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PENETRATION TEST REPORT

EXPLOITING VULNERABILITIES IN DVWA

PRESENTER:

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Executive Summary:

The penetration testing initiative was conducted with the primary objective of evaluating the security posture of our organization's systems, networks, and applications. This strategic assessment aimed to identify and address potential vulnerabilities that could be exploited by malicious actors, ultimately enhancing our overall cybersecurity resilience.

DVWA, or Damn Vulnerable Web Application, is a deliberately insecure web application designed for educational and testing purposes. It serves as a practical tool for security professionals, ethical hackers, and developers to gain hands-on experience in identifying, exploiting, and mitigating common web application vulnerabilities.

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SEVERITY SCALE

CRITICAL Severity Issue: A "Critical Severity Issue" is a severe and potentially damaging vulnerability discovered during the assessment. It signifies a significant security weakness attackers could exploit to compromise the system or network. Addressing critical severity issues promptly is crucial to enhancing the overall security posture and preventing potential security breaches.

HIGH Severity issue: A "High Severity Issue" denotes a serious vulnerability that, while not as critical as a critical severity issue, still poses a substantial risk to the security of the system or network. Addressing high-severity issues is important to enhance overall security and reduce the potential for exploitation by malicious actors. Though not an immediate threat, these issues should be addressed on time to mitigate potential security risks.

MEDIUM Severity Issue: A "Medium Severity Issue" refers to a significant vulnerability that may not pose an immediate or critical threat to the security of the system or network. While not as serious as high or critical severity issues, addressing medium severity issues is important for maintaining a robust security

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posture. These issues should be resolved to prevent potential exploitation or to limit the cumulative impact when combined with other vulnerabilities.

LOW Severity Issue: A "Low Severity Issue" in penetration testing indicates a relatively minor vulnerability and may not present an immediate or significant threat to the security of the system or network. While these issues are not as critical as higher severity ones, they should still be addressed to maintain a comprehensive security stance.

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INFORMATION GATHERING:

TARGET: 10.0.2.4

I used the “nmap -sV -A 10.0.2.4” command to find the open ports.

```
┌──(kali㉿kali)-[~]
└─$ nmap -sV -A 10.0.2.4
Starting Nmap 7.94 ( https://nmap.org ) at 2024-01-05 04:30 EST
Nmap scan report for 10.0.2.4
Host is up (0.00062s latency).
Not shown: 977 closed tcp ports (conn-refused)
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 2.3.4
| ftp-syst:
|   STAT:
| FTP server status:
|      Connected to 10.0.2.15
|      Logged in as ftp
|      TYPE: ASCII
|      No session bandwidth limit
|      Session timeout in seconds is 300
|      Control connection is plain text
|      Data connections will be plain text
|      vsFTPd 2.3.4 - secure, fast, stable
|_End of status
|_ftp-anon: Anonymous FTP login allowed (FTP code 230)
22/tcp   open  ssh         OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
| ssh-hostkey:
|   1024 60:0f:cf:e1:c0:5f:6a:74:d6:90:24:fa:c4:d5:6c:cd (DSA)
|_  2048 56:56:24:0f:21:1d:de:a7:2b:ae:61:b1:24:3d:e8:f3 (RSA)
23/tcp   open  telnet      Linux telnetd
25/tcp   open  smtp        Postfix smtpd
|_smtp-commands: metasploitable.localdomain, PIPELINING, SIZE 10240000, VRFY,
 ETRN, STARTTLS, ENHANCEDSTATUSCODES, 8BITMIME, DSN
|_ssl-date: 2024-01-05T09:32:28+00:00; +22s from scanner time.
| sslv2:
|   SSLv2 supported
|   ciphers:
|     SSL2_DES_64_CBC_WITH_MD5
|     SSL2_RC4_128_WITH_MD5
|     SSL2_RC2_128_CBC_EXPORT40_WITH_MD5
|     SSL2_RC4_128_EXPORT40_WITH_MD5
|     SSL2_RC2_128_CBC_WITH_MD5
|_    SSL2_DES_192_EDE3_CBC_WITH_MD5
53/tcp   open  domain      ISC BIND 9.4.2
| dns-nsid:
|_  bind.version: 9.4.2
80/tcp   open  http        Apache httpd 2.2.8 ((Ubuntu) DAV/2)
|_http-server-header: Apache/2.2.8 (Ubuntu) DAV/2
|_http-title: Metasploitable2 - Linux
111/tcp  open  rpcbind     2 (RPC #100000)
| rpcinfo:
|   program version    port/proto  service
|   100000  2            111/tcp   rpcbind
```

