TP2 - Discovery and Analysis of Network Ports and Services

Objectives:

- Learn how to perform different types of network scans using Nmap
- Discover open ports and service versions on a target machine
- Analyze the results and infer information about the scanned machines
- Learn how to manipulate NSE scripts

Introduction

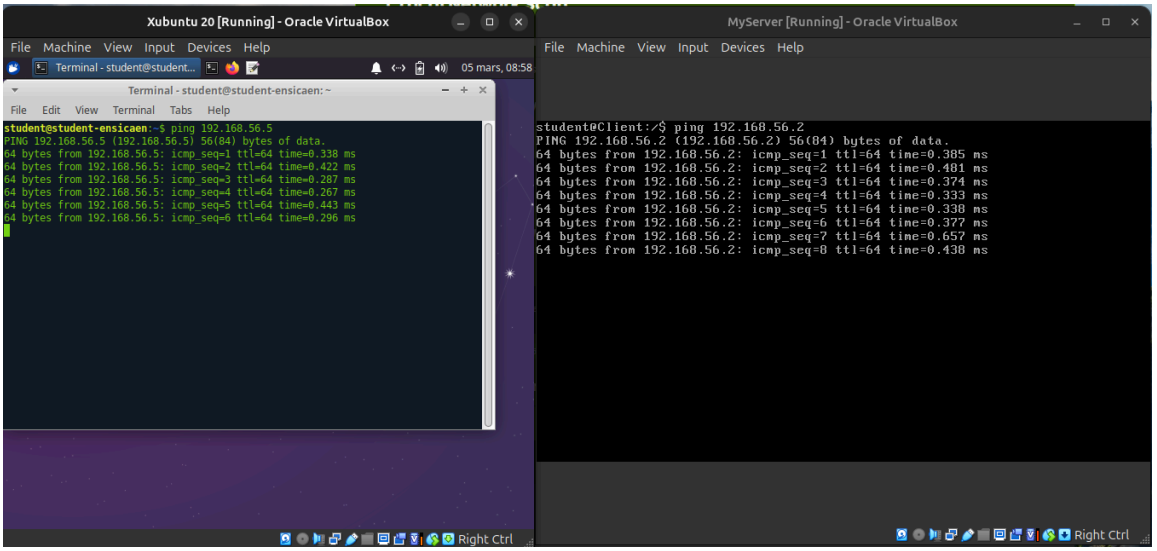
The phase of analyzing and discovering the ports of a target machine is a crucial step in the hacking process. The goal is to determine the type of service running on a machine to assess whether it is vulnerable.

Nmap (Network Mapper) is an open-source software created by Fyodor and distributed by Insecure.org. It allows scanning and detecting open ports, identifying hosted services, and obtaining information about the operating system of a remote computer.

Nmap is equipped with an NSE (Nmap Scripting Engine), which provides more powerful and flexible functionalities during the analysis phase.

