Cybersecurity Internship Program

Task-2: BUILD YOUR PERSONAL CYBERSECURITY LAB

Prepared By: Gajendrasinh V. Zala

Organization By:

MAINCRAFTS TECHNOLOGY

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1. Introduction

Cybersecurity practical learning requires a safe and isolated environment. This report documents the creation of a personal cybersecurity laboratory using virtualization technology. The lab consists of an attacker machine (**Kali Linux**) and a vulnerable web application (**DVWA / OWASP Juice Shop**). Proper network segmentation is implemented to ensure that testing remains contained and does not impact the host system or external networks.

2. Objective

The primary goal of this task is to establish a secure, isolated penetration-testing lab for practicing:

- **Vulnerability Assessment:** Identifying weaknesses in systems.
- **Web Application Testing:** Exploiting flaws in web services.
- **Network Scanning:** Discovering active hosts and open ports.
- **Security Tool Proficiency:** Mastering industry-standard tools.

3. Lab Architecture Overview

The lab is designed using a multi-adapter approach to balance connectivity and security.

- **Attacker Machine:** Kali Linux (Debian-based penetration testing suite).
- **Target Machine:** DVWA or OWASP Juice Shop (Deliberately insecure applications).
- **Network Logic:** The Attacker communicates with the Target via a **Host-Only Network**, while the Attacker maintains an external **NAT** connection for repository updates.

4. Prerequisites

Requirement	Recommendation
RAM	Minimum 8GB (16GB preferred)
Disk Space	40–60 GB

Requirement	Recommendation
CPU	Virtualization (VT-x/AMD-V) Enabled
Host OS	Windows / Linux / Mac

5. Tools & Technologies Used

- **Hypervisor:** Oracle VM VirtualBox
- **Operating Systems:** Kali Linux VM
- **Vulnerable Labs:** DVWA
- **Security Tools:** Nmap, Burp Suite, Wireshark

6. Network Configuration

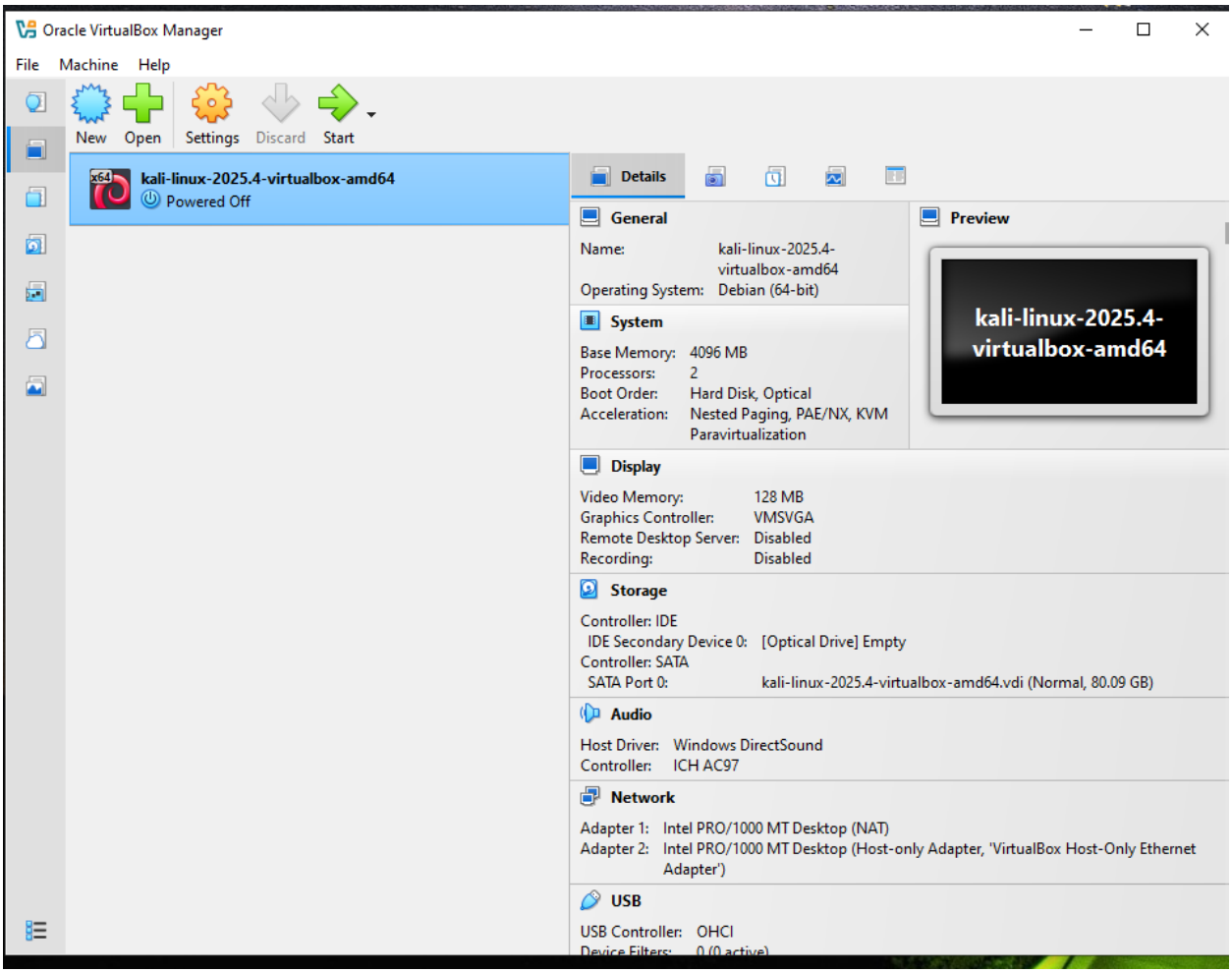
Two network adapters were configured for the Kali Linux environment:

1. **Adapter 1 – NAT:** Provides internet connectivity for downloading tools and security updates.
2. **Adapter 2 – Host-Only:** Creates a private "sandbox" network. This ensures that any exploits or scans are restricted to the virtual environment and cannot reach the local home network.

7. Step-by-Step Implementation

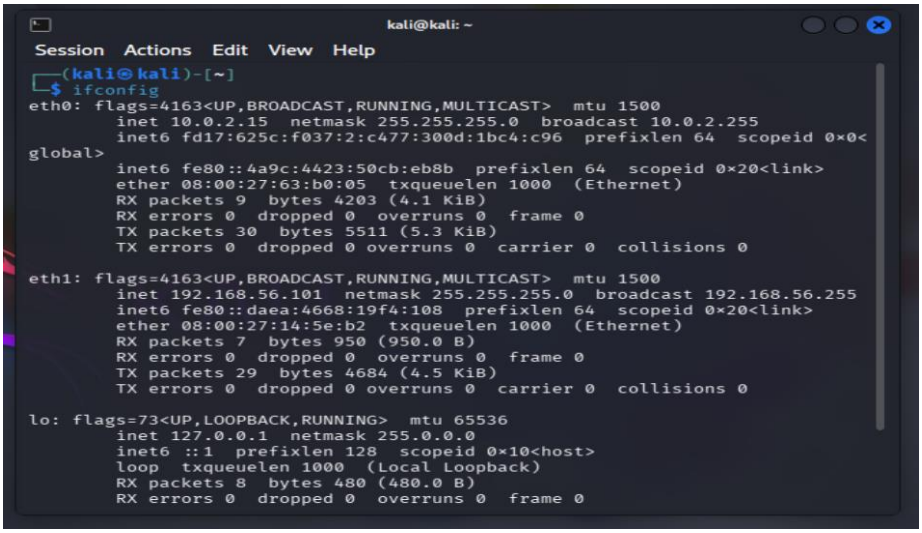
- **Step 1: VirtualBox Installation** – Installed the hypervisor and configured the "VirtualBox Host-Only Ethernet Adapter."

- **Step 2: Kali Linux Deployment** – Imported the Kali Linux `.ova` file, assigned 2 CPU cores and 4GB RAM, and attached both network adapters.



- **Step 3: Vulnerable Application Setup** – Deployed the target environment (DVWA) via a standalone VM .