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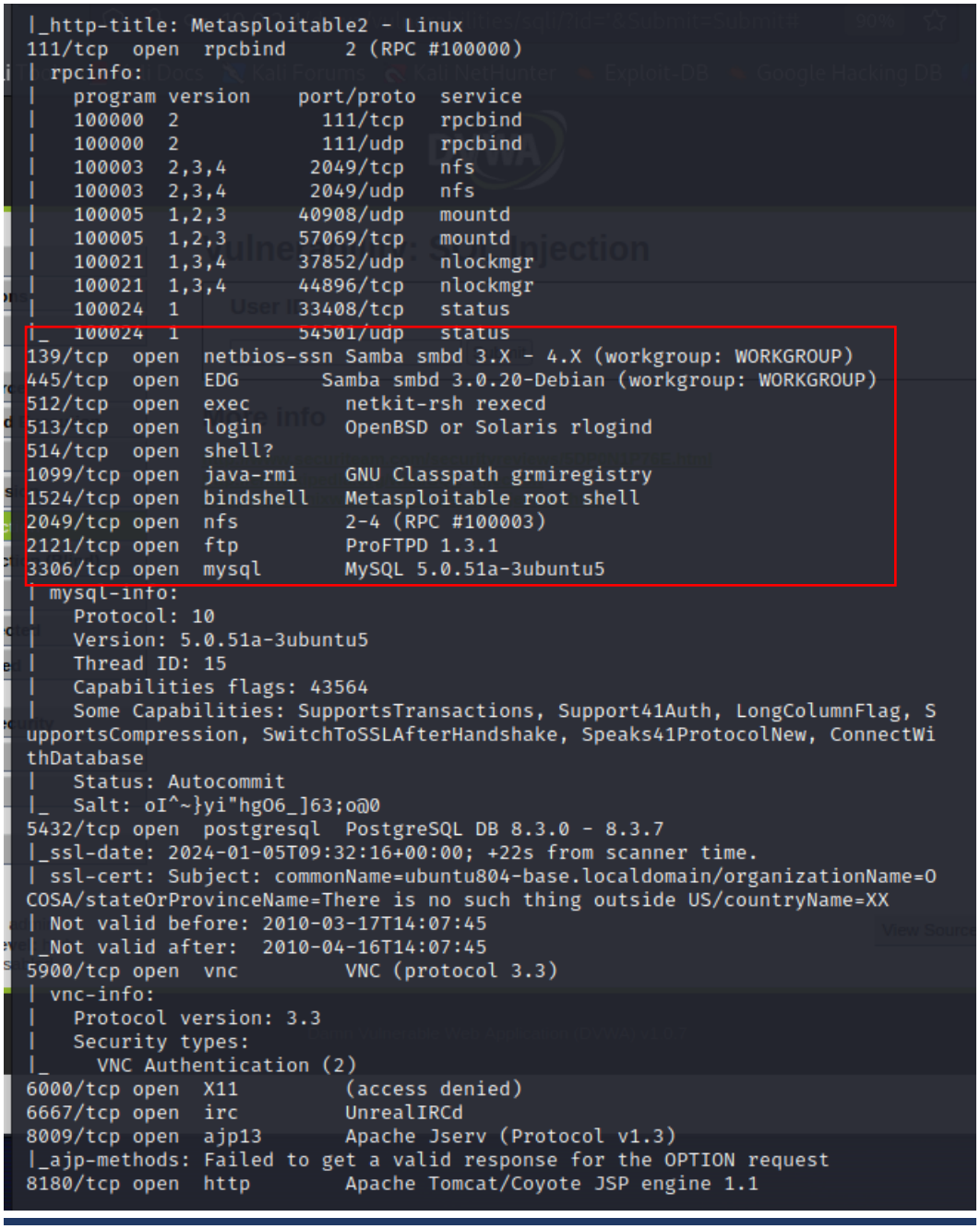

```
|_http-title: Metasploitable2 - Linux
111/tcp  open  rpcbind     2 (RPC #100000)
| rpcinfo:
|   program version    port/proto  service
|   100000  2            111/tcp   rpcbind
|   100000  2            111/udp   rpcbind
|   100003  2,3,4       2049/tcp   nfs
|   100003  2,3,4       2049/udp   nfs
|   100005  1,2,3      40908/udp   mountd
|   100005  1,2,3      57069/tcp   mountd
|   100021  1,3,4      37852/udp   nlockmgr
|   100021  1,3,4      44896/tcp   nlockmgr
|   100024  1          33408/tcp   status
|_  100024  1          54501/udp   status
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  EDG       Samba smbd 3.0.20-Debian (workgroup: WORKGROUP)
512/tcp  open  exec        netkit-rsh rexecd
513/tcp  open  login       OpenBSD or Solaris rlogind
514/tcp  open  shell?
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
| mysql-info:
|   Protocol: 10
|   Version: 5.0.51a-3ubuntu5
|   Thread ID: 15
|   Capabilities flags: 43564