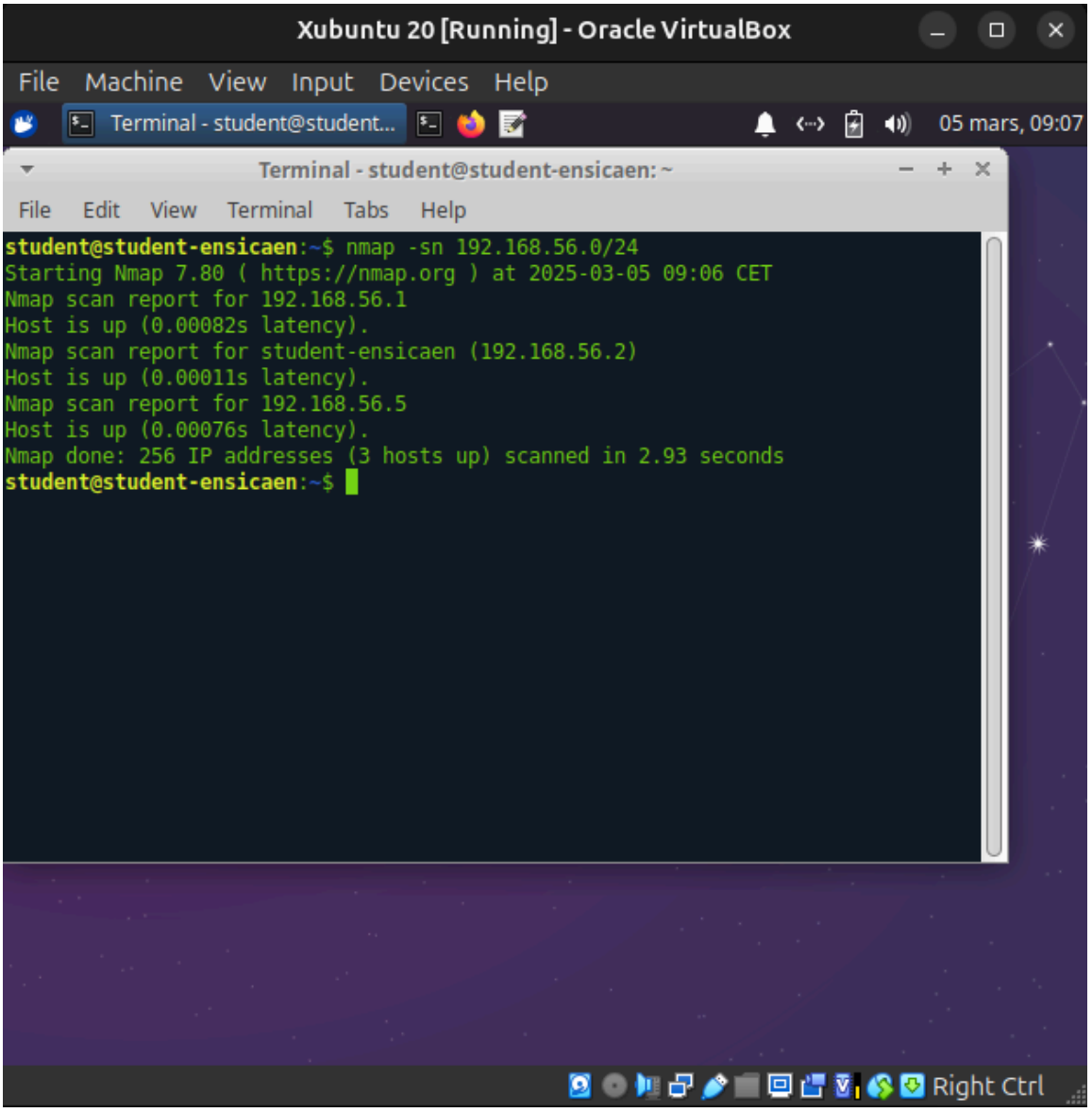
I. Local Network Scan

1. Start the two virtual machines: "Student" & "MyServer."
2. Verify connectivity between the two machines.



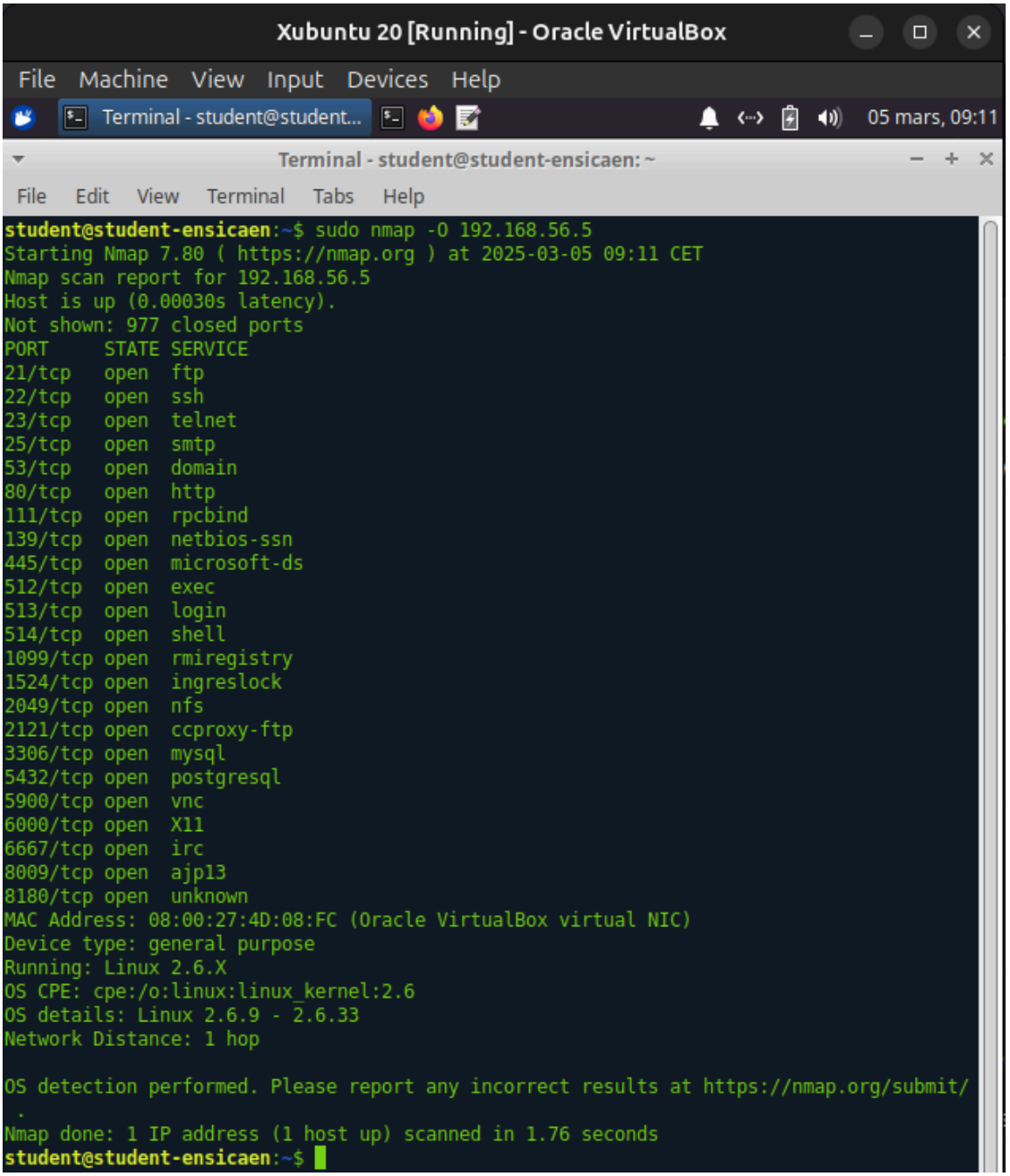
3. Run Nmap on the "Student" machine and analyze the local network to determine which machines are connected.

```
nmap -sn <Network_IP_Range>
```



