Minor Project 1: Linux IAM and Hardening

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PROJECT OVERVIEW

Objective:

To design and implement a secure user/group and permission model on an Ubuntu server, detect and fix 3 misconfigurations, and maintain evidence of all configurations and auditing.

Tools & Environment:

- Ubuntu Server (Lab VM)
- Kali Linux (Attacker VM– for testing)
- sudo access enabled

Baseline Policy Document

Role	Privileges	Sudo Access	File access
Admin	Manage users, services, and software	useradd, usermod, systemctl, apt	Full access to /srv/project
Dev	Modify project files, restart app service	systemctl restart/status project.service only	Write to /srv/project, read-only for others
Auditor	Read log and audit evidence only	None	Read-only /srv/project, /var/log/audit

Implementation Steps

- Creating User and Group
    - Sudo groupadd
    - Sudo useradd

- Configuring Sudoers
  Created/etc/sudoers.d/roles-admin and /etc/ sudoers.d/roles-dev

- Securing Project Directory

  sudo mkdir-p /srv/project

  sudo chown :proj /srv/project

  sudo chmod 770 /srv/project

  sudo setfacl-m g:dev:rwx /srv/project

  sudo setfacl-m g:auditor:r-x /srv/project

- Enbaling Auditing
  sudo apt install auditd-y
  sudo systemctl enable auditd—now
  sudo auditctl-w /etc/passwd-p wa-k identity
  sudo auditctl-w /etc/sudoers-p wa-k identity

- Vulnerability

Wor ld-wr i t a b l e /etc/cron.d/test	Unauthorized could add jobs	users sudo chmod 600 etc/cron.d/test
Sudo NOPASSWD for dev	Privilege escalation	Removed from/etc/sudoers.d/roles-dev
Weak permissions on /srv/project	Read/write for all users	sudo chmod 770 /srv/project and reset ACL

- Network check

  Scanned and Verified

  sudo ss-tulpn > ~/evidence/ports_after_closure.txt

  sudo lsof-i-Pn > ~/evidence/open_sockets_after.txt

  sudo nmap-p8080127.0.0.1 > ~/evidence/nmap_8080_check.txt

- Remediation Verification

Task	Status
Remove world-writable files	✓
Disable unnecessary sudo NOPASSWD	✓
Lock down file permissions	✓
Enable audit logging	✓
Close unused ports	✓
Generate evidence folder	✓

- Summary

  Users: 3 created (alice, bob, charlie)

  Groups: 3 configured (admin, dev, auditor)