|   Some Capabilities: SupportsTransactions, Support41Auth, LongColumnFlag, S
upportsCompression, SwitchToSSLAfterHandshake, Speaks41ProtocolNew, ConnectWi
thDatabase
|   Status: Autocommit
|_  Salt: oI^~}yi"hgO6_]63;o@0
5432/tcp open  postgresql  PostgreSQL DB 8.3.0 - 8.3.7
|_ssl-date: 2024-01-05T09:32:16+00:00; +22s from scanner time.
| ssl-cert: Subject: commonName=ubuntu804-base.localdomain/organizationName=O
COSA/stateOrProvinceName=There is no such thing outside US/countryName=XX
| Not valid before: 2010-03-17T14:07:45
|_Not valid after:  2010-04-16T14:07:45
5900/tcp open  vnc         VNC (protocol 3.3)
| vnc-info:
|   Protocol version: 3.3
|   Security types:
|_    VNC Authentication (2)
6000/tcp open  X11         (access denied)
6667/tcp open  irc         UnrealIRCd
8009/tcp open  ajp13       Apache Jserv (Protocol v1.3)
|_ajp-methods: Failed to get a valid response for the OPTION request
8180/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
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DVWA Vulnerability Scanning

EXPLOITATION:

Vulnerability I: Command Execution

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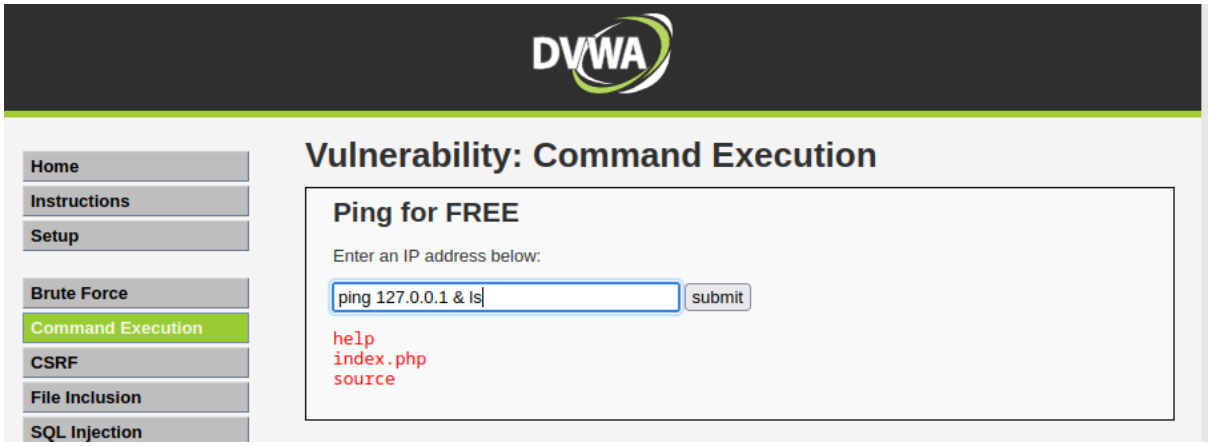
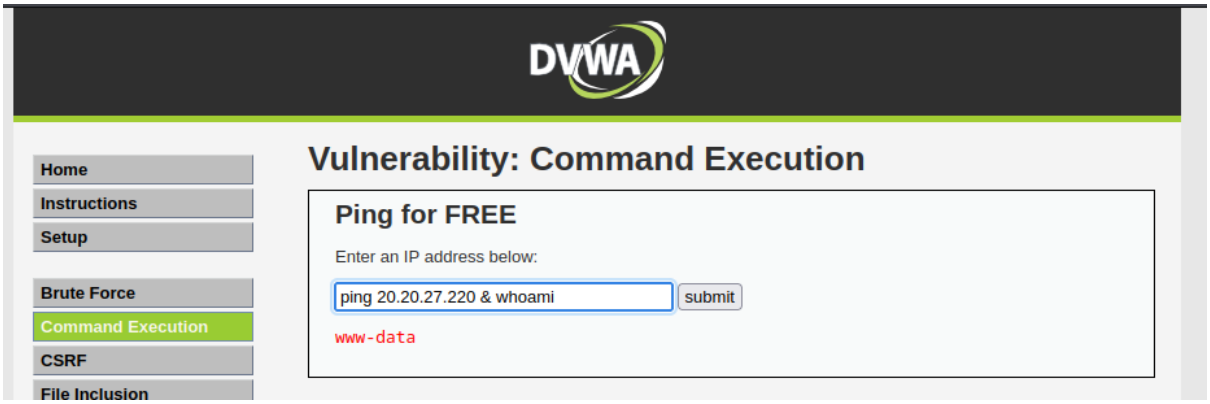
VULNERABILITY EXPLOITED SEVERITY: LOW

Command execution vulnerabilities occur when an application allows an attacker to execute arbitrary commands on a host OS.

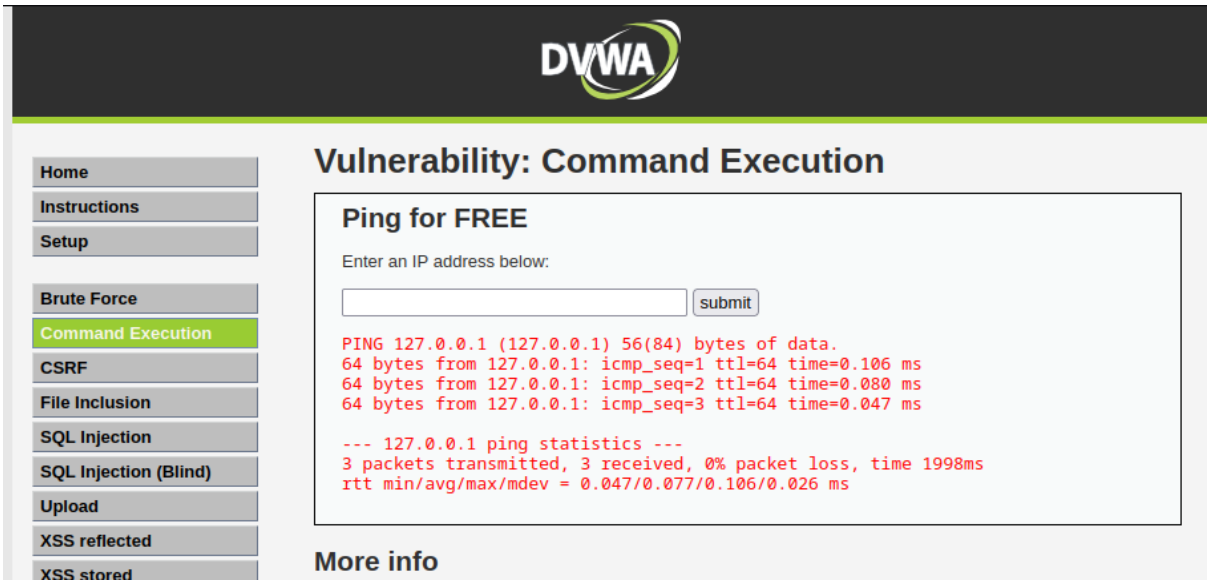
I entered an IP address in the search bar and used the ls command.



- ls command is used to list the files and directories in a directory.
- As you can see from the picture above, the command execution was successful, server returned the files.
- The next one I used was Whoami.
- It returns the username associated with the current user who is running the command.



➢ It gave the username associated with the IP address.

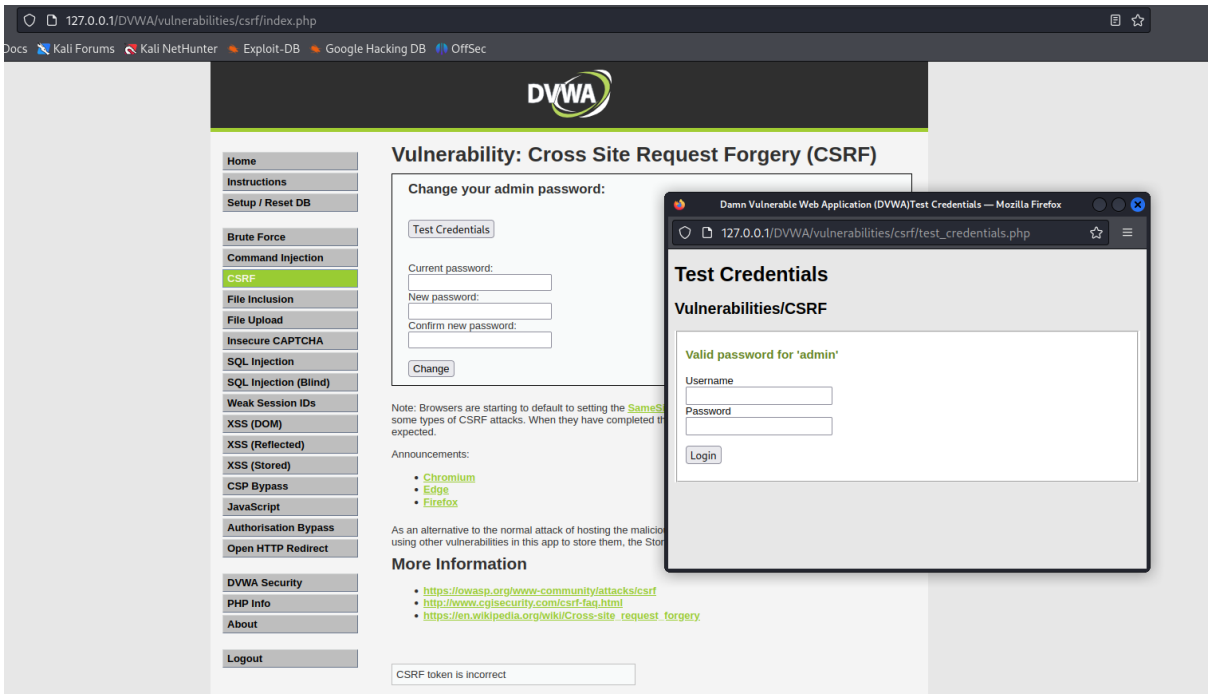


Vulnerability II: Cross-Site Request Forgery(CSRF)

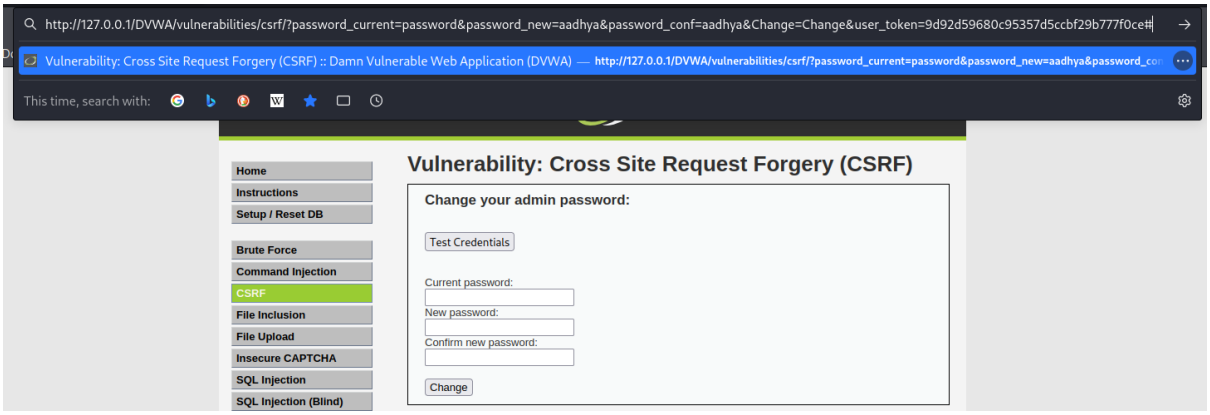
VULNERABILITY EXPLOITED SEVERITY: LOW

