GoodSecurity Penetration Test Report

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1.0 High-Level Summary

GoodSecurity was tasked with performing an internal penetration test on GoodCorp's CEO, Hans Gruber. An internal penetration test is a dedicated attack against internally connected systems. The focus of this test is to perform attacks, similar to those of a hacker and attempt to infiltrate Hans' computer and determine if it is at risk. GoodSecurity's overall objective was to exploit any vulnerable software and find the secret recipe file on Hans' computer, while reporting the findings back to GoodCorp.

When performing the internal penetration test, there were several alarming vulnerabilities that were identified on Hans' desktop. When performing the attacks, GoodSecurity was able to gain access to his machine and find the secret recipe file by exploit two programs that had major vulnerabilities. The details of the attack can be found in the 'Findings' category.

2.0 Findings

Machine IP:

The `nmap` scan determined the IP address of Hans' machine is `192.168.0.20`.

Hostname:

The `nmap` scan determined the hostname of Hans' machine is `MSEDGEWIN10`.

Vulnerability Exploited:

The name of the vulnerability that was used is Icecast Header Overwrite and is detailed by CVE-2004-1561. The Metasploit module used to exploit the vulnerability is `exploit/windows/http/icecast_header`.

Vulnerability Explanation:

The vulnerability is a buffer-overflow attack that can be found in Icecast versions 2.0.1 and earlier. If an attacker sends 32 HTTP headers to the Icecast server, it causes a "write one past the end of a pointer array." The technical details of how this works are outside of the scope of this document, but this "write one past the end" will overwrite the saved instruction pointer on Windows machines. This allows an attacker to execute arbitrary code on the target machine. The exploit is less well-defined on Linux machines.

Severity:

This exploit is assigned a Common Vulnerability Scoring System ("CVSS") score of **7.5**, indicating high severity. Since the exploit allows for arbitrary code execution, it is the opinion of this reporter that the vulnerability is quite severe. This attacker was able to access the supposedly "secret" files on the target machine, enumerate all logged on users, and retrieve the plaintext password for the machine's Administrator account, which this reporter was advised was "long and complex and therefore unhackable."

Proof of Concept:

First, GoodSecurity needed to determine the IP address of Hans' computer. In order to determine Hans' IP address, we must ascertain what subnet the computers are connected to. From the attacker's machine, we ran the `ifconfig` command, which yields the following results:

```
root@kali:~# ifconfig
eth0: flags=4163<UP,BROADCAST,RUNNING,MULTICAST>  mtu 1500
        inet 192.168.0.8  netmask 255.255.255.0  broadcast 192.168.0.255
        inet6 fe80::215:5dff:fe00:400  prefixlen 64  scopeid 0x20<link>
        ether 00:15:5d:00:04:00  txqueuelen 1000  (Ethernet)
        RX packets 141  bytes 14576 (14.2 KiB)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 28  bytes 2052 (2.0 KiB)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
```

The results of the command indicate the attacker machine has the IP address `192.168.0.8`, and a subnet mask of `255.255.255.0`, which means the computers are connected to the subnet described by the CIDR notation `192.168.0.0/24`.

With the network IP determined, we now run an `nmap` command to discover computers connected to the network, as well as the services and versions thereof running on those machines. To accomplish this, we run the following command (from the attacker kali machine):

```
nmap -sV 192.168.0.0/24
```

