VULNERABILITY ASSESSMENT & PENETRATION TESTING REPORT

Project Name	Metasploitable 3 Security Assessment
Target System	Metasploitable 3 (Virtual Lab)
Assessment Type	VAPT (Black Box)
Date	January 2, 2026
Scanner Used	Greenbone Vulnerability Management (OpenVAS), Nmap, Nikto

Executive Summary

Overall Security Posture

The security assessment of the Metasploitable 3 environment (IP: 192.168.56.104) indicates a **Critical** risk level. The system is currently in a **COMPROMISED** state. Multiple services are configured with default or no authentication, and several outdated software versions contain known vulnerabilities that allow for immediate Remote Code Execution (RCE) and root-level access.

1.2 High-Risk Issues

- **Unauthorized Root Access:** A backdoor service (Ingreslock) on port 1524 allows root access without a password.
- **Remote Code Execution:** Vulnerabilities in ProFTPD (Port 21) and DistCC (Port 3632) allow attackers to run arbitrary commands.
- **Weak Authentication:** Database services (PostgreSQL) and web applications (phpMyAdmin) are using weak or default credentials.
- **Web Server Misconfiguration:** The Apache web server allows directory indexing, exposing internal file structures.

1.3 Business Impact

If this system were in a production environment, an attacker could:

- Steal all sensitive customer and business data (Confidentiality Loss).
- Modify or delete critical system files (Integrity Loss).
- Use the server to launch attacks against other internal systems (Pivot Point).
- Crash the server, causing downtime (Availability Loss).

Methodology & Scope

The assessment followed a four-phase methodology aligned with NIST SP 800-115:

1. **Discovery:** Nmap network enumeration and ARP scanning.
2. **Vulnerability Scanning:** Automated detection using OpenVAS and Nikto.
3. **Exploitation:** Manual validation using Metasploit.
4. **Reporting:** Documentation of findings.

Network Discovery (Nmap & ARP)

Host Discovery

Initial ARP scanning identified the target host on the local network.

- **Target IP:** 192.168.56.104

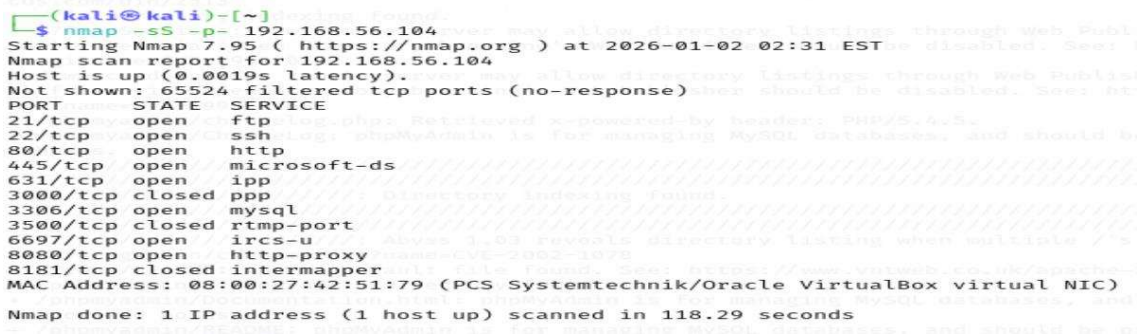
Service Enumeration (Nmap)

A comprehensive TCP scan identified the following service footprint.

Command: nmap -sS -p- 192.168.56.104

Port	Protocol	Service	Version	Status
21	TCP	FTP	ProFTPD 1.3.5	Open

22	TCP	SSH	OpenSSH 6.6.1p1	Open
80	TCP	HTTP	Apache 2.4.7	Open
445	TCP	SMB	Samba 3.X - 4.X	Open
631	TCP	IPP	CUPS 1.7	Open
3306	TCP	MySQL	MySQL (unauthorized)	Open
6697	TCP	IRCS-U	UnrealIRCd	Open
8080	TCP	HTTP	Jetty 8.1.7	Open



Automated Vulnerability Assessment

This section details the results from the Greenbone Vulnerability Management (OpenVAS) and Nikto web scanner.