CSRF is a type of security vulnerability that occurs when an attacker tricks a user's browser into making an

unauthorized request on behalf of the user. This can lead to actions being performed on a website without the user's knowledge.



✓ I changed the password and copied the URL. http://127.0.0.1/DVWA/vulnerabilities/csrf/?password_current=password&password_new=aadhya&password_conf=aadhya&Change=Change&user_token=9d92d59680c95357d5ccbf29b777f0ce#



- ✓I sent this URL to someone and if they click this URL without their knowledge their password changes.

Vulnerability III: SQL Injection:

VULNERABILITY EXPLOITED SEVERITY: LOW

- ✓SQL injection vulnerabilities occur when a web application allows untrusted user input directly incorporated into SQL queries without proper validation or sanitization.
- ✓This oversight can lead to attackers manipulating the SQL queries in unexpected ways, potentially compromising the security of the application and its associated database.

  EG: An attacker might input something like ' OR '1'='1'; -- into a login form, manipulating the SQL query to always return true, allowing unauthorized access.

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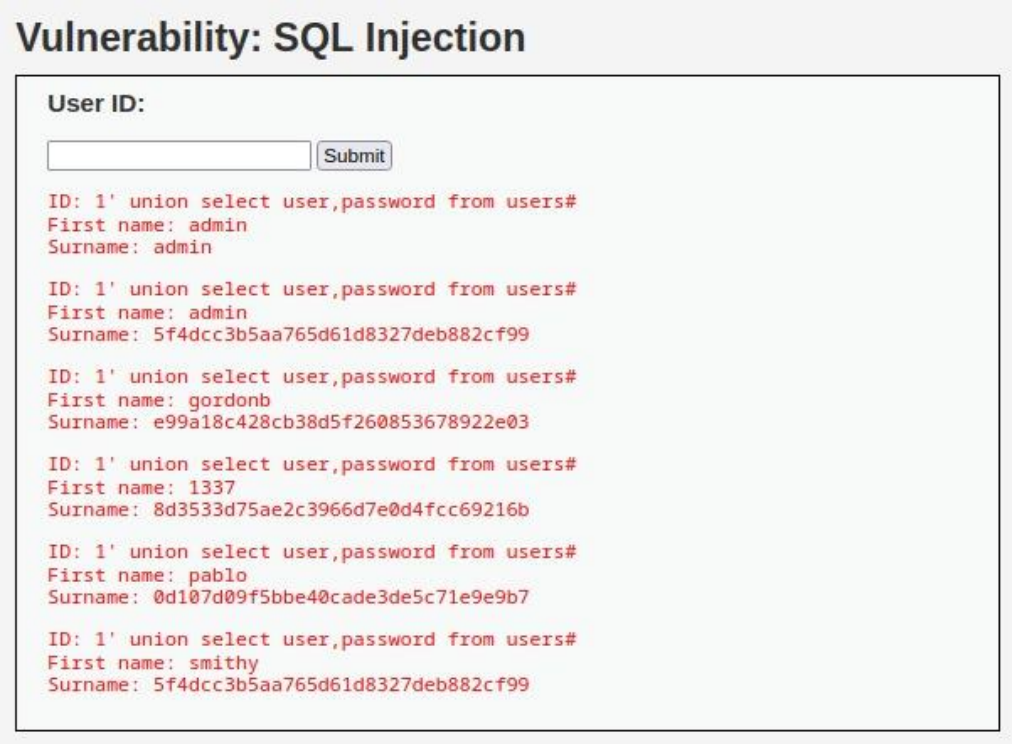

Vulnerability IV: XXS(Reflected)

VULNERABILITY EXPLOITED SEVERITY: LOW

- ✓ XSS is a security vulnerability that allows attackers to inject malicious scripts into web pages viewed by other users. In the case of reflected XSS, the injected script is part of the request (e.g., in the URL), and it gets reflected in the response.
- ✓ An attacker can craft a URL containing a script payload. If the application fails to properly sanitize or validate user inputs, the script may be executed when the URL is visited.

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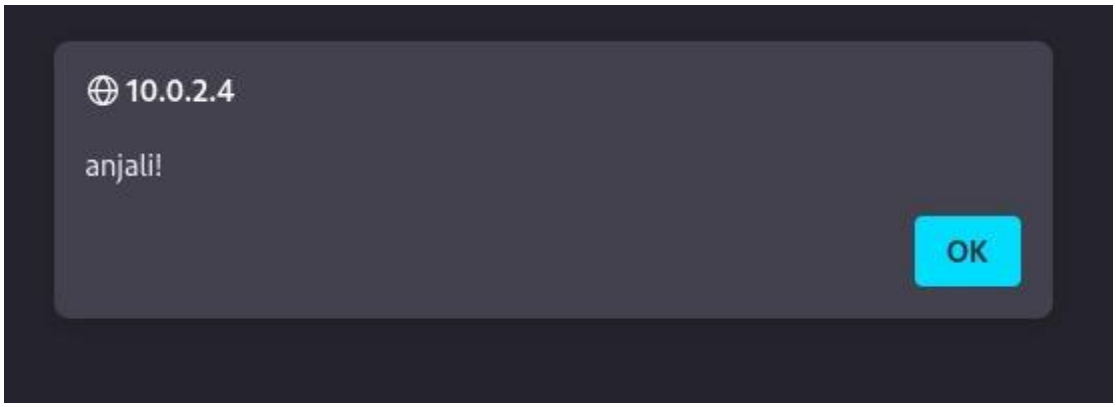
- Example payload: http://example.com/page?name=<script>alert('anjali')</script>



Vulnerability V: XXS(Stored)

VULNERABILITY EXPLOITED SEVERITY: LOW

- ✓ Attackers inject malicious scripts into persistent storage (like a database). When other users retrieve the data, the script is executed.