4. Use Nmap to determine the operating system name of the "MyServer" machine.

```
nmap -O <MyServer_IP>
```



5. Infer the operating system version.

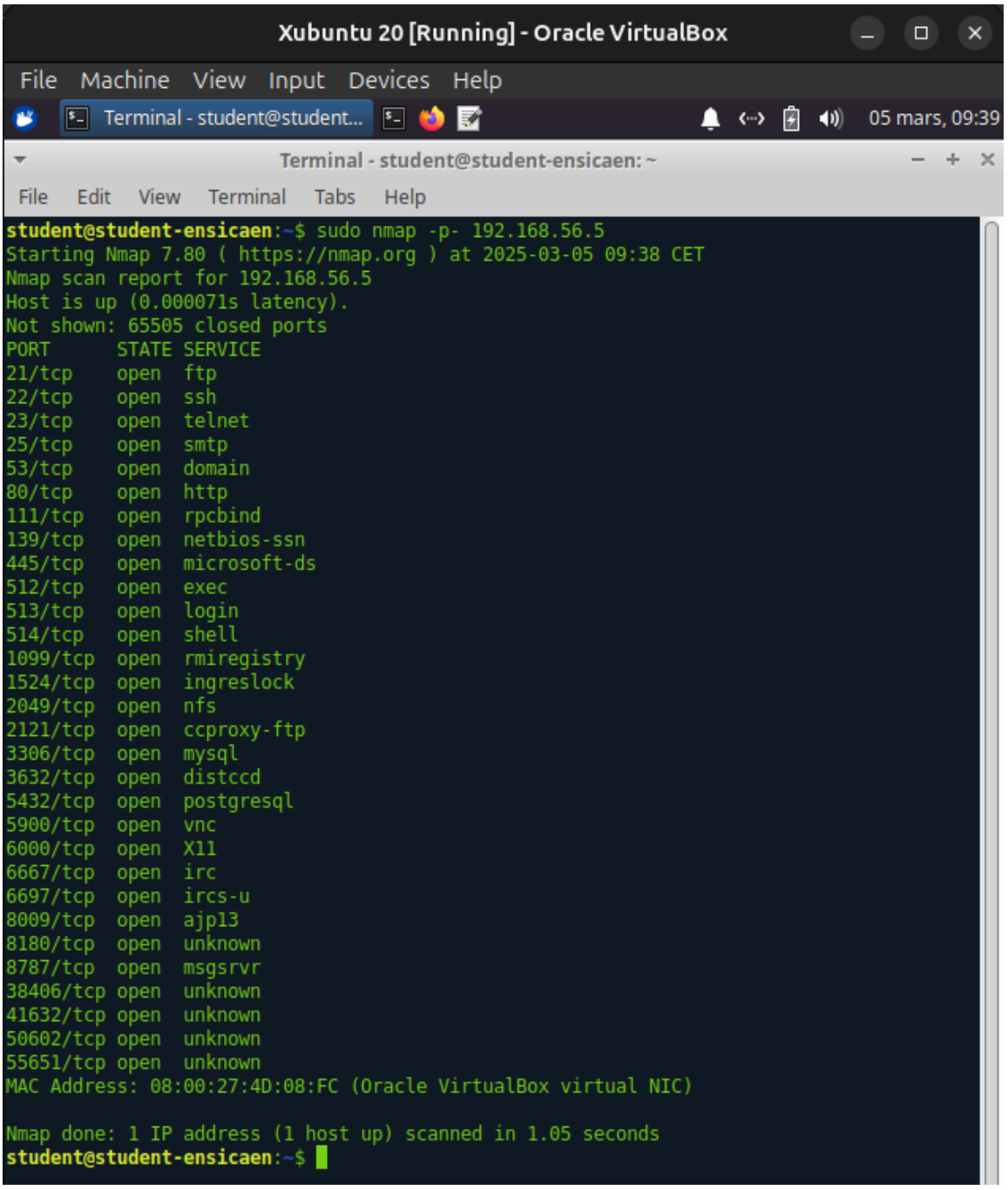
> It's a Linux-based Operating System

II. Analysis of MyServer's Ports

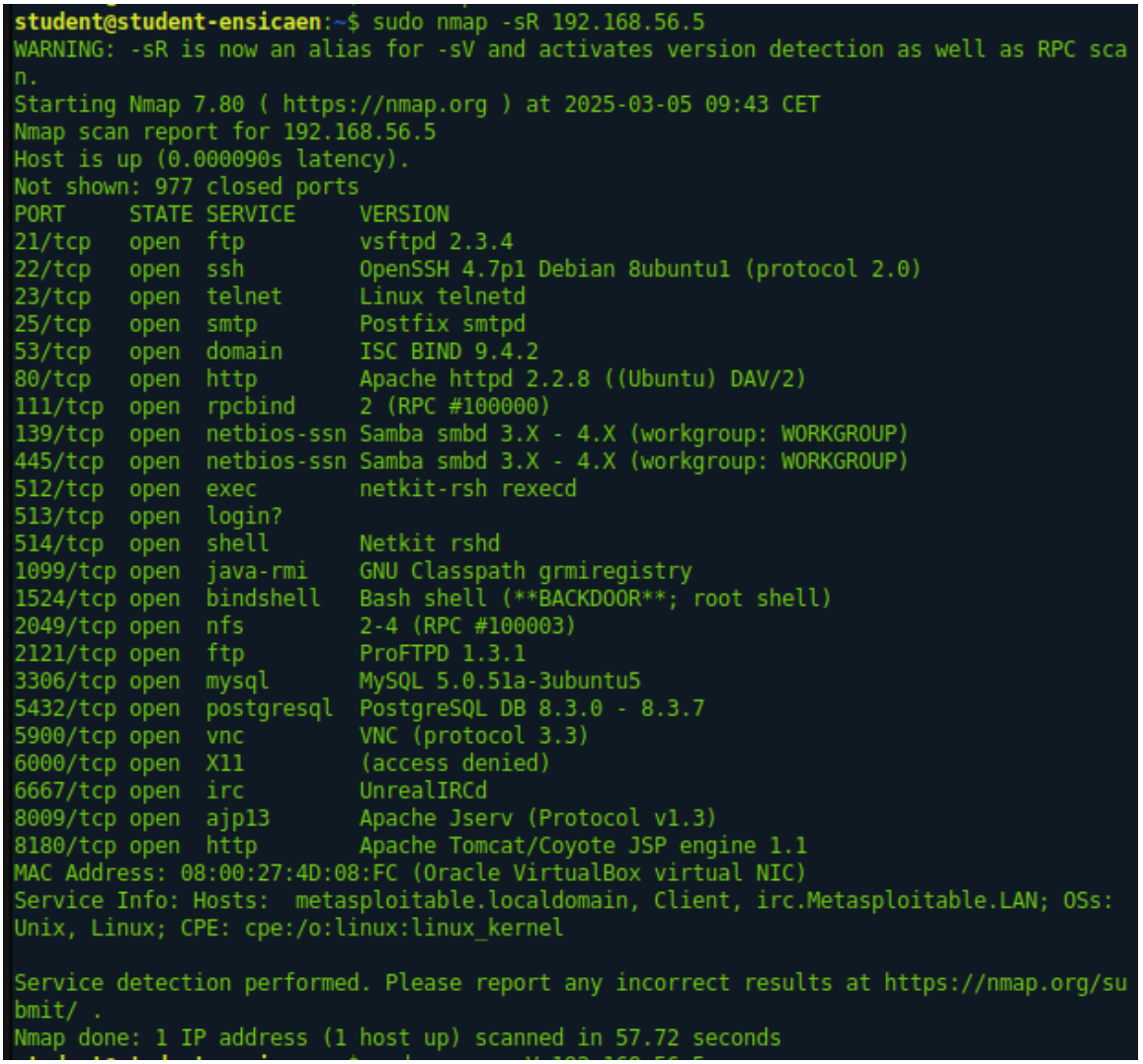
1. Use Nmap to determine all open ports on the VM.

```
nmap -p- <MyServer_IP>
```

(`-p-` scans all 65535 ports.)



2. Enumerate all services on the VM.

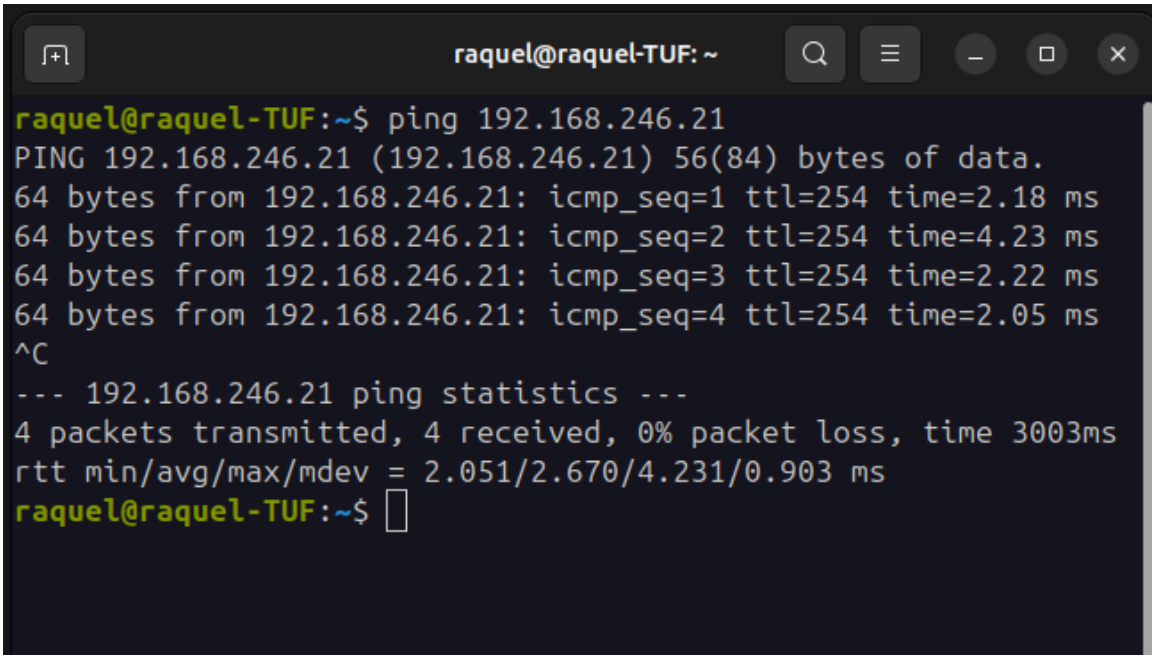


```
student@student-ensicaen:~$ sudo nmap -sR 192.168.56.5
WARNING: -sR is now an alias for -sV and activates version detection as well as RPC sca
n.
Starting Nmap 7.80 ( https://nmap.org ) at 2025-03-05 09:43 CET
Nmap scan report for 192.168.56.5
Host is up (0.000090s latency).
Not shown: 977 closed ports
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 2.3.4
22/tcp   open  ssh         OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp   open  telnet      Linux telnetd
25/tcp   open  smtp        Postfix smtpd
53/tcp   open  domain      ISC BIND 9.4.2
80/tcp   open  http        Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp  open  rpcbind     2 (RPC #100000)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp  open  exec        netkit-rsh rexecd
513/tcp  open  login?
514/tcp  open  shell       Netkit rshd
1099/tcp open  java-rmi    GNU Classpath grmiregistry
1524/tcp open  bindshell   Bash shell (**BACKDOOR**; root shell)
2049/tcp open  nfs         2-4 (RPC #100003)
2121/tcp open  ftp         ProFTPD 1.3.1
3306/tcp open  mysql       MySQL 5.0.51a-3ubuntu5
5432/tcp open  postgresql  PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp open  vnc         VNC (protocol 3.3)
6000/tcp open  X11         (access denied)
6667/tcp open  irc         UnrealIRCd
8009/tcp open  ajp13       Apache Jserv (Protocol v1.3)
8180/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
MAC Address: 08:00:27:4D:08:FC (Oracle VirtualBox virtual NIC)
Service Info: Hosts:  metasploitable.localdomain, Client, irc.Metasploitable.LAN; OSs:
Unix, Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at https://nmap.org/su
bmit/ .
Nmap done: 1 IP address (1 host up) scanned in 57.72 seconds
```

