



Cybersecurity 701

Dictionary Lab



Dictionary Materials

- Materials needed
 - Kali Linux Virtual Machine
- Software Tool used
 - JTR (John the Ripper)
 - Password cracking tool (pre-installed on Kali OS)



Objectives Covered

- Security+ Objectives (SY0-701)
 - Objective 2.4 - Given a scenario, analyze indicators of malicious activity.
 - Password attacks



What is a Dictionary Attack?

- A dictionary attack is a form of password attack where the attacker uses a pre-determined list of passwords, or dictionary, to attempt to crack a password.

```
buick  
buicks  
build  
buildable  
builded  
builder  
builders  
building  
building's  
buildingless  
buildings  
buildress  
builds  
buildup  
buildup's  
buildups  
built  
builtin
```

This is part of the contents of a dictionary list pre-installed on most Kali systems. It can be found at the following directory:

</usr/share/ike-scan/>

Dictionary Lab Overview

1. Set up Environment
2. Create dictionary
3. Create example users
4. Set example passwords
5. Locate password file
6. Launch the Attack
7. Observe results

Note: In this lab, you are going to create a dictionary of passwords that contains a list of names of people that you know.

From that list, you will create users with passwords that are contained within the dictionary.



Set up Environment

- Log into your range
- Open the Kali Linux Environment
 - You should be on your Kali Linux Desktop



Create the Dictionary

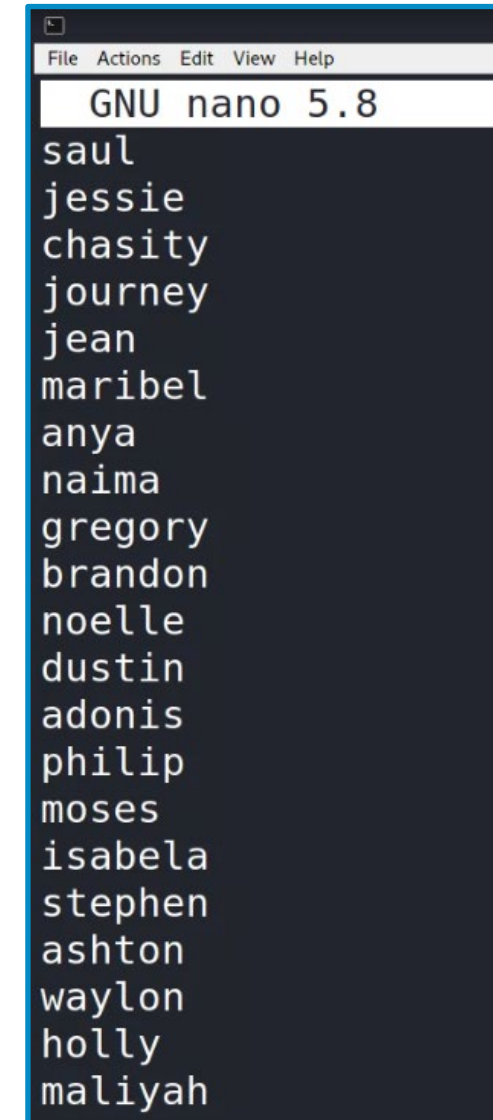
- Open Terminal in Kali
- Navigate to the Desktop:
cd Desktop
- Create a .txt file that will serve as the dictionary:
touch dictionary.txt
- Open the dictionary file with a text editor
nano dictionary.txt

```
(kali@10.15.55.196) - [~]  
$ cd Desktop/  
  
(kali@10.15.55.196) - [~/Desktop]  
$ touch dictionary.txt  
  
(kali@10.15.55.196) - [~/Desktop]  
$ nano dictionary.txt
```

Creating the Dictionary

- In the text editor, add a list of 20 names of people you know, just like the example on the right
- Once finished, press **CTRL+X** to exit
- Press **Y** to save
- Press **ENTER** to save as the same name (**dictionary.txt**)

You can ensure the names are saved in the file by double clicking to open the file on the Desktop.



```
File Actions Edit View Help
GNU nano 5.8
saul
jessie
chasity
journey
jean
maribel
anya
naima
gregory
brandon
noelle
dustin
adonis
philip
moses
isabela
stephen
ashton
waylon
holly
maliyah
```