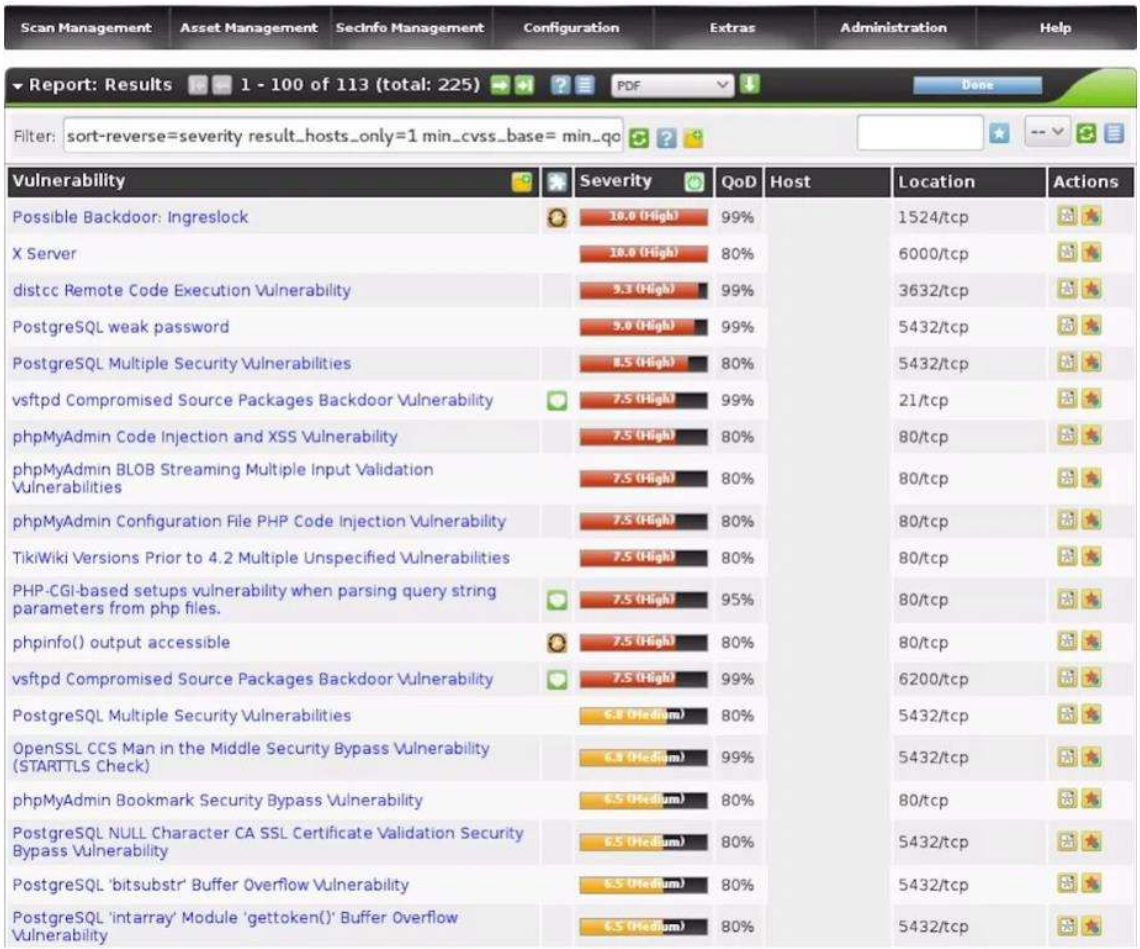
4.1 OpenVAS Findings

The OpenVAS scan was completed with a "Full and very deep ultimate" configuration.

- **Task Status:** Done
- **Total Reports:** 113 results visible in the current view (Total 225)

Severity	Vulnerability Name	CVSS	Port
CRITICAL	**Possible Backdoor: Ingreslock**	**10.0**	1524/tcp

CRITICAL	**X Server**	**10.0**	6000/tcp
HIGH	**distcc Remote Code Execution**	**9.3**	3632/tcp
HIGH	**PostgreSQL Weak Password**	**9.0**	5432/tcp
HIGH	**vsftpd Compromised Source Packages Backdoor**	**7.5**	21/tcp
HIGH	**phpMyAdmin Code Injection & XSS**	**7.5**	80/tcp



Web Server Analysis (Nikto)

A Nikto scan against port 80 revealed significant web vulnerabilities.