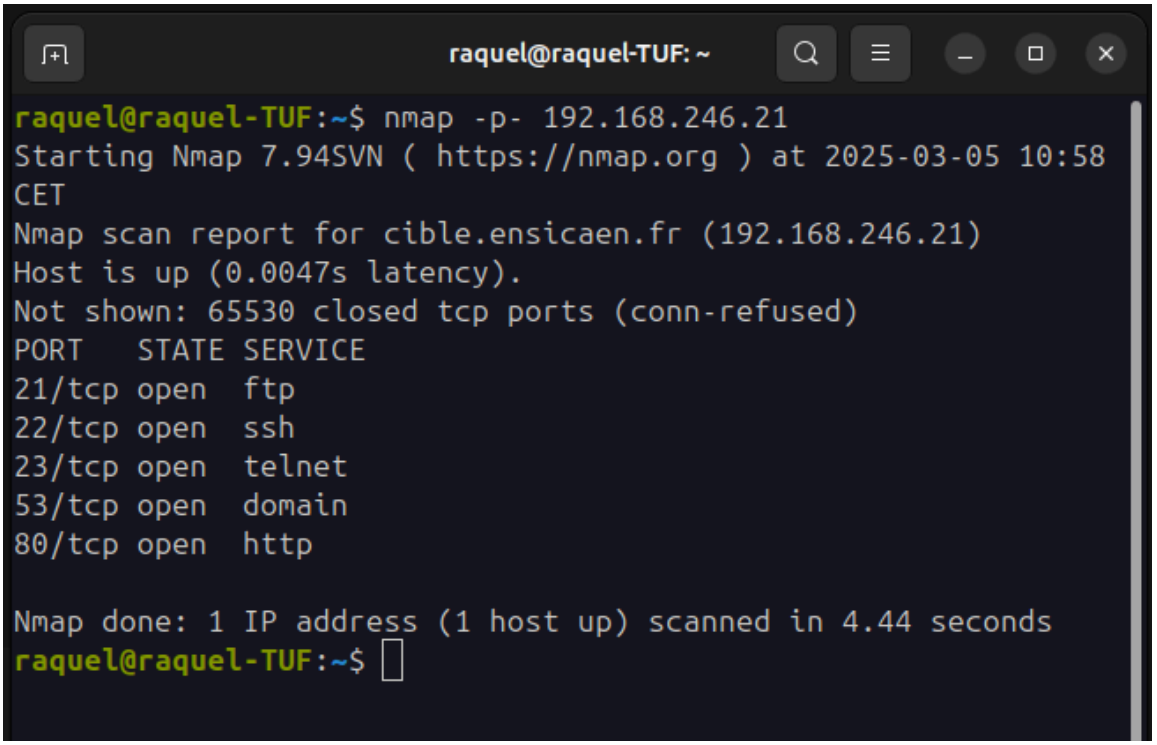
III. Analysis of a Local Network Server

1. Ensure that the local server is reachable (@IP: 192.168.246.21).

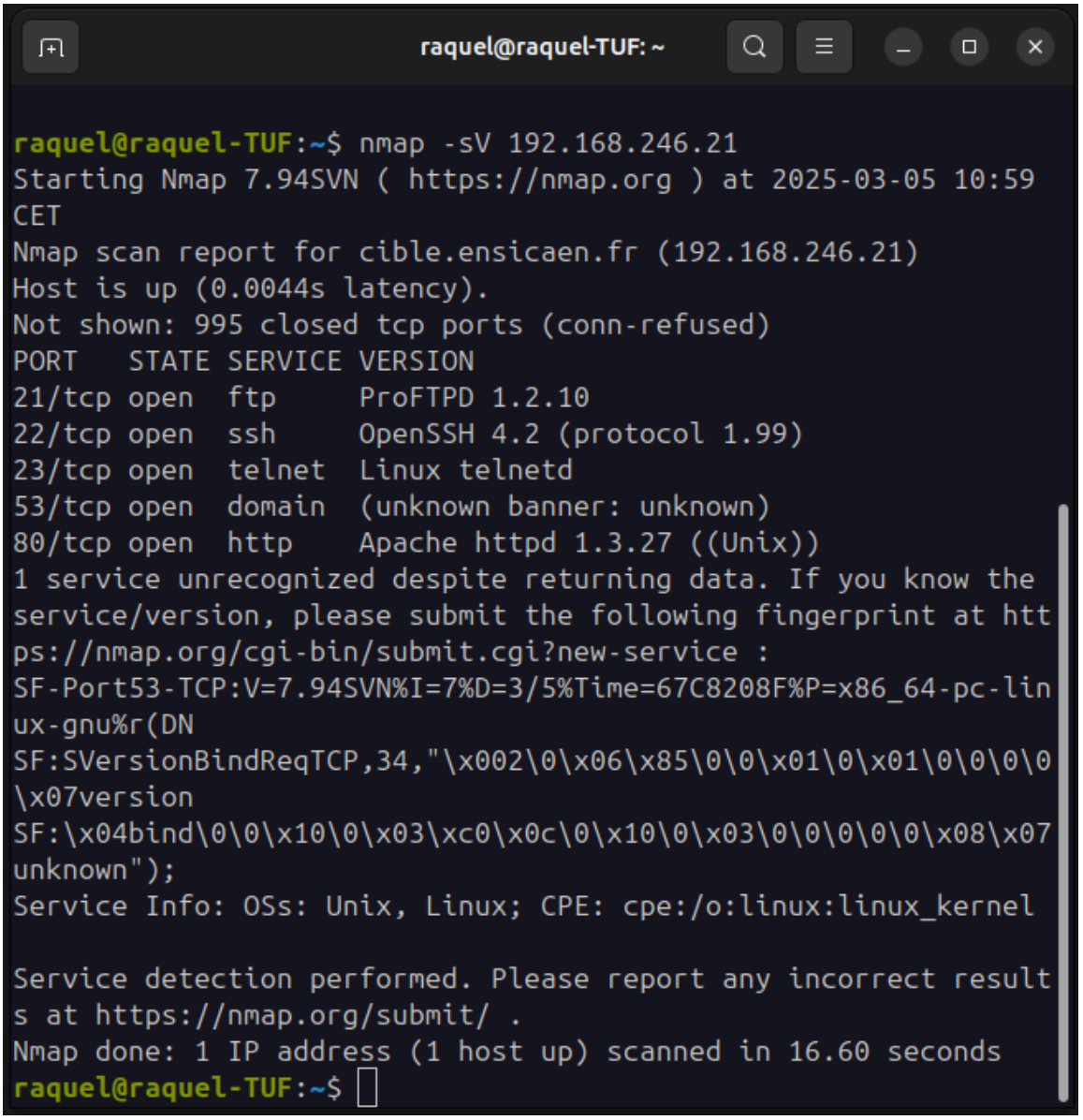
> 💡 It must be connected to the ensicaen's wifi



2. Use Nmap to determine all open ports.



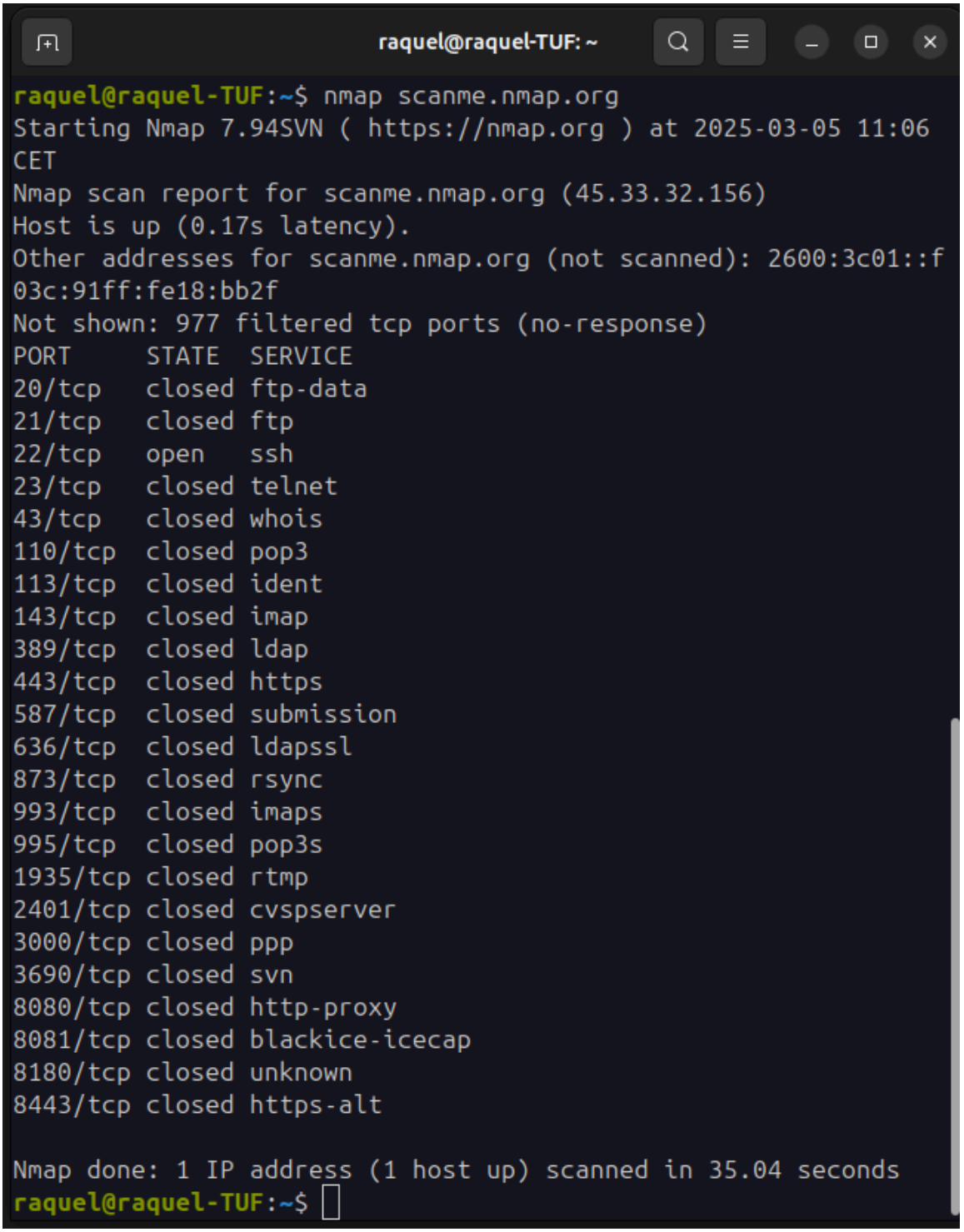
3. Enumerate the services.