Create Users

- Login as the root user with the following command:
`sudo su -`
- Notice the command prompt is now `root@<kali_IP>`
- Create additional users by using the following command:
 - This command creates a user named “ginny”
`useradd ginny`
- Create at least 3 users
- Remember the users' names - you will need these to set passwords for them

```
(kali@10.15.55.196) - [~/Desktop]  
$ sudo su -
```

```
(root@10.15.55.196) - [~]  
# useradd ginny
```



Set passwords

- Use the following command to set a password for each account:
 - The following command starts the prompt to set a password for the user ginny
`passwd ginny`
- Enter the password at the prompt
“New password:”
 - Set the password to be one from the list of the names you added to the dictionary file earlier!
- Repeat this step for all user accounts you created.

```
(root@10.15.55.196) - [~]  
# passwd ginny  
New password:  
Retype new password:  
passwd: password updated successfully
```



Locate Hashed Passwords

- Navigate to the `etc` directory:
`cd /etc`
- View the files
`ls`
- The file `passwd` contains all the usernames on the system
- In older systems, the password for each user was stored in the `passwd` file
(That's why it's named that)
 - NOT a secure way of storing passwords!

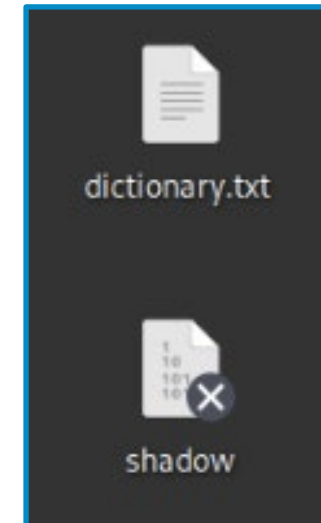
```
passwd  
passwd -
```



Locate Hashed Passwords

- Linux switched over to hashing passwords and storing them in a file named **shadow**
- Use the following command to see the hashed passwords in the **shadow** file:
cat shadow
- Copy the **shadow** file to your Desktop using the following command:
cp shadow /home/kali/Desktop

```
(root@10.15.55.196) - [/etc]  
# cat shadow
```



You should have both the **dictionary.txt** file and **shadow** file on your Desktop

Launch the Attack

- Navigate to the Desktop directory:
`cd /home/kali/Desktop`
- To launch the attack with the dictionary you created, use the following command:
`john shadow --wordlist=dictionary.txt`
- You should notice John The Ripper cracked the passwords very quickly using the dictionary that you created.

```
(root@10.15.55.196) - [/home/kali/Desktop]
# john shadow --wordlist=dictionary.txt
Created directory: /root/.john
Using default input encoding: UTF-8
Loaded 5 password hashes with 5 different salts (sha
512crypt, crypt(3) $6$ [SHA512 256/256 AVX2 4x])
Cost 1 (iteration count) is 5000 for all loaded hash
es
Will run 2 OpenMP threads
Press 'q' or Ctrl-C to abort, almost any other key f
or status
holly          (harry)
saul           (ginny)
jessie         (ron)
3g 0:00:00:00 DONE (2023-07-05 16:25) 10.00g/s 70.00
p/s 350.0c/s 350.0C/s saul..maliyah
Use the "--show" option to display all of the cracke
d passwords reliably
Session completed
```

How to Defend Against a Dictionary Attack

- Do not use generic passwords or old passwords
 - Dictionary attacks use commonly-used passwords
 - Dictionary attacks often contain old passwords that make have been compromised in the past
- Strong Passwords
- Increasingly longer delay between failed attempts
- Lockout after __ failed attempts
- Two-Factor Authentication
 - Why would these help secure your password?
- What are some other ways of defending against a dictionary attack?



Real Dictionaries

- Real dictionary attacks use millions and billions of passwords.
- The dictionary file sizes are enormous because of all the possible combinations they contain.
- Where do these passwords come from?
 - When a cyberattack occurs, the culprits will sometimes leak usernames and passwords online. These are added into a continuously growing list of known passwords and circulated online.
 - A simple Google search will provide plenty of examples that can be used.

