

Practical 4

Aim: Practical on vulnerability scanning and assessment

Vulnerability Scanning using Nmap:

1. Navigate to nmap scripts folder and view all the scripts in that folder

```
kali@kali: /usr/share/nmap/scripts
File Actions Edit View Help
(kali@kali)-[~]
$ cd /usr/share/nmap/scripts
(kali@kali)-[/usr/share/nmap/scripts]
$ ls | wc -l
605
(kali@kali)-[/usr/share/nmap/scripts]
$ ls -la | more
total 4968
drwxr-xr-x 2 root root 32768 Aug  8 06:05 .
drwxr-xr-x 4 root root 4096 Aug  8 06:05 ..
-rw-r--r-- 1 root root 3901 Jan 18 2022 acarsd-info.nse
-rw-r--r-- 1 root root 8749 Jan 18 2022 address-info.nse
-rw-r--r-- 1 root root 3345 Jan 18 2022 afp-brute.nse
-rw-r--r-- 1 root root 6463 Jan 18 2022 afp-ls.nse
-rw-r--r-- 1 root root 7001 Jan 18 2022 afp-path-vuln.nse
-rw-r--r-- 1 root root 5600 Jan 18 2022 afp-serverinfo.nse
-rw-r--r-- 1 root root 2621 Jan 18 2022 afp-showmount.nse
-rw-r--r-- 1 root root 2262 Jan 18 2022 ajp-auth.nse
-rw-r--r-- 1 root root 2983 Jan 18 2022 ajp-brute.nse
-rw-r--r-- 1 root root 1329 Jan 18 2022 ajp-headers.nse
-rw-r--r-- 1 root root 2590 Jan 18 2022 ajp-methods.nse
-rw-r--r-- 1 root root 3051 Jan 18 2022 ajp-request.nse
-rw-r--r-- 1 root root 6719 Jan 18 2022 allseeingeeye-info.nse
-rw-r--r-- 1 root root 1678 Jan 18 2022 amqp-info.nse
-rw-r--r-- 1 root root 15024 Jan 18 2022 asn-query.nse
-rw-r--r-- 1 root root 2054 Jan 18 2022 auth-owners.nse
-rw-r--r-- 1 root root  870 Jan 18 2022 auth-spoof.nse
-rw-r--r-- 1 root root 9050 Jan 18 2022 backorifice-brute.nse
-rw-r--r-- 1 root root 10193 Jan 18 2022 backorifice-info.nse
-rw-r--r-- 1 root root 53137 Jan 18 2022 bacnet-info.nse
-rw-r--r-- 1 root root 6136 Jan 18 2022 banner.nse
-rw-r--r-- 1 root root 2012 Jan 18 2022 bitcoin-getaddr.nse
-rw-r--r-- 1 root root 1812 Jan 18 2022 bitcoin-info.nse
-rw-r--r-- 1 root root 4437 Jan 18 2022 bitcoinrpc-info.nse
-rw-r--r-- 1 root root 4079 Jan 18 2022 bittorrent-discovery.nse
```

2. Update scripts

Before Nmap can be used to perform a vulnerability scan, penetration testers must update the Nmap script database to see whether there are any new scripts added to the database, so that they do not miss the vulnerability identification.

```
kali@kali: /usr/share/nmap/scripts
File Actions Edit View Help
(kali@kali)-[/usr/share/nmap/scripts]
$ sudo nmap --script-updatedb
[sudo] password for kali:
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-08 01:19 EDT
NSE: Updating rule database.
NSE: Script Database updated successfully.
Nmap done: 0 IP addresses (0 hosts up) scanned in 0.73 seconds
(kali@kali)-[/usr/share/nmap/scripts]
$
```

3. Run Nmap to check vulnerability services running on metasploitable2.

```
kali@kali: /usr/share/nmap/scripts
File Actions Edit View Help

(kali@kali)-[/usr/share/nmap/scripts]
$ sudo nmap -sC 192.168.37.130
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-08 01:22 EDT

Host script results:
|_clock-skew: mean: 1h00m08s, deviation: 2h00m00s, median: 7s
|_smb-os-discovery:
|   OS: Unix (Samba 3.0.20-Debian)
|   Computer name: metasploitable
|   NetBIOS computer name:
|   Domain name: localdomain
|   FQDN: metasploitable.localdomain
|   System time: 2022-10-08T01:22:33-04:00
|_smb2-time: Protocol negotiation failed (SMB2)
|_nbstat: NetBIOS name: METASPLOITABLE, NetBIOS user: <unknown>, NetBIOS MAC: <unknown> (unknown)
|_smb-security-mode:
|   account_used: <blank>
|   authentication_level: user
|   challenge_response: supported
|_ message_signing: disabled (dangerous, but default)

Nmap done: 1 IP address (1 host up) scanned in 72.45 seconds

(kali@kali)-[/usr/share/nmap/scripts]
$
```

4. Let us find available scripts to find vulnerability for ssh.

```
kali@kali: /usr/share/nmap/scripts
File Actions Edit View Help

(kali@kali)-[/usr/share/nmap/scripts]
$ nmap --script-help ssh2-enum-algos
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-08 01:25 EDT

ssh2-enum-algos
Categories: safe discovery
https://nmap.org/nsedoc/scripts/ssh2-enum-algos.html
Reports the number of algorithms (for encryption, compression, etc.) that
the target SSH2 server offers. If verbosity is set, the offered algorithms
are each listed by type.

If the "client to server" and "server to client" algorithm lists are identical
(order specifies preference) then the list is shown only once under a combined
type.

(kali@kali)-[/usr/share/nmap/scripts]
$
```

