Vulnerability Assessment and Pentesting

Abstract

- Reconnaissance
 - Nmap Discover hosts and services on a network
- Enumeration and Exploitation
 - Web Application security vulnerabilities
- Exploitation
 - John the Ripper Cracks hashes for various crypt algorithms
- Vulnerability Assessment; Remediation
 - Lynis Used for vulnerability detection, penetration testing, and system hardening.
 - ClamAV Antivirus that detects malware, trojans, and viruses.

Vulnerability Assessment

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Nmap

In case it is not already installed

sudo apt-get install nmap

nmap scan (1,000 most common ports)

nmap scanme.nmap.org

Find Version Numbers

Nmap scanme.nmap.org -A | tee scanme.results &

Finding Exploits

• Exploit DB

CVSS and CVE

- CVSS Common Vulnerability Scoring System
 Provides methodology to sort vulnerabilities into numerical categories
- CVE Common Vulnerabilities and Exposures
 Entries of commonly known security vulnerabilities

Formatting of CVE entries is in the following format: CVE-YEAR-ID (Example: CVE-2017-14956)

Attack Vector - Can be used to gain access to a service (Example: SQL Injection allows for unauthorized access to database entries)

End Result - The attacker achieves complete access of a system

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Web App Security Vulnerabilities

[external presentation]

John the Ripper

Overview of John the Ripper

- A free and fast password cracker available for Mac,
 Windows, and various unix flavors.
- Download page: https://www.openwall.com/john/ (Kali-Linux has John the Ripper pre-installed)

Common use cases

• Cracks hashes such as MD5, DES, Blowfish, and other crypt password hash types.

What is a hash?

The result of using a hash function designed to protect plaintext

Examples of popular hashes:

MD5

Plaintext: password

MD5 Hash: 5f4dcc3b5aa765d61d8327deb882cf99

SHA-1

Plaintext: password

SHA-1 Hash:

5BAA61E4C9B93F3F0682250B6CF8331B7EE68FD8

DES

Plaintext: password

DES Hash: K.578QlvUawY2

Even changing one letter (case sensitive) in a plaintext string can result in an entirely different hash.

Exercise:

- 1. Open a terminal session in Kali.
- 2. Generate a md5 hash by executing this command:
 - " echo -n password | md5sum "
- 3. Try different combinations of a word to see the hash.

John the Ripper usage

Two basic requirements to crack hashes:

- 1) A wordlist
- 2) A password file with a hash

John has a default password list that can be used. You can locate it by executing "locate password.lst" To set a custom password list, edit the wordlist setting in the configuration file by executing "john --wordlist=customlist.lst passwdfile"

To use John the Ripper:

- 1) Open terminal
- 2) Type "john" with nothing preceding it and the intended arguments proceeding it. (example: john /Desktop/hashfile.txt --show)

Documentation:

https://www.openwall.com/john/doc/EXAMPLES.shtml

Additional Information

There are popular methods of cracking passwords in John the Ripper:

- Wordlist mode Simple but slow cracking mode that uses a wordlist to crack passwords. To ensure fast runtime, sort your wordlist in alphabetical order.
- Single crack mode Uses login names, user home directory names, and GECOS / Full Name fields as candidate passwords. Faster than wordlist mode.
- Incremental (Bruteforce) mode Attempts all possible character combinations as passwords. Specify a
 password length limit to ensure the process lifespan ends in reasonable time.

To specify a cracking mode, use the following arguments (--increment, --single, or --wordlist)

Mangling Rules - Effective, but resource intensive method of generating similar passwords.

Example:

Base word = password

Leetify = P4ssw0rd

Append/prepending => h3r3p4ssw0rd!

To use mangling rules add the "--rules " argument when starting a session

Cracking System Passwords

- What is the shadow file?
 An unreadable system file where user passwords are encrypted and stored
- What is the passwd file?
 A readable system file where user details except for passwords are stored
- Using John to crack user passwords
- Unmask the shadow file by using this command ("unshadow/etc/passwd//etc/shadow > hashfile ")
- 2. Begin the cracking process by executing ("john hashfile --show")

Side notes:

- The shadow file cannot be read without using the unshadow command
- All cracked passwords are stored in the **john.pot** file
- If a shadow file does not exist, execute (" pwconv ")

Cracking external hashes

Cracking hashes in other files
 Instead of unmasking the shadow file, use a another file with hashes.

Example:

"john/root/Desktop/hashfile --format=raw-md5 --wordlist=password.lst --show "

This command attempts to crack a raw md5 hash using wordlist mode.

Note: All cracked hashes can be located in the **john.pot** file (To find execute, " **locate john.pot** ")

Exercise:

- 1. Generate a MD5 hash (echo -n password | md5sum) and save to a file
- 2. Crack the MD5 hash using a wordlist

Summary

John the Ripper can be used for:

- Cracking MD5, DES, SHA, and other hash types
- Incremental (bruteforce), dictionary (wordlist), and hybrid cracking methods

Kali Linux commands:

- Nano/Cat
- Touch
- Echo
- Unshadow
- Locate

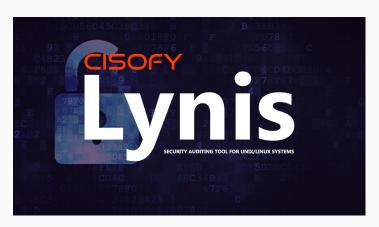
Review Challenge

- 1. Go to this URL: http://challenge1.litesandbox.me/index.php
- 2. Obtain the raw MD5 hash
- 3. Crack the raw MD5 hash
- 4. Login to the dashboard
 Use the Jumbo rule when cracking the password (--rules=Jumbo)

Remediation: Lynis and clamav

Lynis

- Performs an extensive heath scan on Unix machines.
- Used for three things; System hardening, auditing, and compliance testing.
- Pre-installed on Kali.
- Can perform both local and remote scans.



Lynis

Get help on lynis

lynis

Run a lynis scan on your system

lynis audit system

ClamAv

- Open-source antivirus software for unix machines.
- Able to detect common malicious software and viruses.
- Integrates with other software such as pfSense



ClamAv

Install

sudo apt-get install clamav

More details on how to run a scan

• man clamscan or clamscan --help

Run a scan on your entire machine

clamscan

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