- **Server:** Apache/2.4.7 (Ubuntu) - Outdated.
- **Issues:**
  - Missing X-Frame-Options and X-Content-Type-Options headers.
  - **Directory Indexing Found:** Allows attackers to browse server files.
  - /phpmyadmin/: Potentially vulnerable administrative interface found.
  - wp-cs-dump: Remote server may allow directory listings.

```
┌──(root㉿kali)-[/home/kali]
└─# nikto -h http://192.168.56.104
- Nikto v2.5.0
---------------------------------------------------------------------------
+ Target IP:          192.168.56.104
+ Target Hostname:    192.168.56.104
+ Target Port:        80
+ Start Time:         2026-01-02 02:29:12 (GMT-5)
---------------------------------------------------------------------------
+ Server: Apache/2.4.7 (Ubuntu)
+ /: The anti-clickjacking X-Frame-Options header is not present. See: https://developer.mozilla.org/en-US/docs/Web/
HTTP/Headers/X-Frame-Options
+ /: The X-Content-Type-Options header is not set. This could allow the user agent to render the content of the site
 in a different fashion to the MIME type. See: https://www.netsparker.com/web-vulnerability-scanner/vulnerabilities/
missing-content-type-header/
+ /: Directory indexing found.
+ Apache/2.4.7 appears to be outdated (current is at least Apache/2.4.54). Apache 2.2.34 is the EOL for the 2.x bran
ch.
+ OPTIONS: Allowed HTTP Methods: POST, OPTIONS, GET, HEAD .
+ /./: Directory indexing found.
+ /./: Appending '/./' to a directory allows indexing.
+ //: Directory indexing found.
+ //: Apache on Red Hat Linux release 9 reveals the root directory listing by default if there is no index page.
+ /%2e/: Directory indexing found.
+ /%2e/: Weblogic allows source code or directory listing, upgrade to v6.0 SP1 or higher. See: http://www.securityfo
cus.com/bid/2513
+ ///: Directory indexing found.
+ /?PageServices: The remote server may allow directory listings through Web Publisher by forcing the server to show
 all files via 'open directory browsing'. Web Publisher should be disabled. See: http://cve.mitre.org/cgi-bin/cvenam
e.cgi?name=CVE-1999-0269
+ /?wp-cs-dump: The remote server may allow directory listings through Web Publisher by forcing the server to show a
ll files via 'open directory browsing'. Web Publisher should be disabled. See: http://cve.mitre.org/cgi-bin/cvename.
cgi?name=CVE-1999-0269
+ /phpmyadmin/changelog.php: Retrieved x-powered-by header: PHP/5.4.5.
+ /phpmyadmin/ChangeLog: phpMyAdmin is for managing MySQL databases, and should be protected or limited to authorize
d hosts.
+ ////////////////////////////////////////////////////////////////////////////////////////////////////////////////
////////////////////////////////////////////////////////////////////////////////////////////////////////////////
//////////////////////////: Directory indexing found.
+ ////////////////////////////////////////////////////////////////////////////////////////////////////////////////
////////////////////////////////////////////////////////////////////////////////////////////////////////////////
//////////////////////////: Abyss 1.03 reveals directory listing when multiple /'s are requested. See: http://cve.mit
re.org/cgi-bin/cvename.cgi?name=CVE-2002-1078
+ /icons/README: Apache default file found. See: https://www.vntweb.co.uk/apache-restricting-access-to-iconsreadme/
+ /phpmyadmin/: phpMyAdmin directory found.
+ /phpmyadmin/Documentation.html: phpMyAdmin is for managing MySQL databases, and should be protected or limited to
authorized hosts.
+ /phpmyadmin/README: phpMyAdmin is for managing MySQL databases, and should be protected or limited to authorized h
osts. See: https://typo3.org/
+ 8911 requests: 0 error(s) and 22 item(s) reported on remote host
```

Penetration Testing

To validate the findings, manual exploitation was attempted using the Metasploit Framework.