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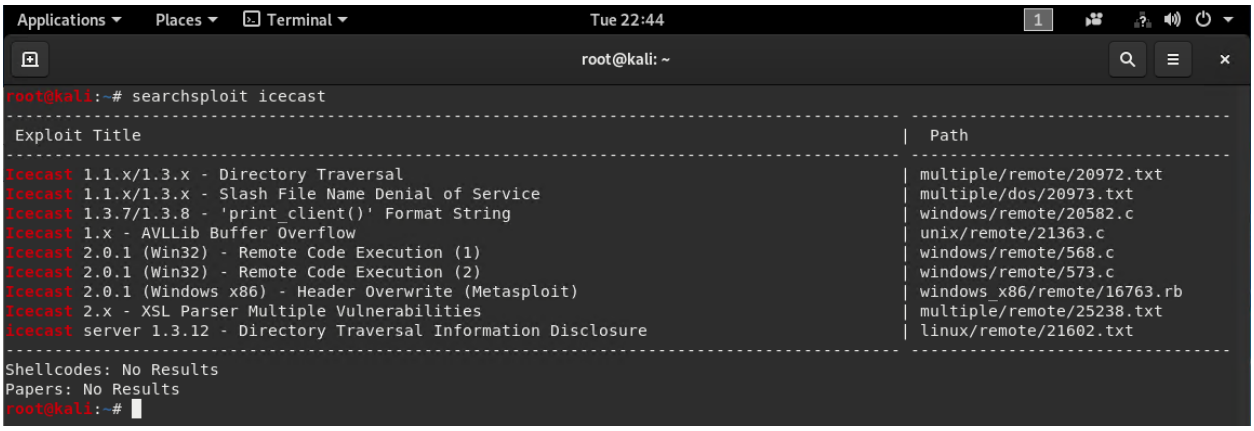
The entire output of the above command is outside of the scope of this report, but the relevant output (i.e., that which relates to Hans' computer) is as follows:

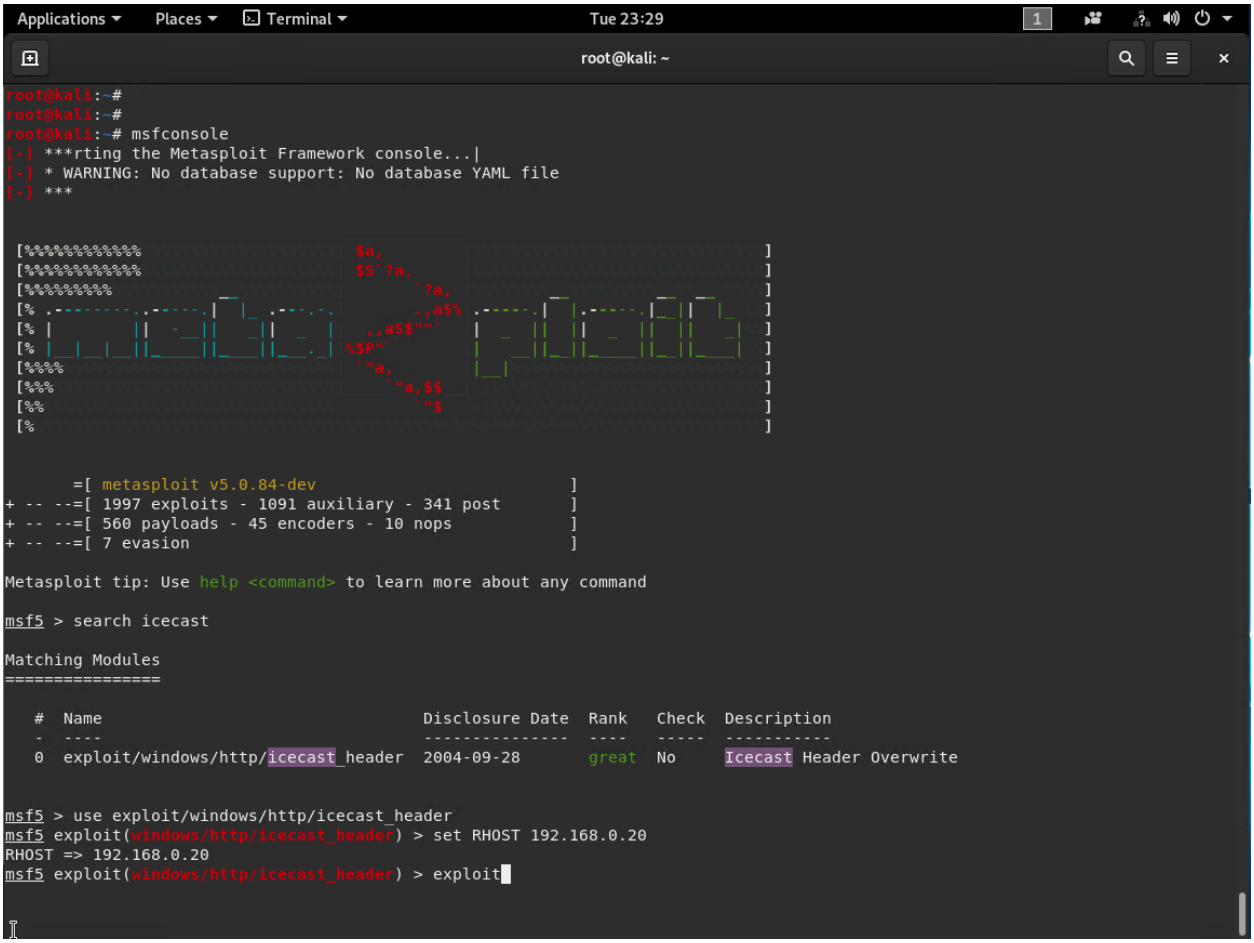
```
Nmap scan report for 192.168.0.20
Host is up (0.00097s latency).
Not shown: 994 closed ports
PORT     STATE SERVICE       VERSION
25/tcp   open  smtp          SLmail smtpd 5.5.0.4433
135/tcp  open  msrpc         Microsoft Windows RPC
139/tcp  open  netbios-ssn   Microsoft Windows netbios-ssn
445/tcp  open  microsoft-ds?
3389/tcp open  ms-wbt-server Microsoft Terminal Services
8000/tcp open  http          Icecast streaming media server
MAC Address: 00:15:5D:00:04:01 (Microsoft)
Service Info: Host: MSEDGEWIN10; OS: Windows; CPE: cpe:/o:microsoft:windows
```

