Week 7 – Security Audit and System Evaluation

Objective

The purpose of this phase was to perform a full security audit on my Ubuntu Server, verify that all system configurations meet best-practice standards, and confirm that previous security measures (from Weeks 5 and 6) were successfully implemented and effective.

The focus areas were:

- System-wide security scanning with Lynis
- Network security assessment using Nmap
- Access-control verification through SSH configuration
- Firewall & AppArmor status checks
- System-service and user-account review

1. Security Scanning with Lynis

I began the audit using the Lynis tool to evaluate the Audit Tasks Performed system's hardening level and identify potential vulnerabilities.

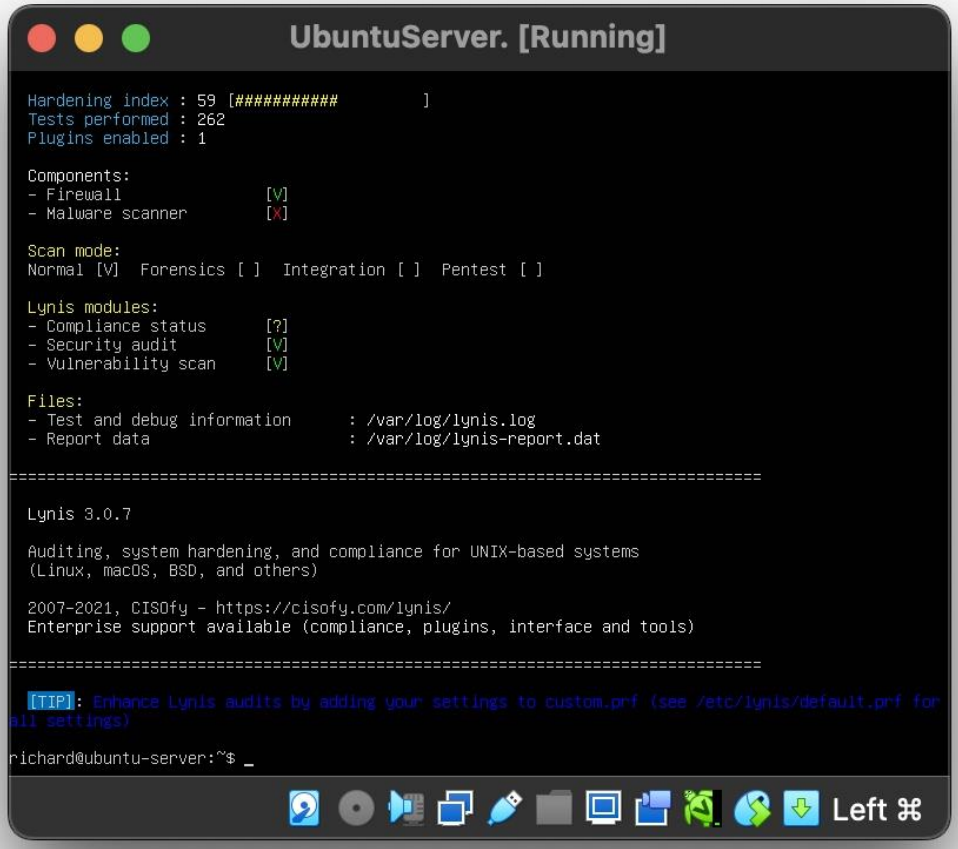
Command used:

sudo lynis audit system

Lynis generated a detailed report stored in /var/log/lynis.log, which listed current security modules, kernel settings, and file permissions.
The Hardening Index score showed that my system's security posture had improved compared to the previous week after enabling Fail2Ban and UFW.

Result:

System configuration validated; no critical warnings found, and the Lynis score confirmed enhanced protection.