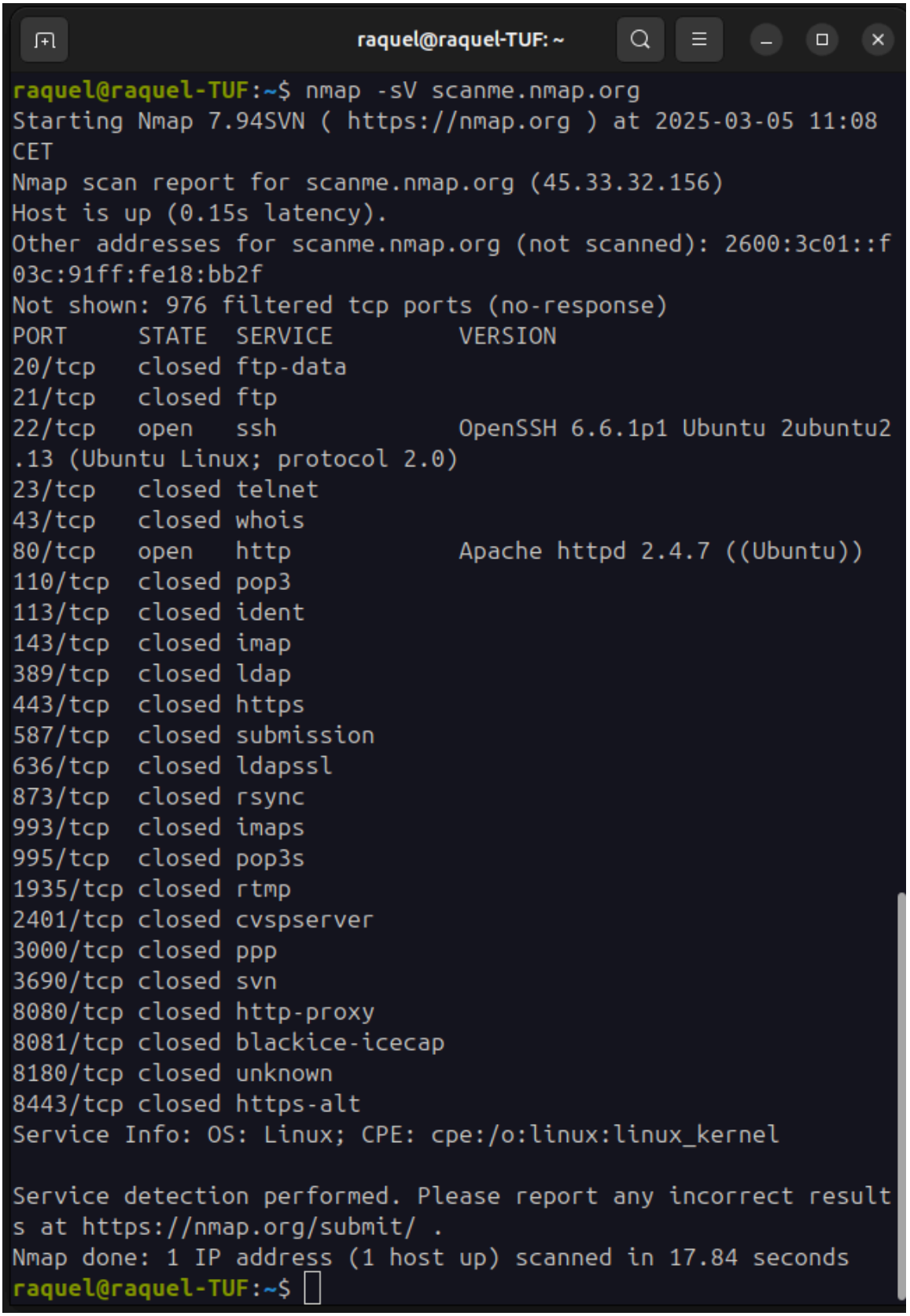
IV. Website Analysis

We want to analyze the following website: http://scanme.nmap.org

1. Determine the open ports.



2. Enumerate the active services.



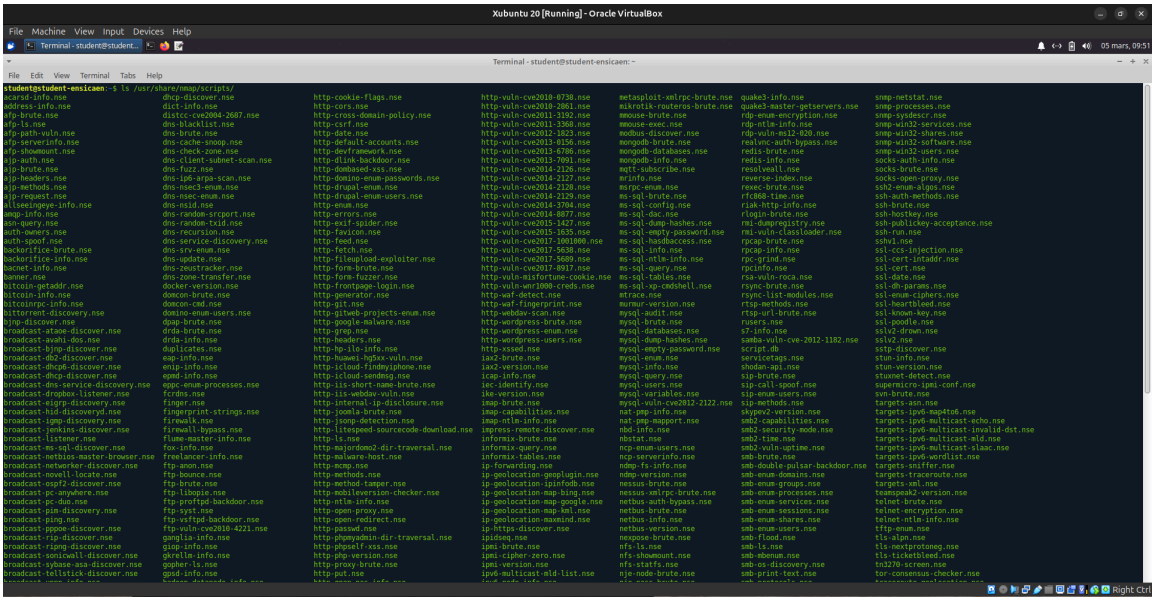
3. Identify the operating system version.