A service and version scan indicated Hans' machine is running the Icecast streaming media server, which represents a potential vulnerability. We then used the `searchsploit` command to search the exploit database ("exploitdb") to find any potential exploits related to Icecast:

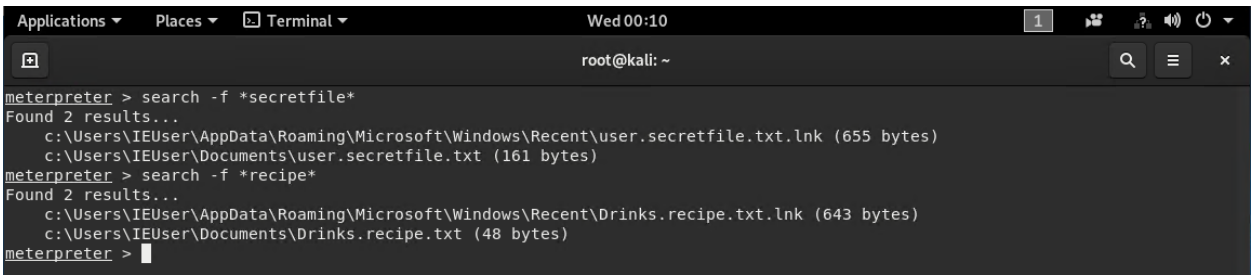


The search yielded one interesting result, `Icecast 2.0.1 (Windows x86) - Header Overwrite (Metasploit)`, which is a Metasploit module that can be used to run the actual exploit. From here, we enter the Metasploit console ("`msf`"). We then search for the module we found using `searchsploit`, load it into the Metasploit framework, and configure it to attack Hans' computer at the IP address

discovered by nmap.



