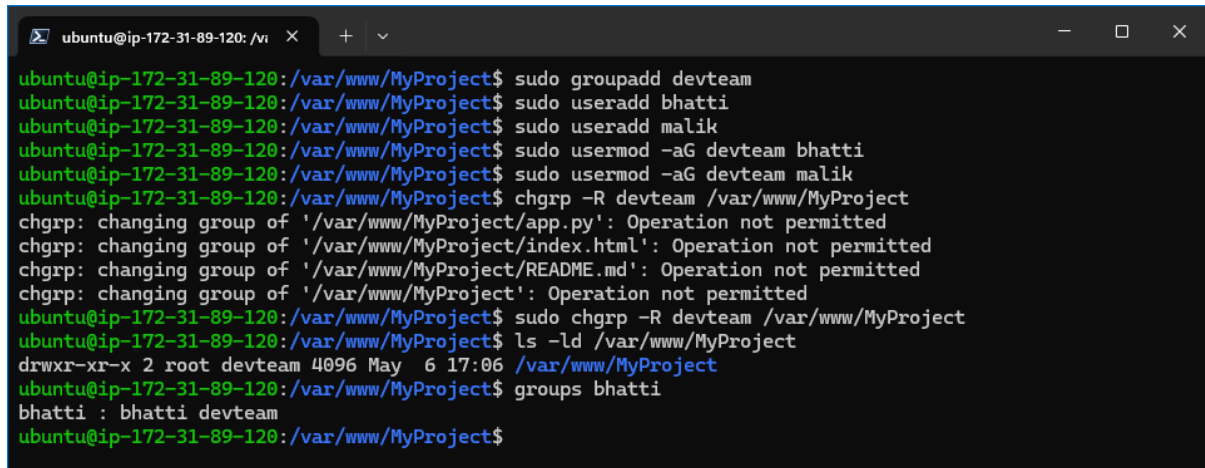
Expected Output:

```
bhatti : bhatti devteam
```

Explanation:

- Verifies bhatti is in the devteam group.

Screenshot:



```
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo groupadd devteam
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo useradd bhatti
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo useradd malik
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo usermod -aG devteam bhatti
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo usermod -aG devteam malik
ubuntu@ip-172-31-89-120: /var/www/MyProject$ chgrp -R devteam /var/www/MyProject
chgrp: changing group of '/var/www/MyProject/app.py': Operation not permitted
chgrp: changing group of '/var/www/MyProject/index.html': Operation not permitted
chgrp: changing group of '/var/www/MyProject/README.md': Operation not permitted
chgrp: changing group of '/var/www/MyProject': Operation not permitted
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo chgrp -R devteam /var/www/MyProject
ubuntu@ip-172-31-89-120: /var/www/MyProject$ ls -ld /var/www/MyProject
drwxr-xr-x 2 root devteam 4096 May  6 17:06 /var/www/MyProject
ubuntu@ip-172-31-89-120: /var/www/MyProject$ groups bhatti
bhatti : bhatti devteam
ubuntu@ip-172-31-89-120: /var/www/MyProject$
```

Task 3: Change Ownership

Scenario:

Assign bhatti as the lead developer and owner of project files.

Step 1: Change directory ownership

Command:

```
chown -R bhatti:devteam /var/www/ProjectX
```

Explanation:

- Transfers ownership of the files to user bhatti and group devteam.

Step 2: Verify ownership

Command:

```
ls -l /var/www/ProjectX
```

Expected Output (example):

```
-rw-rw---- 1 bhatti devteam 0 Apr 26 10:00 app.py
-rw-rw---- 1 bhatti devteam 0 Apr 26 10:00 index.html
-rw-rw---- 1 bhatti devteam 0 Apr 26 10:00 README.md
```

Explanation:

- Shows updated file ownership.