He couldn’t identify the exact one

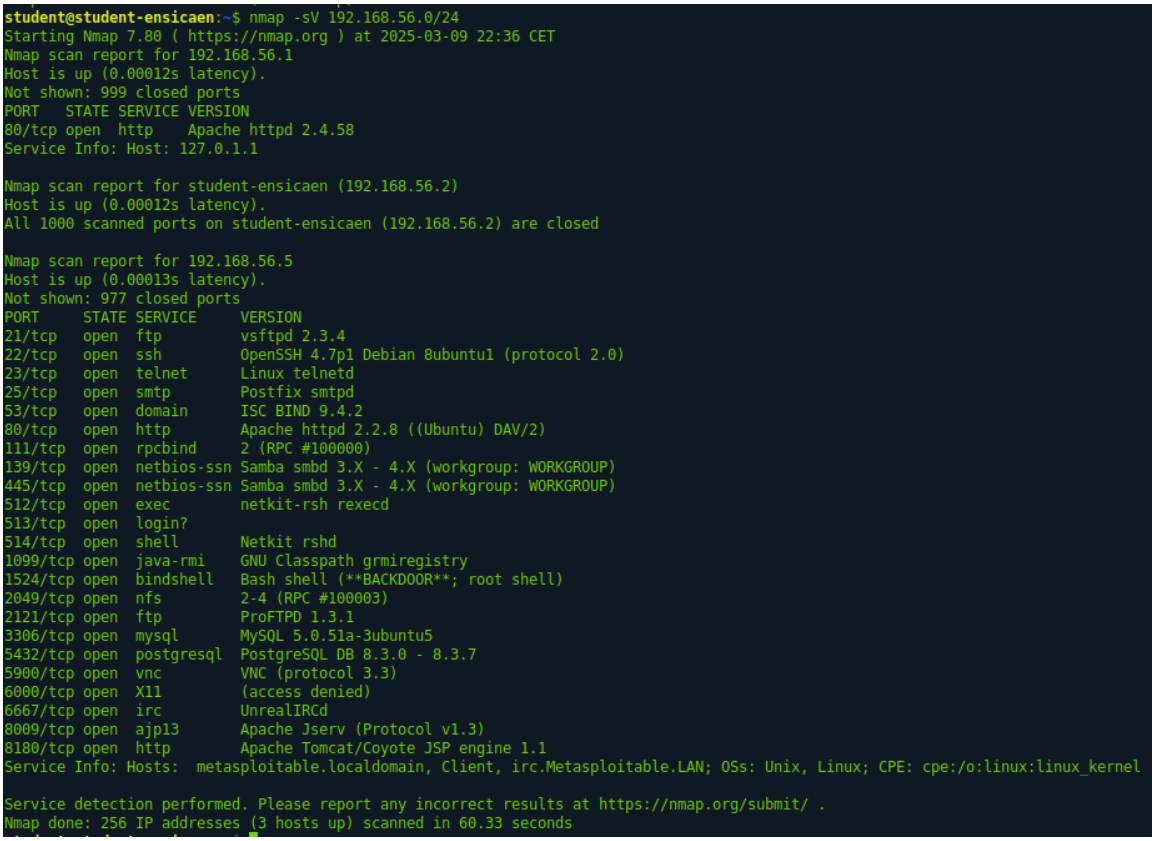
```
Device type: general purpose|firewall|storage-misc|WAP
Running (JUST GUESSING): Linux 2.6.X|3.X|4.X|2.4.X (86%), WatchGuard Fireware 11.X (86%),
Synology DiskStation Manager 5.X (85%)
OS CPE: cpe:/o:linux:linux_kernel:2.6.32 cpe:/o:linux:linux_kernel:3.10 cpe:/o:linux:linux
_kernel:4.4 cpe:/o:watchguard:fireware:11.8 cpe:/o:linux:linux_kernel cpe:/a:synology:disk
station_manager:5.1 cpe:/o:linux:linux_kernel:2.4
Aggressive OS guesses: Linux 2.6.32 (86%), Linux 2.6.32 or 3.10 (86%), Linux 2.6.39 (86%),
 Linux 3.10 - 3.12 (86%), Linux 4.4 (86%), WatchGuard Fireware 11.8 (86%), Synology DiskSt
ation Manager 5.1 (85%), Linux 2.6.35 (85%), Linux 4.9 (85%), Linux 3.4 (85%)
No exact OS matches for host (test conditions non-ideal).
```

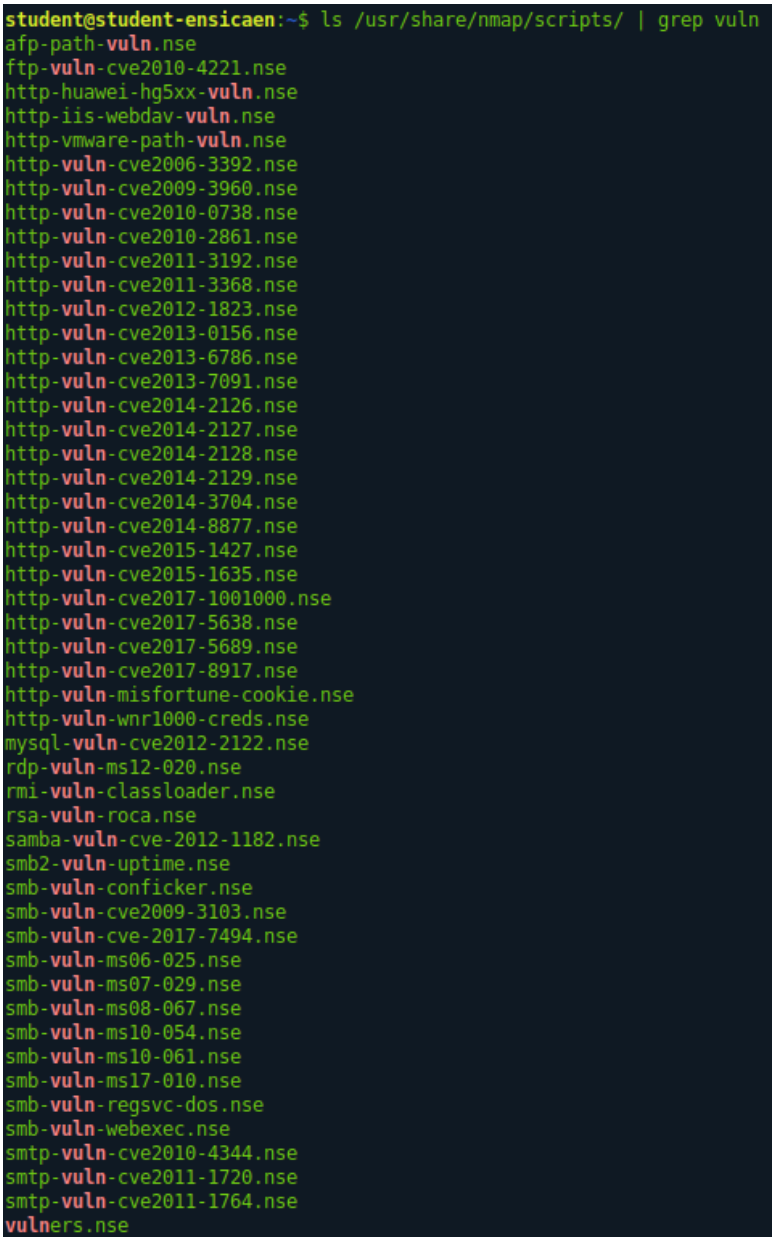
V. Nmap Scripting Engine

1. Display all available NSE scripts for Nmap in `/usr/share/nmap/scripts/`.



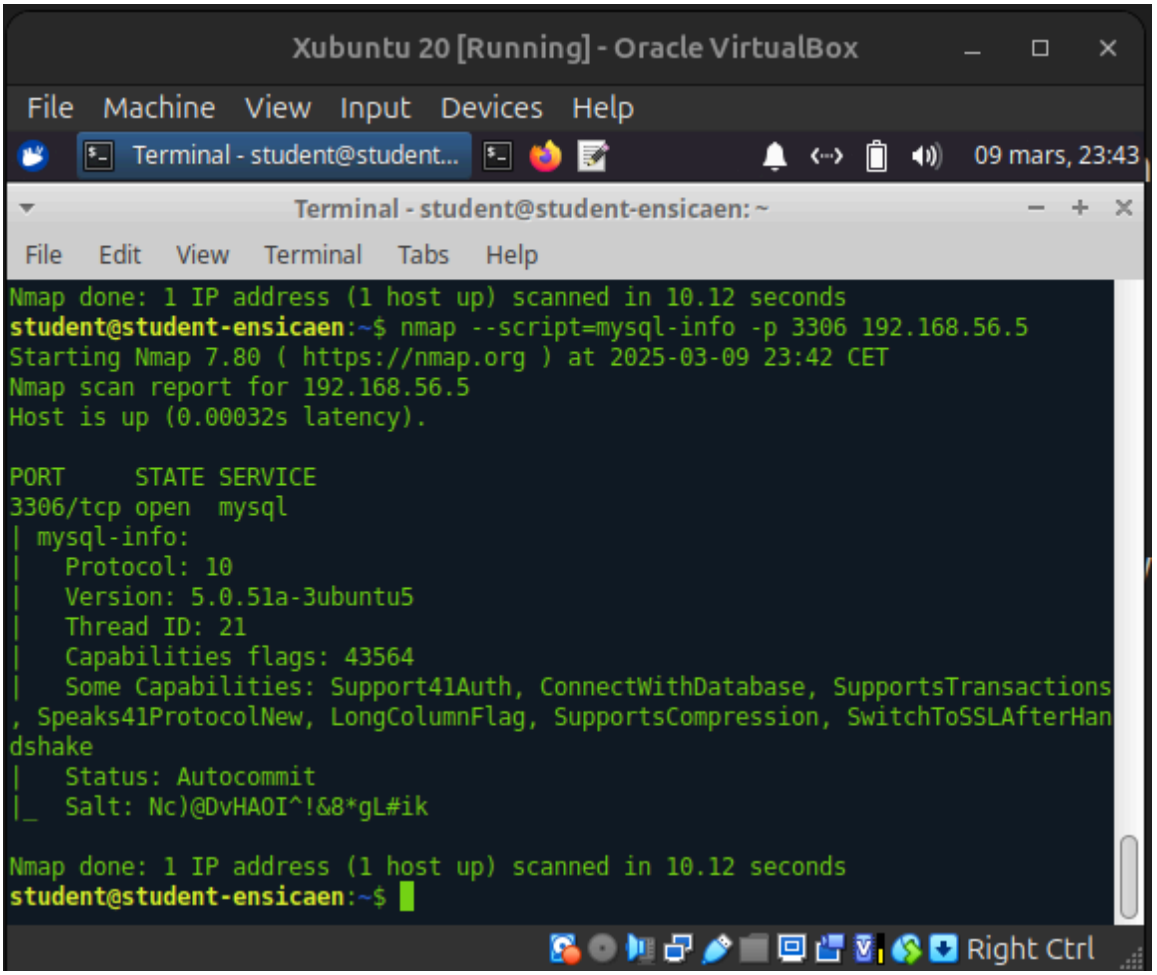
2. Search for and apply a suitable NSE script for the discovered services. You are required to analyze three services using NSE scripts on the "Client" machine.
    - Example: To use an NSE script: `nmap --script script_name -p port_number @IP`