- Example payload in a comment form: <script>alert('wow') </script>

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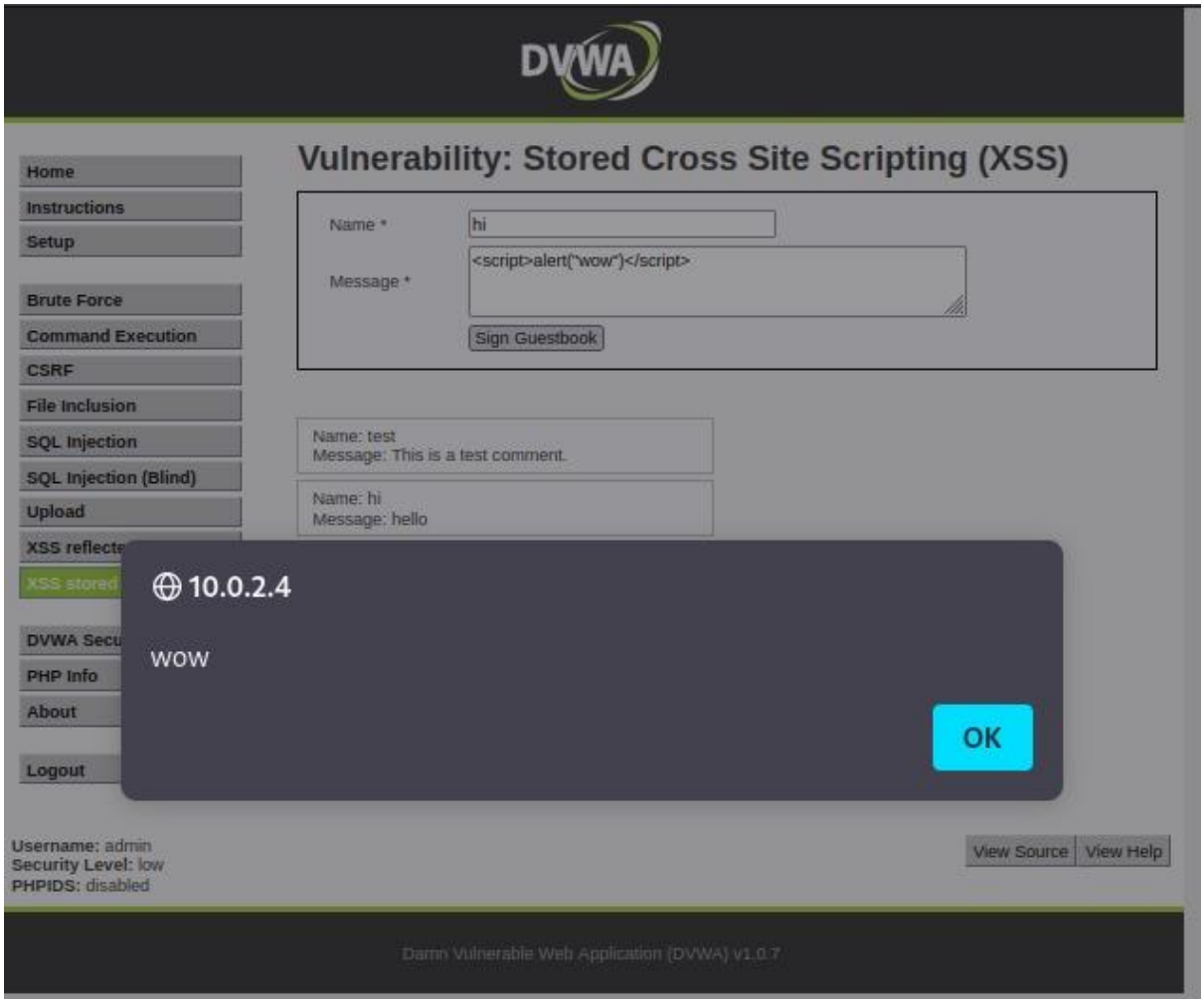

MITIGATION

Mitigating vulnerabilities is a crucial aspect of maintaining a secure and resilient IT environment.

- ✓Vulnerability Scanning
- ✓Least Privilege Principle
- ✓Web Application Security
- ✓Security Awareness Training
- ✓ Encryption
- ✓Multi-Factor Authentication (MFA)

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TOOLS UTILIZED:

Nmap:

- ✓ Nmap, short for "Network Mapper," is a powerful open-source tool used for network discovery and security auditing.
- ✓ It is designed to explore networks, identify hosts, services, and open ports, and create a map of the network topology.
- ✓ Nmap is widely used by network administrators, security professionals, and penetration testers to assess the security of computer networks.

https://nmap.org/download#windows

Kali Linux:

- ✓ Kali Linux is a specialized Linux distribution designed for penetration testing, ethical hacking, and security auditing.
- ✓ It provides a wide array of tools and utilities that make it a go-to platform for cybersecurity professionals, penetration testers, and ethical hackers.

https://www.kali.org/

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REFERENCES:

Nmap:

https://www.geeksforgeeks.org/nmap-command-in-linux-with-examples/

DVWA:

https://securingninja.com/dvwa-hacking-tutorial/

CONCLUSION:

In conclusion, penetration testing is a vital and proactive approach to identifying and addressing security vulnerabilities within an organization's systems, networks, and applications. This process involves simulating real-world cyberattacks to assess the effectiveness of existing security measures and discover potential weaknesses.

Key points to consider regarding penetration testing:

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- Identification of Vulnerabilities
- Risk Assessment
- Business Impact Evaluation
- Continuous Improvement
- Security Awareness and Training
- Legal and Ethical Considerations