  Sudorules: verified and validated

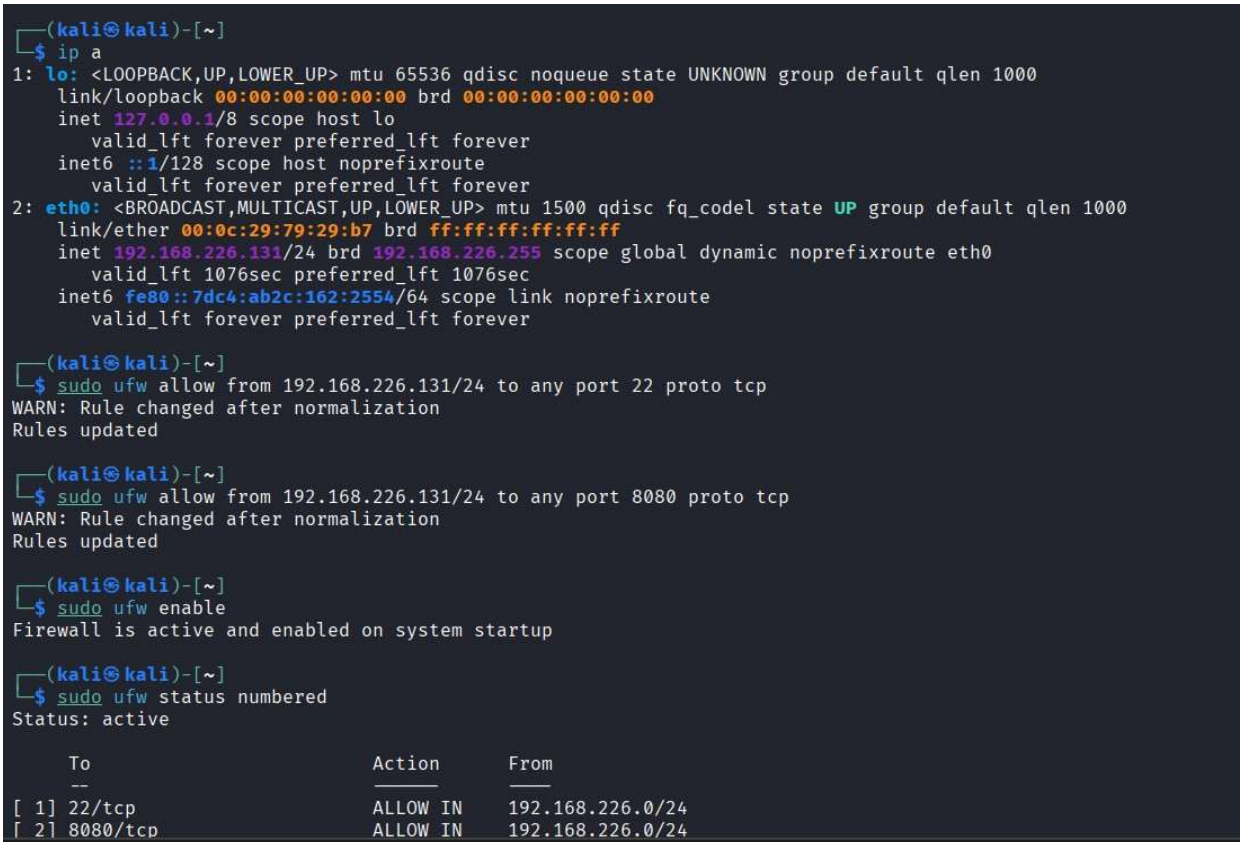
  ACLs: configured correctly

  Audit logs: functioning

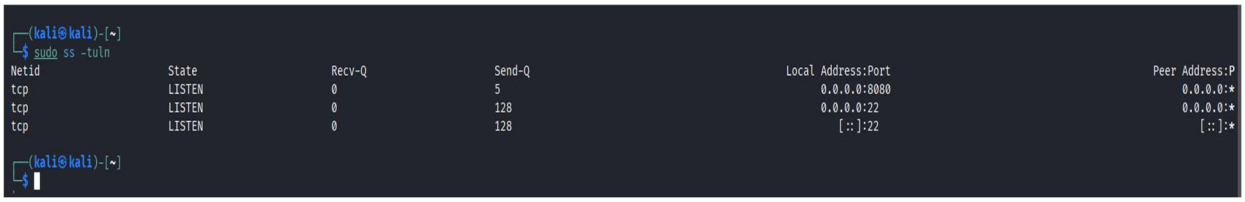
  Ports: secure, verified closed

Proofs

1. Opening Ports to listen through



2. Open Ports for Enumerations for system hardening using ss commands



3. **Nmap Scans**

```
┌──(kali㉿kali)-[~]
└─$ sudo nmap  -sS 192.168.226.0/24
Starting Nmap 7.95 ( https://nmap.org ) at 2025-11-25 07:29 EST
Nmap scan report for 192.168.226.1
Host is up (0.00097s latency).
All 1000 scanned ports on 192.168.226.1 are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)
MAC Address: 00:50:56:C0:00:08 (VMware)

Nmap scan report for 192.168.226.2
Host is up (0.0030s latency).
Not shown: 999 closed tcp ports (reset)
PORT   STATE SERVICE
53/tcp open  domain
MAC Address: 00:50:56:E0:E3:99 (VMware)

Nmap scan report for 192.168.226.254
Host is up (0.0011s latency).
All 1000 scanned ports on 192.168.226.254 are in ignored states.
Not shown: 1000 filtered tcp ports (no-response)
MAC Address: 00:50:56:FB:81:15 (VMware)

Nmap scan report for 192.168.226.131
Host is up (0.0000070s latency).
Not shown: 998 closed tcp ports (reset)
PORT     STATE SERVICE
22/tcp   open  ssh
8080/tcp open  http-proxy

Nmap done: 256 IP addresses (4 hosts up) scanned in 8.71 seconds
```

4. **Nmap Port scans command used to check specific ports (22 and 8080) on a target host**

```
┌──(kali㉿kali)-[~]
└─$ sudo nmap  -Pn -p 22,8080 192.168.226.1
Starting Nmap 7.95 ( https://nmap.org ) at 2025-11-25 07:34 EST
Nmap scan report for 192.168.226.1
Host is up (0.00074s latency).

PORT     STATE    SERVICE
22/tcp   filtered ssh
8080/tcp filtered http-proxy
MAC Address: 00:50:56:C0:00:08 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 1.46 seconds
```

5. Verification of service termination and port closure using ss, lsof, and Nmap