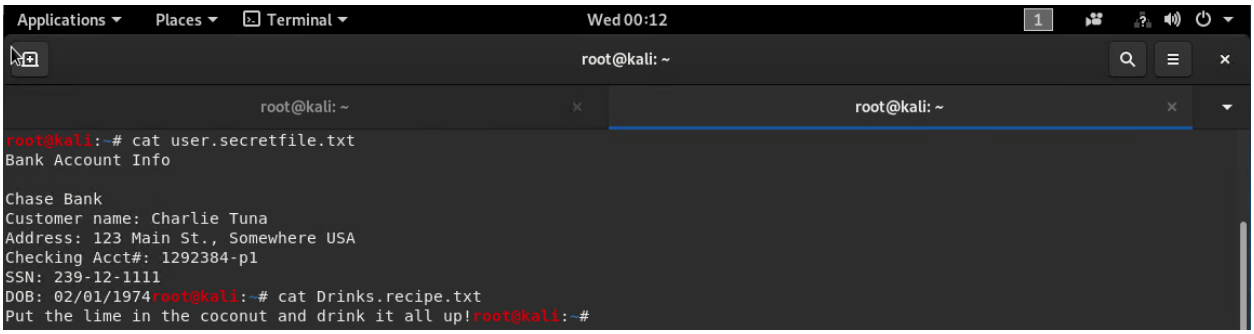
After configuration, we run `exploit` to run the actual exploit and open a `meterpreter` shell. Once in `meterpreter`, we can search for files on the target system using the `search` command.



The search yielded two results: a file called `user.secretfile.txt`, and a file called `Drinks.recipe.txt`. As these are the files we have been tasked with finding, we now exfiltrate these

files to our local machine using the `download` command.

Once the files are on our local machine, we can view their contents with a simple `cat` command.



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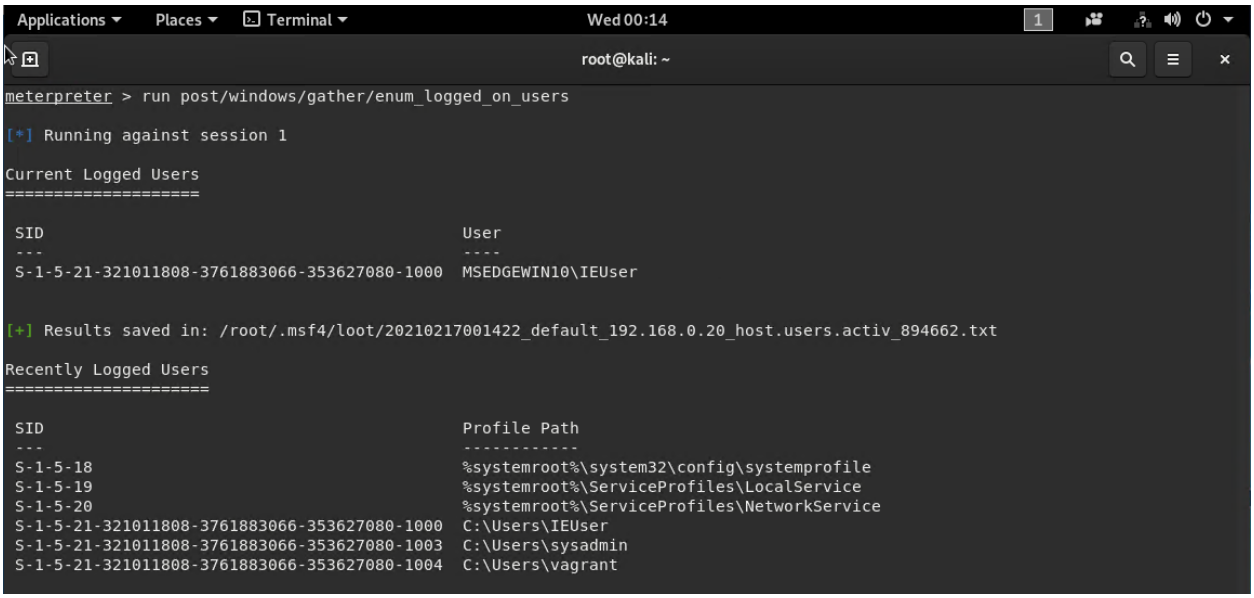
Since we have a `meterpreter` reverse-shell set up, we can further explore the target machine with a few simple commands. First, to enumerate all logged on users on the target system, we run the `meterpreter` post-exploit script `post/windows/gather/enum_logged_on_users`.