Step 3: Switch to bhatti and create new file

Command:

```
su - bhatti
```

```
cd /var/www/ProjectX
```

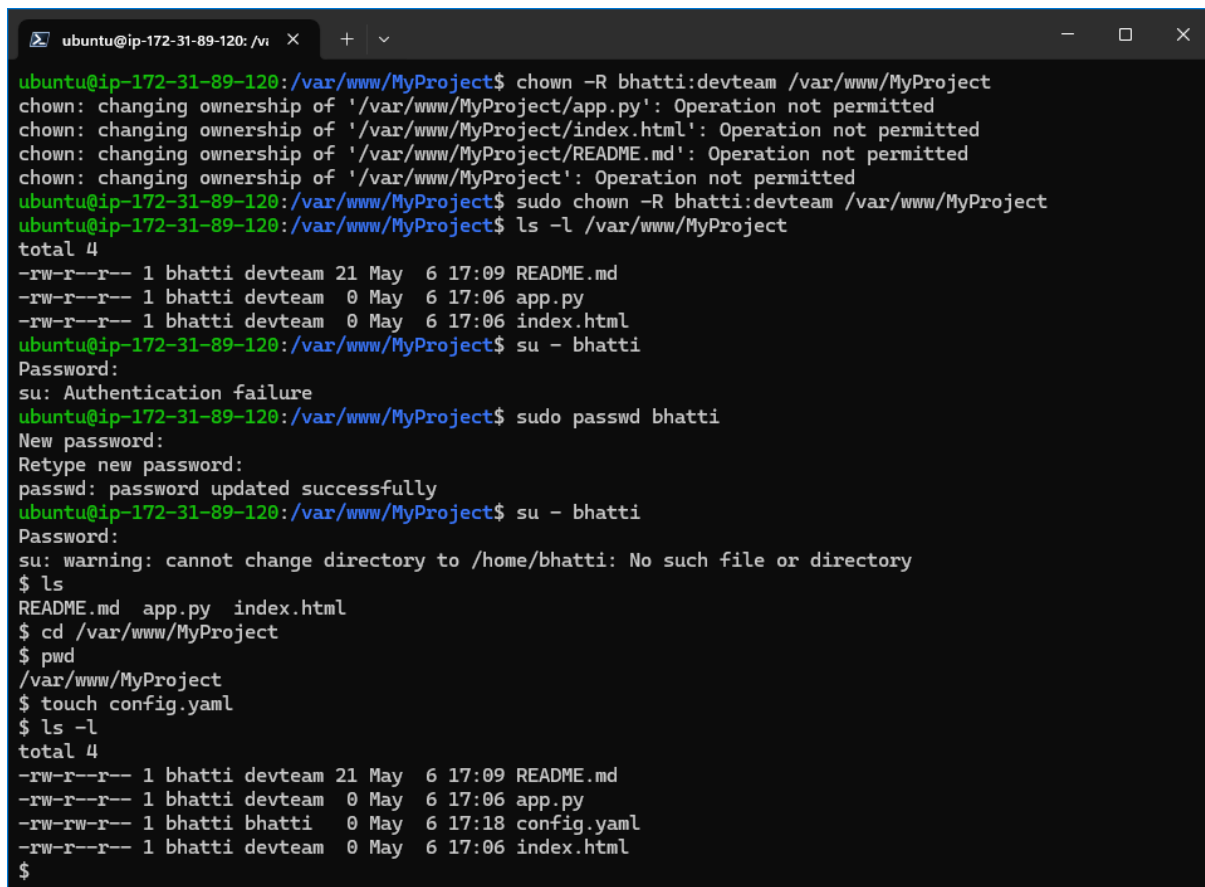
```
touch config.yaml
```

```
ls -l
```

Explanation:

- Switches user context to bhatti, creates a new config file, and verifies it.