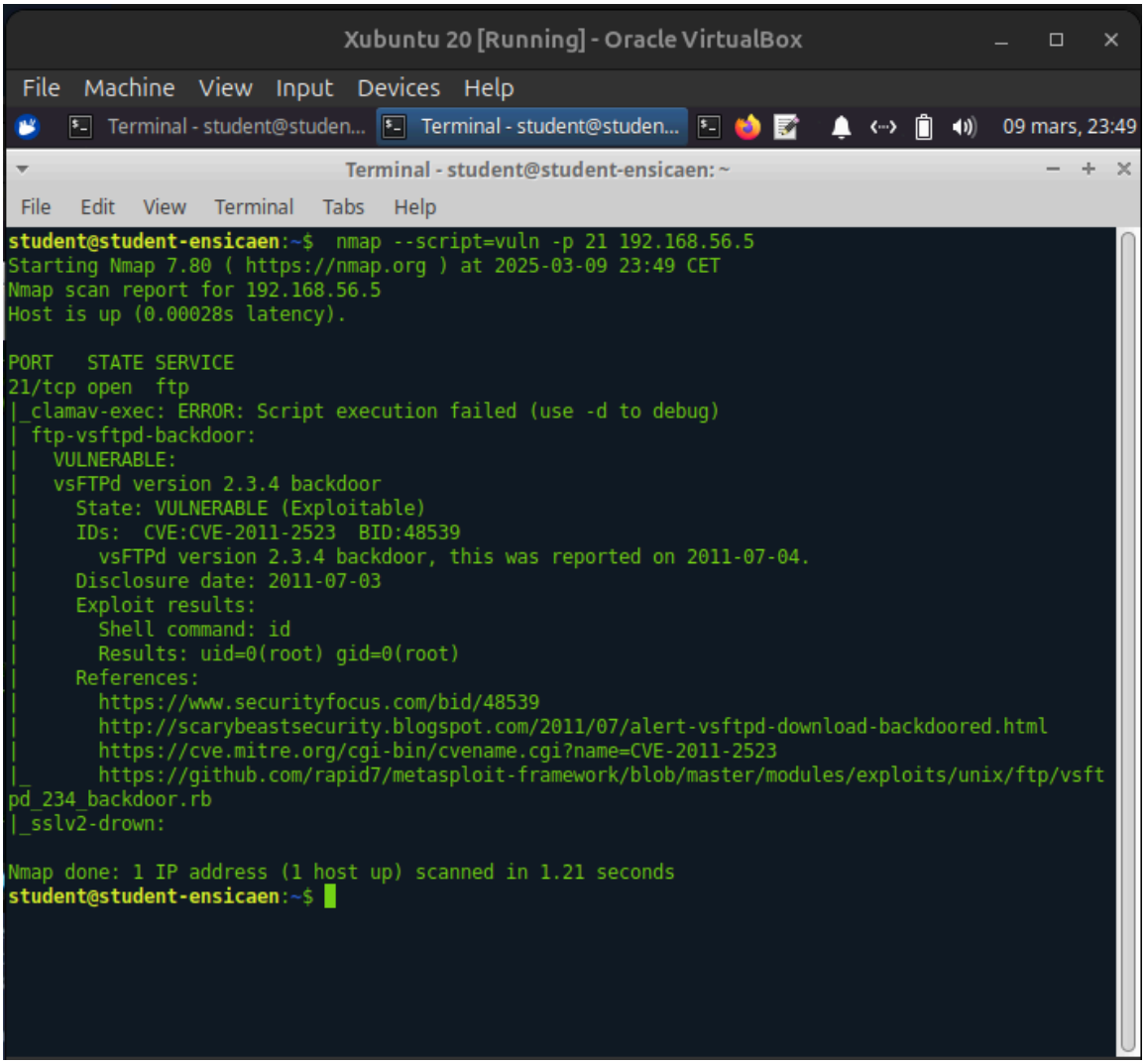

student@student-ensicaen:~$ nmap -sV 192.168.56.0/24
Starting Nmap 7.80 (https://nmap.org) at 2025-03-09 22:36 CET
Nmap scan report for 192.168.56.1
Host is up (0.00012s latency).
Not shown: 999 closed ports
PORT STATE SERVICE VERSION
80/tcp open http Apache httpd 2.4.58
Service Info: Host: 127.0.1.1
Nmap scan report for student-ensicaen (192.168.56.2)
Host is up (0.00012s latency).
All 1000 scanned ports on student-ensicaen (192.168.56.2) are closed
Nmap scan report for 192.168.56.5
Host is up (0.00013s latency).
Not shown: 977 closed ports
PORT STATE SERVICE VERSION
21/tcp open ftp vsftpd 2.3.4
22/tcp open ssh OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp open telnet Linux telnetd
25/tcp open smtp Postfix smtpd
53/tcp open domain ISC BIND 9.4.2
80/tcp open http Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp open rpcbind 2 (RPC #100000)
139/tcp open netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp open netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp open exec netkit-rsh rexecd
513/tcp open login?
514/tcp open shell Netkit rshd
1099/tcp open java-rmi GNU Classpath grmiregistry
1524/tcp open bindshell Bash shell (**BACKDOOR**; root shell)
2049/tcp open nfs 2-4 (RPC #100003)
2121/tcp open ftp ProFTPD 1.3.1
3306/tcp open mysql MySQL 5.0.51a-3ubuntu5
5432/tcp open postgresql PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp open vnc VNC (protocol 3.3)
6000/tcp open X11 (access denied)
6667/tcp open irc UnrealIRCd
8009/tcp open ajp13 Apache Jserv (Protocol v1.3)
8180/tcp open http Apache Tomcat/Coyote JSP engine 1.1
Service Info: Hosts: metasploitable.localdomain, Client, irc.Metasploitable.LAN; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel
Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 256 IP addresses (3 hosts up) scanned in 60.33 seconds