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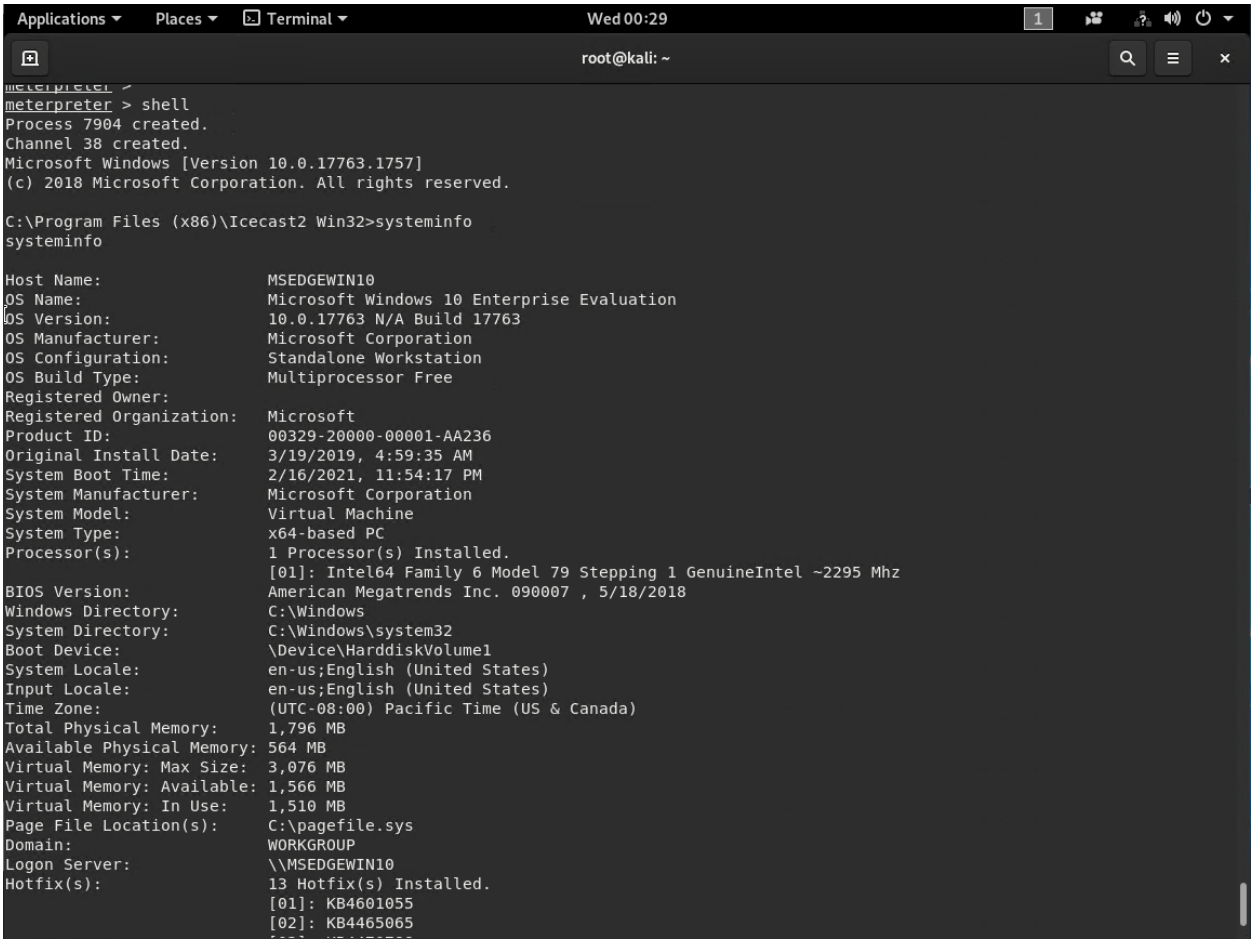
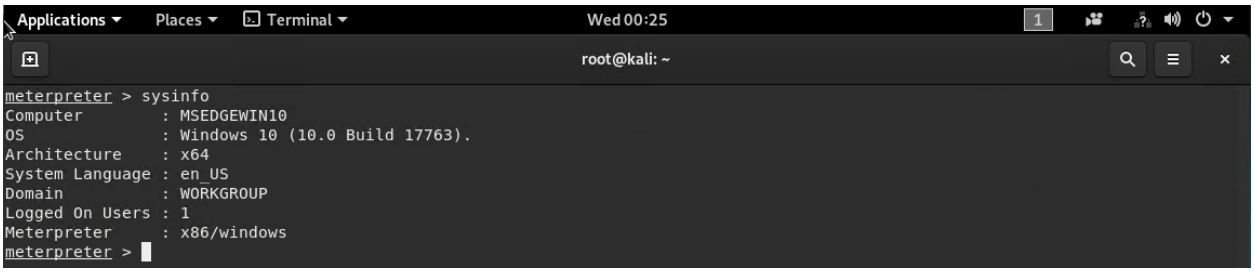
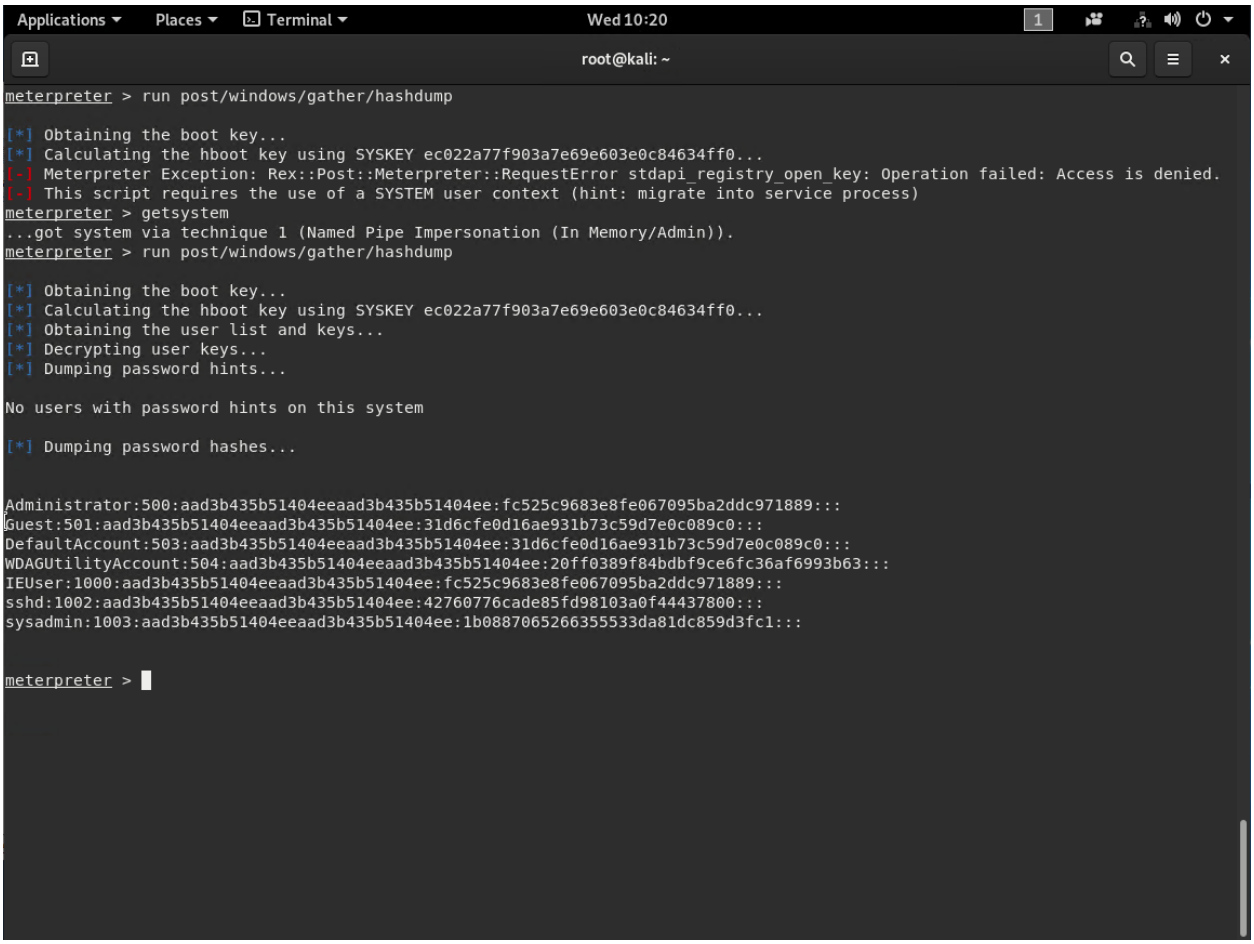
We can then drop into a normal Windows CMD prompt and gather system information about the target machine using the `systeminfo` command.