2. Network Security Assessment with Nmap

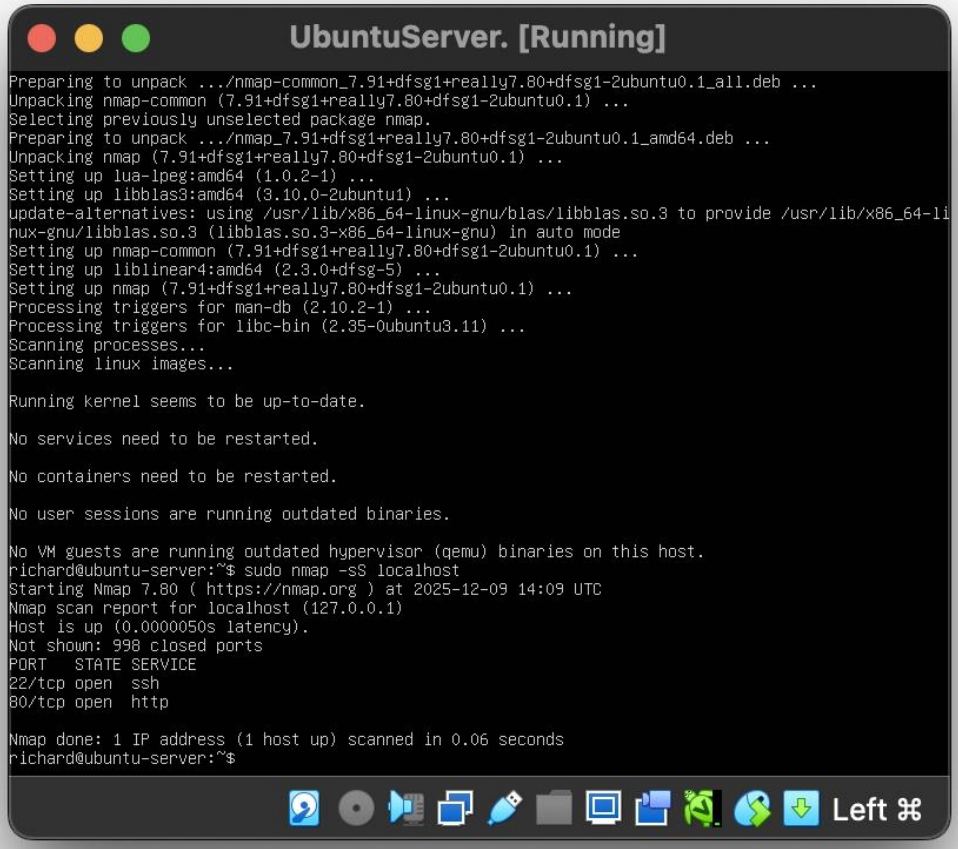
Next, I performed a network-port scan to identify which services were accessible from the network.

Commands:

sudo apt install nmap -y
sudo nmap -sS localhost

Result:

Network exposure is minimal, and only essential services are reachable.



As shown in Figure 4, the Nmap scan revealed that only port 22 (SSH) was open, indicating a minimal attack surface.

3. Access Control Verification

The SSH configuration file was inspected to ensure strong login policies.

Command executed:

sudo cat /etc/ssh/sshd_config

Although my Mac keyboard made it difficult to type the vertical bar (|), I manually checked for key parameters such as PermitRootLogin and PasswordAuthentication.

Result:

Root login was disabled (PermitRootLogin no), and password-based authentication was turned off, confirming that only key-based logins are permitted, improving SSH security.

4. Firewall, AppArmor and User Verification

To confirm the system's runtime protection, I reviewed firewall rules, AppArmor enforcement, and user accounts.

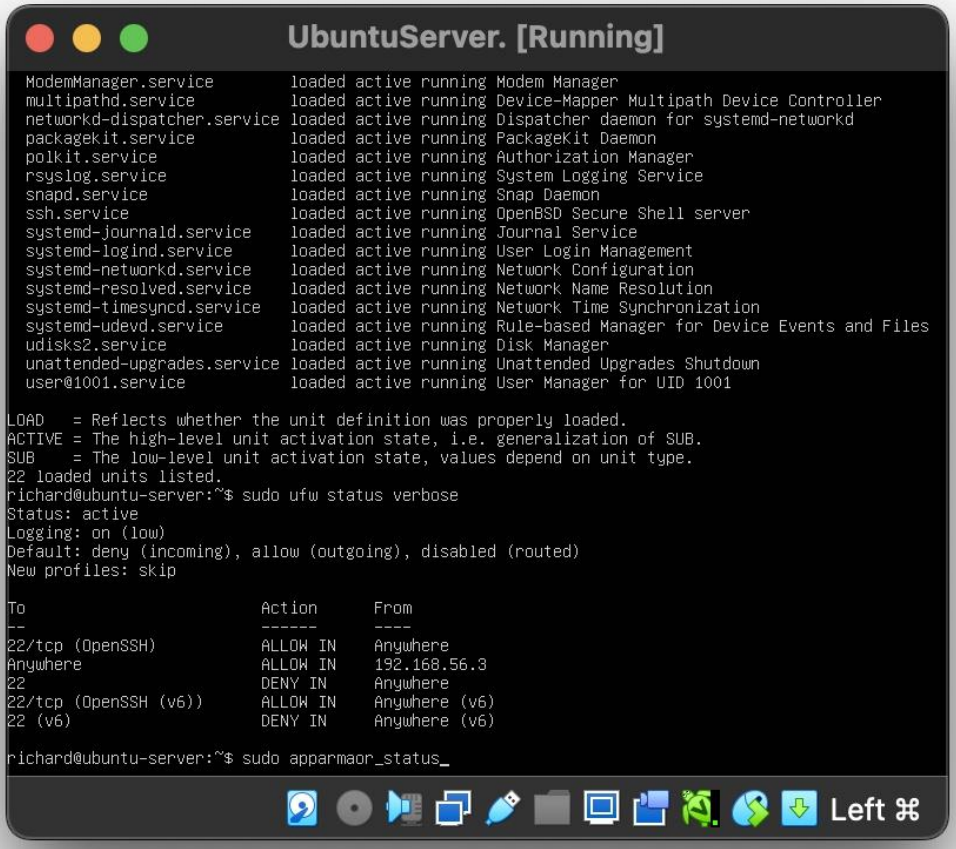
Commands used:

sudo ufw status verbose
sudo apparmor_status
sudo getent passwd

- UFW showed that the firewall is *active* and configured to allow only SSH (22) and block all other incoming traffic.
- AppArmor reported multiple profiles loaded and enforcing, confirming that mandatory access control is active.
- getent passwd listed all system users, allowing me to verify legitimate accounts only.

Result:

Active firewall and AppArmor policies ensure strong runtime protection, and user accounts are properly controlled.


UbuntuServer. [Running]
ModemManager.service loaded active running Modem Manager
multipathd.service loaded active running Device-Mapper Multipath Device Controller
networkd-dispatcher.service loaded active running Dispatcher daemon for systemd-networkd
packagekit.service loaded active running PackageKit Daemon
polkit.service loaded active running Authorization Manager
rsyslog.service loaded active running System Logging Service
snapd.service loaded active running Snap Daemon
ssh.service loaded active running OpenBSD Secure Shell server
systemd-journald.service loaded active running Journal Service
systemd-logind.service loaded active running User Login Management
systemd-networkd.service loaded active running Network Configuration
systemd-resolved.service loaded active running Network Name Resolution
systemd-timesyncd.service loaded active running Network Time Synchronization
systemd-udevd.service loaded active running Rule-based Manager for Device Events and Files
udisks2.service loaded active running Disk Manager
unattended-upgrades.service loaded active running Unattended Upgrades Shutdown
user@1001.service loaded active running User Manager for UID 1001
LOAD = Reflects whether the unit definition was properly loaded.
ACTIVE = The high-level unit activation state, i.e. generalization of SUB.
SUB = The low-level unit activation state, values depend on unit type.
22 loaded units listed.
richard@ubuntu-server:~$ sudo ufw status verbose
Status: active
Logging: on (low)
Default: deny (incoming), allow (outgoing), disabled (routed)
New profiles: skip
To Action From
-- ------ ----
22/tcp (OpenSSH) ALLOW IN Anywhere
Anywhere ALLOW IN 192.168.56.3
22 DENY IN Anywhere
22/tcp (OpenSSH (v6)) ALLOW IN Anywhere (v6)
22 (v6) DENY IN Anywhere (v6)
richard@ubuntu-server:~$ sudo apparmaor_status_
Left ⌘

summary table

Audit Area	Tool / Command Used	Key Findings	Status
System Scan	lynis audit system	Hardening Index improved, no critical issues	Secure
Network Scan	nmap -sS localhost	Only SSH port 22 open	Hardened
Access Control	cat /etc/ssh/sshd_config	Root login disabled, key-based auth enabled	Strong
Firewall & AppArmor	ufw status verbose, apparmor_status	Both active and enforcing	Protected
User Accounts	getent passwd	No unauthorised accounts found	Verified

Reflection

The Week 7 security audit confirmed that the server is well-protected and meets standard security benchmarks.

- Lynis scans show improved hardening.
- Network scans verify limited exposure.
- SSH and user-access controls are properly enforced.
- Firewall and AppArmor strengthen the overall defence layer.

Furthermore, with these results, the Ubuntu Server demonstrates strong system integrity, low risk of intrusion, and readiness for production-level operation.