student@student-ensicaen:~$ ls /usr/share/nmap/scripts/ | grep vuln
afp-path-vuln.nse
ftp-vuln-cve2010-4221.nse
http-huawei-hg5xx-vuln.nse
http-iis-webdav-vuln.nse
http-vmware-path-vuln.nse
http-vuln-cve2006-3392.nse
http-vuln-cve2009-3960.nse
http-vuln-cve2010-0738.nse
http-vuln-cve2010-2861.nse
http-vuln-cve2011-3192.nse
http-vuln-cve2011-3368.nse
http-vuln-cve2012-1823.nse
http-vuln-cve2013-0156.nse
http-vuln-cve2013-6786.nse
http-vuln-cve2013-7091.nse
http-vuln-cve2014-2126.nse
http-vuln-cve2014-2127.nse
http-vuln-cve2014-2128.nse
http-vuln-cve2014-2129.nse
http-vuln-cve2014-3704.nse
http-vuln-cve2014-8877.nse
http-vuln-cve2015-1427.nse
http-vuln-cve2015-1635.nse
http-vuln-cve2017-1001000.nse
http-vuln-cve2017-5638.nse
http-vuln-cve2017-5689.nse
http-vuln-cve2017-8917.nse
http-vuln-misfortune-cookie.nse
http-vuln-wnr1000-creds.nse
mysql-vuln-cve2012-2122.nse
rdp-vuln-ms12-020.nse
rmi-vuln-classloader.nse
rsa-vuln-roca.nse
samba-vuln-cve-2012-1182.nse
smb2-vuln-uptime.nse
smb-vuln-conficker.nse
smb-vuln-cve2009-3103.nse
smb-vuln-cve-2017-7494.nse
smb-vuln-ms06-025.nse
smb-vuln-ms07-029.nse
smb-vuln-ms08-067.nse
smb-vuln-ms10-054.nse
smb-vuln-ms10-061.nse
smb-vuln-ms17-010.nse
smb-vuln-regsvc-dos.nse
smb-vuln-webexec.nse
smtp-vuln-cve2010-4344.nse
smtp-vuln-cve2011-1720.nse
smtp-vuln-cve2011-1764.nse
vulners.nse

```
student@student-ensicaen:~$ ls /usr/share/nmap/scripts/ | grep mysql
mysql-audit.nse
mysql-brute.nse
mysql-databases.nse
mysql-dump-hashes.nse
mysql-empty-password.nse
mysql-enum.nse
mysql-info.nse
mysql-query.nse
mysql-users.nse
mysql-variables.nse
mysql-vuln-cve2012-2122.nse
student@student-ensicaen:~$ ls /usr/share/nmap/scripts/ | grep ftp
ftp-anon.nse
ftp-bounce.nse
ftp-brute.nse
ftp-libopie.nse
ftp-proftpd-backdoor.nse
ftp-syst.nse
ftp-vsftpd-backdoor.nse
ftp-vuln-cve2010-4221.nse
tftp-enum.nse
student@student-ensicaen:~$ ls /usr/share/nmap/scripts/ | grep http
http-adobe-coldfusion-apsa1301.nse
http-affiliate-id.nse
http-apache-negotiation.nse
http-apache-server-status.nse
http-aspnet-debug.nse
http-auth-finder.nse
http-auth.nse
http-avaya-ipoffice-users.nse
http-awstatstotals-exec.nse
http-axis2-dir-traversal.nse
http-backup-finder.nse
http-barracuda-dir-traversal.nse
http-bigip-cookie.nse
http-brute.nse
http-cakephp-version.nse
http-chrono.nse
http-cisco-anyconnect.nse
http-coldfusion-subzero.nse
http-comments-displayer.nse
http-config-backup.nse
http-cookie-flags.nse
http-cors.nse
http-cross-domain-policy.nse
http-csrf.nse
http-date.nse
http-default-accounts.nse
http-devframework.nse
http-dlink-backdoor.nse
http-dombased-xss.nse
http-domino-enum-passwords.nse
http-drupal-enum.nse
http-drupal-enum-users.nse
```

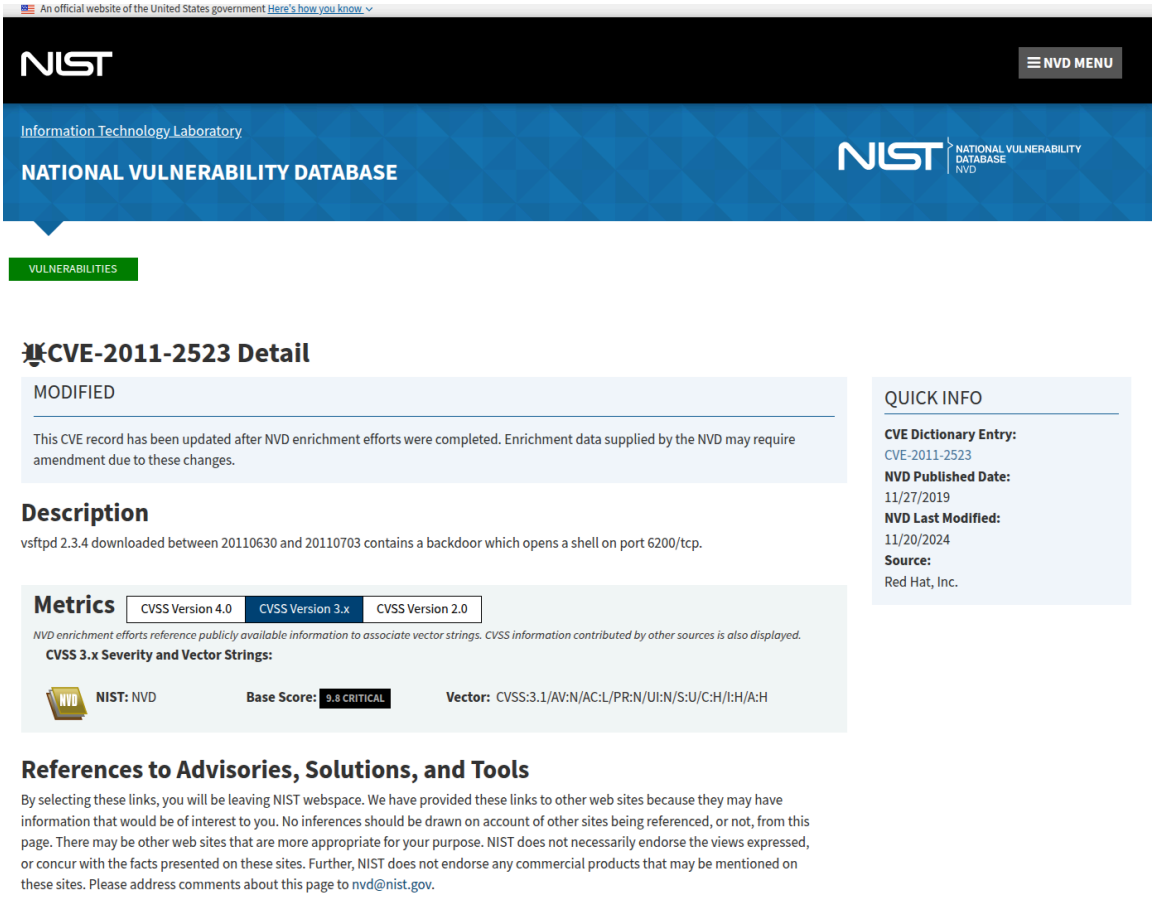
```
student@student-ensicaen:~$ nmap --script=http-title -p 80 192.168.56.5
Starting Nmap 7.80 ( https://nmap.org ) at 2025-03-09 23:51 CET
Nmap scan report for 192.168.56.5
Host is up (0.00024s latency).

PORT   STATE SERVICE
80/tcp open  http
|_http-title: Metasploitable2 - Linux

Nmap done: 1 IP address (1 host up) scanned in 0.19 seconds
student@student-ensicaen:~$
```


Xubuntu 20 [Running] - Oracle VirtualBox
File Machine View Input Devices Help
Terminal - student@student...
09 mars, 23:43
Terminal - student@student-ensicaen: ~
File Edit View Terminal Tabs Help
Nmap done: 1 IP address (1 host up) scanned in 10.12 seconds
student@student-ensicaen:~$ nmap --script=mysql-info -p 3306 192.168.56.5
Starting Nmap 7.80 (https://nmap.org) at 2025-03-09 23:42 CET
Nmap scan report for 192.168.56.5
Host is up (0.00032s latency).
PORT STATE SERVICE
3306/tcp open mysql
| mysql-info:
| Protocol: 10
| Version: 5.0.51a-3ubuntu5
| Thread ID: 21
| Capabilities flags: 43564
| Some Capabilities: Support41Auth, ConnectWithDatabase, SupportsTransactions
, Speaks41ProtocolNew, LongColumnFlag, SupportsCompression, SwitchToSSLAfterHan
dshake
| Status: Autocommit
|_ Salt: Nc)@DvHAOI^!&8*gL#ik
Nmap done: 1 IP address (1 host up) scanned in 10.12 seconds
student@student-ensicaen:~$
Right Ctrl



VI. Research on Service Vulnerabilities

1. Use a public vulnerability research site, as seen in the course, to find vulnerabilities in three services identified during the scan.



2. Determine the CVSS (Common Vulnerability Scoring System) score and the impact of exploiting the vulnerability.