Additionally, `meterpreter` provides a `sysinfo` command to gather more basic information about the system.



We can now attempt to determine the plaintext passwords for users on the target system. In order to achieve this, we must first dump the password hashes to a file, using the `post/windows/gather/hashdump` script, provided by `meterpreter`. After running this script, we receive an error: “This script requires the use of a SYSTEM user context”, indicating we need to escalate privileges. To do this in `meterpreter`, we first use the `priv` extension, and then run the `getsystem` command. After privilege escalation, we can successfully run the `post/windows/gather/hashdump` script, and password hashes are dumped to the screen.



We then copy these password hashes and save them to a file (`/root/windows-hashes.txt`) on the attacker machine.

Once we have the password hashes on our attacker machine, we can use the program John the Ripper to crack the hashes and output plaintext passwords. `john` requires a non-standard argument to crack these passwords: `--format=NT`. This tells `john` that these password hashes are from a Windows machine. Additionally, we use the wordlist `rockyou.txt`, as it contains more common passwords than the standard wordlist used by `john`. After running the program, john tells us the plaintext password for the `Administrator` account is `Passw0rd!`.

```
root@kali:~# john --format=NT --wordlist=/usr/share/wordlists/rockyou.txt /root/windows-hashes.txt
Using default input encoding: UTF-8
Loaded 5 password hashes with no different salts (NT [MD4 256/256 AVX2 8x3])
Press 'q' or Ctrl-C to abort, almost any other key for status
                 (Guest)
Passw0rd!        (Administrator)
2g 0:00:00:01 DONE (2021-02-17 00:45) 1.587g/s 11383Kp/s 11383Kc/s 34378KC/s  _ 09..*7¡Vamos!
Warning: passwords printed above might not be all those cracked
Use the "--show --format=NT" options to display all of the cracked passwords reliably
Session completed
```

3.0 Recommendations

To fix this vulnerability, GoodSecurity recommends that Hans' update Icecast to the most recent version. Icecast's latest release is version 2.4.4, and Hans is running either version 2.0.0 or version 2.0.1. Furthermore, GoodSecurity recommends that Hans stay diligent about keeping his software up to date, to minimize the threat of a similar vulnerability.

Additionally, Hans advised GoodSecurity that the passwords "are long and complex and therefore unhackable." This turned out not to be true. This reporter was able to crack the Administrator password on Hans' machine using open-source software and a publicly available wordlist. GoodSecurity recommends GoodCorp update its password policy to require more complex passwords, ideally ones that contain no dictionary words.