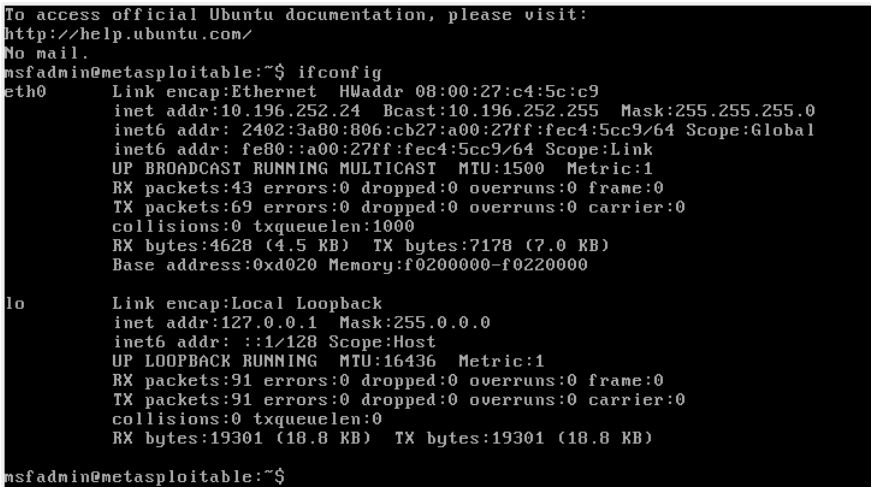
- **Step 4: IP Verification** – Used `ifconfig` (or `ip a`) on both machines to ensure they were on the same Host-Only subnet.