Screenshot:



```
ubuntu@ip-172-31-89-120: /var/www/MyProject$ chown -R bhatti:devteam /var/www/MyProject
chown: changing ownership of '/var/www/MyProject/app.py': Operation not permitted
chown: changing ownership of '/var/www/MyProject/index.html': Operation not permitted
chown: changing ownership of '/var/www/MyProject/README.md': Operation not permitted
chown: changing ownership of '/var/www/MyProject': Operation not permitted
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo chown -R bhatti:devteam /var/www/MyProject
ubuntu@ip-172-31-89-120: /var/www/MyProject$ ls -l /var/www/MyProject
total 4
-rw-r--r-- 1 bhatti devteam 21 May  6 17:09 README.md
-rw-r--r-- 1 bhatti devteam  0 May  6 17:06 app.py
-rw-r--r-- 1 bhatti devteam  0 May  6 17:06 index.html
ubuntu@ip-172-31-89-120: /var/www/MyProject$ su - bhatti
Password:
su: Authentication failure
ubuntu@ip-172-31-89-120: /var/www/MyProject$ sudo passwd bhatti
New password:
Retype new password:
passwd: password updated successfully
ubuntu@ip-172-31-89-120: /var/www/MyProject$ su - bhatti
Password:
su: warning: cannot change directory to /home/bhatti: No such file or directory
$ ls
README.md app.py index.html
$ cd /var/www/MyProject
$ pwd
/var/www/MyProject
$ touch config.yaml
$ ls -l
total 4
-rw-r--r-- 1 bhatti devteam 21 May  6 17:09 README.md
-rw-r--r-- 1 bhatti devteam  0 May  6 17:06 app.py
-rw-rw-r-- 1 bhatti bhatti  0 May  6 17:18 config.yaml
-rw-r--r-- 1 bhatti devteam  0 May  6 17:06 index.html
$
```

Task 4: System-Level Commands

Scenario:

Monitor system performance and check web application status.

Step 1: Monitor system resources

Command:

top

Explanation:

- Displays real-time CPU and memory usage.

Screenshot:

```
ubuntu@ip-172-31-89-120: ~  
top - 17:19:35 up 34 min, 1 user, load average: 0.00, 0.00, 0.00  
Tasks: 103 total, 1 running, 102 sleeping, 0 stopped, 0 zombie  
%Cpu(s): 0.0 us, 0.0 sy, 0.0 ni, 94.7 id, 0.0 wa, 0.0 hi, 0.0 si, 5.3 st  
Mem Mem : 957.4 total, 396.2 free, 329.4 used, 385.3 buff/cache  
Mem Swap: 0.0 total, 0.0 free, 0.0 used, 628.0 avail Mem  
  
  PID USER      PR  NI   VIRT    RES    SHR     S    %CPU  %MEM    TIME+  COMMAND  
    1 root        20   0 22820  13516  9948 S    0.0  1.4   0:01.46 systemd  
    2 root        20   0      0      0      0 S    0.0  0.0   0:00.00 kthreadd  
    3 root        20   0      0      0      0 S    0.0  0.0   0:00.00 pool_workqueue_release  
    4 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-rcu_g  
    5 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-rcu_p  
    6 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-slab  
    7 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-netns  
    8 root        20   0      0      0 I    0.0  0.0   0:00.02 kworker/0:0-events  
    9 root        20   0      0      0 I    0.0  0.0   0:00.06 kworker/0:1-cgroup_destroy  
   10 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/0:0H-events_highpri  
   12 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-ma_pe  
   13 root        20   0      0      0 I    0.0  0.0   0:00.00 rcu_tasks_rude_kthread  
   14 root        20   0      0      0 I    0.0  0.0   0:00.00 rcu_tasks_trace_kthread  
   15 root        20   0      0      0 S    0.0  0.0   0:00.04 ksoftirqd/0  
   16 root        20   0      0      0 I    0.0  0.0   0:00.11 rcu_sched  
   17 root        rt    0      0      0 S    0.0  0.0   0:00.00 migration/0  
   18 root       -51   0      0      0 S    0.0  0.0   0:00.00 idle_inject/0  
   19 root        20   0      0      0 S    0.0  0.0   0:00.00 cpulp/0  
   20 root        20   0      0      0 S    0.0  0.0   0:00.00 kdevtmpfs  
   21 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-net  
   22 root        20   0      0      0 I    0.0  0.0   0:00.03 kworker/0:0:1-events_power_efficient  
   23 root        20   0      0      0 S    0.0  0.0   0:00.00 kauditd  
   24 root        20   0      0      0 S    0.0  0.0   0:00.00 khungtaskd  
   25 root        20   0      0      0 S    0.0  0.0   0:00.00 oom_reaper  
   26 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/0:0:2-events_power_efficient  
   27 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-write  
   28 root        20   0      0      0 S    0.0  0.0   0:00.04 kcompactd0  
   29 root        20   5      0      0 S    0.0  0.0   0:00.00 ksmd  
   30 root        39  19      0      0 S    0.0  0.0   0:00.00 khugepaged  
   31 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-kint  
   32 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-kbldc  
   33 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-kbldc  
   34 root       -51   0      0      0 S    0.0  0.0   0:00.00 irq/0-capi  
   35 root        20   0      0      0 S    0.0  0.0   0:00.00 xen-balloon  
   36 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-tpm_d  
   37 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-ata_s  
   38 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-md  
   39 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-md_b1  
  40 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-edac  
  41 root        0 -20   0      0      0 I    0.0  0.0   0:00.00 kworker/R-devfr  
  42 root       -51   0      0      0 S    0.0  0.0   0:00.00 watchdogd  
  43 root        0 -20   0      0      0 I    0.0  0.0   0:00.03 kworker/0:1H-kblockd  
  44 root        20   0      0      0 S    0.0  0.0   0:00.00 kswapd0  
  45 root        20   0      0      0 S    0.0  0.0   0:00.00 encryptfs-kthread
```