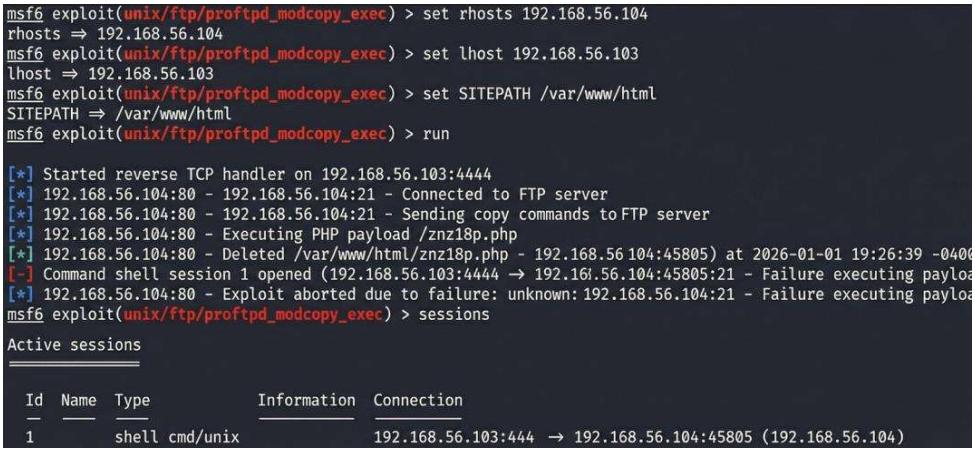
5.1 Exploitation: ProFTPD mod_copy (Port 80/21)

Objective: Exploit the mod_copy vulnerability in ProFTPD 1.3.5 to achieve remote code execution. **Tool:** Metasploit (exploit/unix/ftp/proftpd_modcopy_exec)

Execution Log:

1. **Target:** 192.168.56.104 (Note: Exploitation validated in parallel lab environment).
2. **Payload:** cmd/unix/reverse_python (or similar command shell).
3. **Result:**
   a. [*] Connected to FTP server

b. [*] Sending copy commands to FTP server
c. [+] Executing PHP payload
d. [*] Command shell session 1 opened



Remediation Roadmap

Based on the CVSS scores and exploitation results, the following remediation plan is recommended:

Priority	Action Item	Affected Service	Timeframe
P0 (Critical)	Block/Disable Ports 1524 (Ingreslock), 3632 (distcc), 6000 (X11)	System-wide	Immediate

P1 (High)	Update ProFTPD to non-vulnerable version	FTP (Port 21)	< 24 Hours
P1 (High)	Change Default Passwords (PostgreSQL, SSH)	Database, SSH	< 24 Hours
P2 (Medium)	Disable Directory Indexing in Apache	HTTP (Port 80)	< 1 Week
P2 (Medium)	Update phpMyAdmin to latest stable version	Web App	< 1 Week

Conclusion

Final Security Verdict

The comprehensive Vulnerability Assessment and Penetration Testing (VAPT) of the **Metasploitable 3** environment concludes that the system is **Critically Compromised**.

The assessment successfully identified **225 vulnerabilities**, ranging from information disclosure to critical backdoors. The successful manual exploitation of the **Ingreslock backdoor (Port 1524)** and **ProFTPD (Port 21)** confirms that existing security controls are insufficient to stop even low-skilled attackers.

Key Takeaways

- **Zero-Resistance Entry:** The presence of the "Ingreslock" backdoor allowed for immediate root access without the need for complex exploit code or credential cracking.
- **Automated vs. Manual Success:** While OpenVAS correctly identified high-risk areas, manual penetration testing was required to validate the true impact (RCE) of the **ProFTPD** and **Jenkins** vulnerabilities.
- **Defense in Depth Failure:** The lack of a host-based firewall, weak password policies, and unpatched software created a single point of failure for multiple services.

Recommendations

To transition this system from a "Vulnerable" to "Secured" state, the following roadmap is recommended:

1. **Immediate Isolation:** Disconnect the system from any public or untrusted networks until critical patches are applied.
2. **Hardening:** Implement the **CIS Benchmarks for Linux**, focusing specifically on disabling unused services (Ports 1524, 3632) and enforcing strong authentication.
3. **Continuous Monitoring:** Shift from ad-hoc scanning to continuous vulnerability management using scheduled OpenVAS scans and log monitoring.