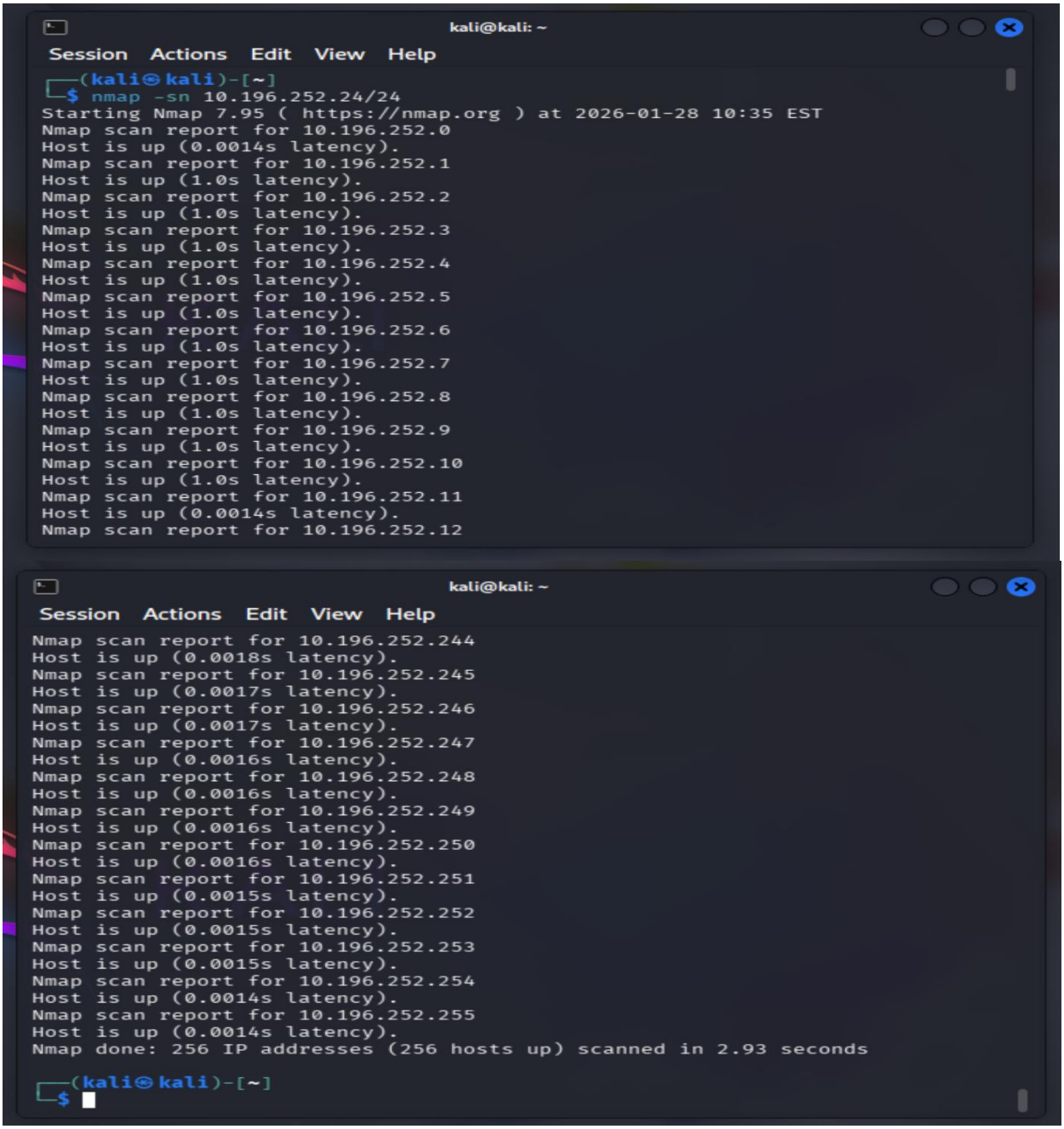
8. Validation & Testing

To confirm the lab was operational, the following tests were conducted:

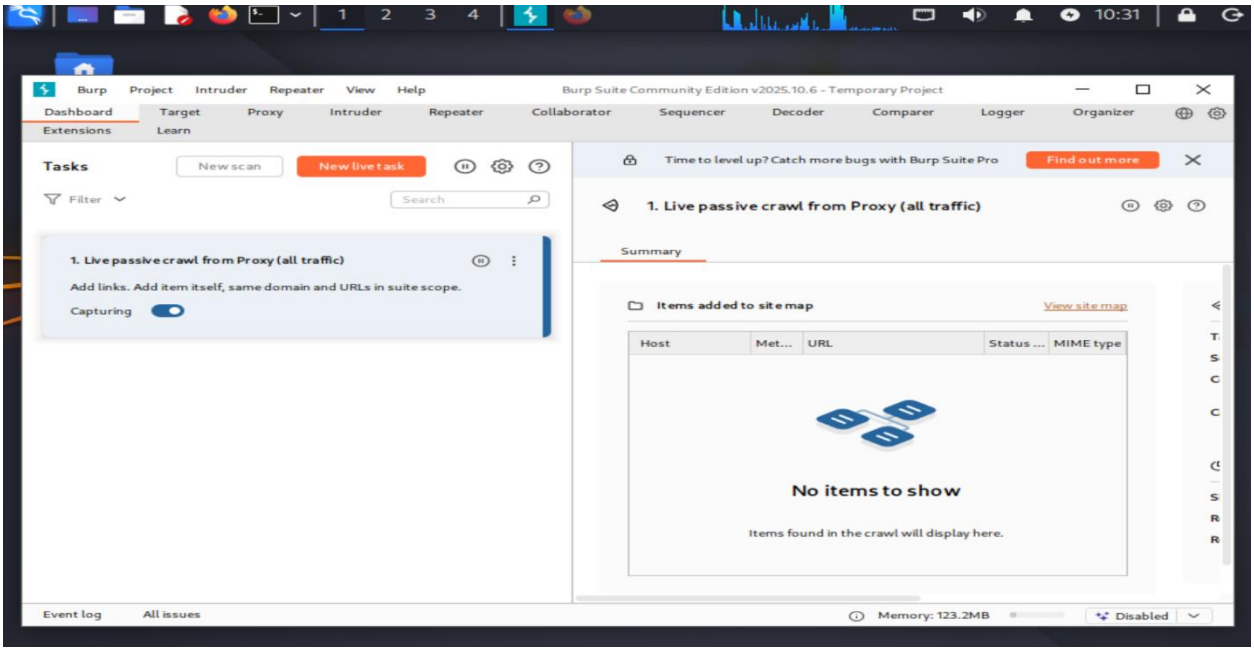
- **Connectivity:** Pinged the target machine from Kali Linux.



- **Reconnaissance:** Performed a basic `nmap` scan against the target IP.



- **Interception:** Configured **Burp Suite** to capture traffic from the vulnerable web app.



- **Analysis:** Used **Wireshark** to monitor packet flow between the two machines.

9. Learning Outcomes

- Mastered **Virtual Machine** deployment and resource allocation.
- Understood the critical difference between **NAT and Host-Only** networking.
- Learned how to deploy and manage **vulnerable testing environments**.
- Gained hands-on experience in **basic reconnaissance** and environment hardening.

10. Conclusion

This task successfully established a functional and safe personal cybersecurity lab. The setup provides a robust platform for ethical hacking practice without risks to production systems. This environment serves as the foundation for all future penetration testing tasks in this internship.

11. References

- VirtualBox Official Documentation
- Kali Linux Documentation
- OWASP Juice Shop Project
- Damn Vulnerable Web Application (DVWA)