Step 2: Check running processes

Command:

ps aux | grep ProjectX

Explanation:

- Lists any running processes related to ProjectX.

Step 3: View system logs

Command:

tail -n 50 /var/log/syslog

Explanation:

- Displays the last 50 lines of the system log for debugging and monitoring.

Screenshot:

```
ubuntu@ip-172-31-89-120: ~$ ps aux | grep MyProject
ubuntu 1505  0.0  0.2  7880  2048 pts/0  S+   17:28  0:00 grep --color=auto MyProject
ubuntu@ip-172-31-89-120: /var/www/MyProject$ tail -n 50 /var/log/syslog
2025-05-06T16:45:36.821976+00:00 ip-172-31-89-120 systemd[1026]: Reached target default.target - Main User Target.
2025-05-06T16:45:36.822979+00:00 ip-172-31-89-120 systemd[1026]: Startup finished in 12ms.
2025-05-06T16:45:36.823388+00:00 ip-172-31-89-120 systemd[1]: Started user@1000.service - User Manager for UID 1000.
2025-05-06T16:45:36.827981+00:00 ip-172-31-89-120 systemd[1]: Started session+1.scope - Session 1 of User ubuntu.
2025-05-06T16:45:37.259996+00:00 ip-172-31-89-120 systemd[1]: systemd-fsck.service: Deactivated successfully.
2025-05-06T16:45:52.194641+00:00 ip-172-31-89-120 systemd[1]: systemd-hostnamed.service: Deactivated successfully.
2025-05-06T16:45:58.682639+00:00 ip-172-31-89-120 systemd[1]: systemd-timedated.service: Deactivated successfully.
2025-05-06T16:58:09.886929+00:00 ip-172-31-89-120 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2025-05-06T16:58:09.812660+00:00 ip-172-31-89-120 systemd[1]: sysstat-collect.service: Deactivated successfully.
2025-05-06T16:58:09.813411+00:00 ip-172-31-89-120 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
2025-05-06T16:58:10.886925+00:00 ip-172-31-89-120 systemd[1]: Starting update-notifier-download.service - Download data for packages that failed at package install time...
2025-05-06T16:58:19.918874+00:00 ip-172-31-89-120 systemd[1]: update-notifier-download.service: Deactivated successfully.
2025-05-06T16:58:19.924852+00:00 ip-172-31-89-120 systemd[1]: Finished update-notifier-download.service - Download data for packages that failed at package install time.
2025-05-06T16:51:19.888182+00:00 ip-172-31-89-120 systemd[1026]: launchpadlib-cache-clean.service - Clean up old files in the launchpadlib cache was skipped because of an unmet condition check (ConditionPathEx
ists=/home/ubuntu/.launchpadlib/api.launchpad.net/cache).
2025-05-06T16:55:01.815756+00:00 ip-172-31-89-120 CRON[1283]: (root) CMD (command -v debian-sa1 > /dev/null && debian-sa1 1 1)
2025-05-06T17:00:18.802619+00:00 ip-172-31-89-120 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2025-05-06T17:00:18.868586+00:00 ip-172-31-89-120 systemd[1]: Starting systemd-tmpfiles-clean.service - Cleanup of Temporary Directories...
2025-05-06T17:00:18.878296+00:00 ip-172-31-89-120 systemd[1]: sysstat-collect.service: Deactivated successfully.
2025-05-06T17:00:18.878377+00:00 ip-172-31-89-120 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
2025-05-06T17:00:18.971913+00:00 ip-172-31-89-120 systemd[1]: systemd-tmpfiles-clean.service: Deactivated successfully.
2025-05-06T17:00:18.971913+00:00 ip-172-31-89-120 systemd[1]: Finished systemd-tmpfiles-clean.service - Cleanup of Temporary Directories.
2025-05-06T17:03:01.820956+00:00 ip-172-31-89-120 CRON[1263]: (root) CMD (command -v debian-sa1 > /dev/null && debian-sa1 1 1)
2025-05-06T17:07:04.791724+00:00 ip-172-31-89-120 chronyd[688]: Detected falseticker 12.285.28.193 (1.ubuntu.pool.ntp.org)
2025-05-06T17:18:18.860359+00:00 ip-172-31-89-120 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2025-05-06T17:18:18.868445+00:00 ip-172-31-89-120 systemd[1]: sysstat-collect.service: Deactivated successfully.
2025-05-06T17:15:01.874745+00:00 ip-172-31-89-120 CRON[1271]: (root) CMD (command -v debian-sa1 > /dev/null && debian-sa1 1 1)
2025-05-06T17:15:03.018058+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: 2025-05-06 17:15:03.0077 WARN EC2RoleProvider Failed to connect to Systems Manager with instance profile role credentials.
ls.Err: retrieved credentials failed to report to ssm. Error: EC2RoleRequestError: no EC2 instance role found
2025-05-06T17:15:03.018997+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: caused by: EC2MetadataError: failed to make EC2Metadata request
2025-05-06T17:15:03.019040+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <?xml version='1.0' encoding='iso-8859-1'?>
2025-05-06T17:15:03.019076+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
2025-05-06T17:15:03.011863+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <html><html http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd>
2025-05-06T17:15:03.011974+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <html xmlns="http://www.w3.org/1999/xhtml" xml:lang="en" lang="en">
2025-05-06T17:15:03.011897+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <head>
2025-05-06T17:15:03.011118+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <title>404 - Not Found</title>
2025-05-06T17:15:03.011124+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: </head>
2025-05-06T17:15:03.011137+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <body>
2025-05-06T17:15:03.011151+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: <h1>404 - Not Found</h1>
2025-05-06T17:15:03.011185+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: </body>
2025-05-06T17:15:03.011286+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: </html>
2025-05-06T17:15:03.011286+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: #011status code: 404, request id:
2025-05-06T17:15:03.011286+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: 2025-05-06 17:15:03.0498 ERROR EC2RoleProvider Failed to connect to Systems Manager with SSM role credentials. error ca
lling RequestManagedInstanceRoleToken: AccessDeniedException: Systems Manager's instance management role is not configured for account: 273890235350
2025-05-06T17:15:03.111582+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: #011status code: 400, request id: 17e72a99-d8bc-48f7-94dc-170ee86bdu83
2025-05-06T17:15:03.211651+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: 2025-05-06 17:15:03.0498 ERROR [CredentialRefresher] Retrieve credentials produced error: no valid credentials could be
retrieved for ec2 identity. Default Host Management Err: error calling RequestManagedInstanceRoleToken: AccessDeniedException: Systems Manager's instance management role is not configured for account: 2738902
35350
2025-05-06T17:15:03.211730+00:00 ip-172-31-89-120 amazon-ssm-agent[951]: #011status code: 400, request id: 17e72a99-d8bc-48f7-94dc-170ee86bdu83
2025-05-06T17:17:01.839187+00:00 ip-172-31-89-120 CRON[1283]: (root) CMD (cd / && run-parts --report /etc/cron.hourly)
2025-05-06T17:20:18.802204+00:00 ip-172-31-89-120 systemd[1]: Starting sysstat-collect.service - system activity accounting tool...
2025-05-06T17:20:18.879751+00:00 ip-172-31-89-120 systemd[1]: sysstat-collect.service: Deactivated successfully.
2025-05-06T17:20:18.879751+00:00 ip-172-31-89-120 systemd[1]: Finished sysstat-collect.service - system activity accounting tool.
ubuntu@ip-172-31-89-120: /var/www/MyProject$
```

Conclusion

This assignment provided practical experience in Linux system administration, simulating common tasks like user/group management, file permission setup, and system resource monitoring for a web development team.