5. Get more info on ssh-run script

```
(kali@kali)-[/usr/share/nmap/scripts]
$ nmap --script-help ssh-run
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-08 01:27 EDT

ssh-run
Categories: intrusive
https://nmap.org/nsedoc/scripts/ssh-run.html
Runs remote command on ssh server and returns command output.

(kali@kali)-[/usr/share/nmap/scripts]
$
```

6. Let's run the ssh-run script on our target (metasploitable2 IP Address)

```
(kali㉿kali)-[/usr/share/nmap/scripts]
$ nmap --script=ssh-run 192.168.37.130
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-08 01:30 EDT
NSE: [ssh-run] Failed to specify credentials and command to run.
Nmap scan report for 192.168.37.130
Host is up (0.0040s latency).
Not shown: 977 closed tcp ports (conn-refused)
PORT      STATE SERVICE
21/tcp    open  ftp
22/tcp    open  ssh
|_ssh-run: Failed to specify credentials and command to run.
23/tcp    open  telnet
25/tcp    open  smtp
53/tcp    open  domain
80/tcp    open  http
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
512/tcp   open  exec
513/tcp   open  login
514/tcp   open  shell
1099/tcp  open  rmiregistry
1524/tcp  open  ingreslock
2049/tcp  open  nfs
2121/tcp  open  ccproxy-ftp
3306/tcp  open  mysql
5432/tcp  open  postgresql
5900/tcp  open  vnc
6000/tcp  open  X11
6667/tcp  open  irc
8009/tcp  open  ajp13
8180/tcp  open  unknown

Nmap done: 1 IP address (1 host up) scanned in 0.45 seconds

(kali㉿kali)-[/usr/share/nmap/scripts]
$
```

7. Get available scripts for http

```
(kali㉿kali)-[/usr/share/nmap/scripts]
$ ls | grep http
http-adobe-coldfusion-apsa1301.nse
http-affiliate-id.nse
http-apache-negotiation.nse
http-apache-server-status.nse
http-aspnet-debug.nse
http-auth-finder.nse
http-auth.nse
http-avaya-ipoffice-users.nse
http-awstatstotals-exec.nse
http-axis2-dir-traversal.nse
http-backup-finder.nse
http-barracuda-dir-traversal.nse
http-bigip-cookie.nse
http-brute.nse
http-cakephp-version.nse
http-chrono.nse
http-cisco-anyconnect.nse
http-coldfusion-subzero.nse
http-comments-displayer.nse
http-config-backup.nse
http-cookie-flags.nse
http-cors.nse
http-cross-domain-policy.nse
http-csrf.nse
http-date.nse
http-default-accounts.nse
http-devframework.nse
http-dlink-backdoor.nse
http-dombased-xss.nse
http-domino-enum-passwords.nse
http-drupal-enum.nse
http-drupal-enum-users.nse
http-enum.nse
http-errors.nse
```

8. Run a http script

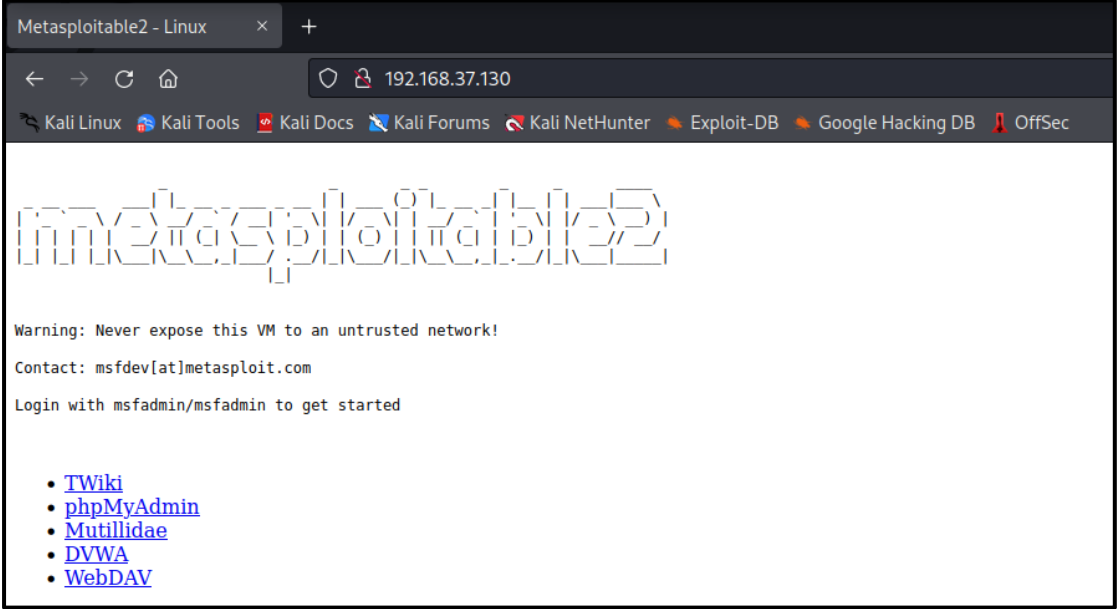
```
(kali@kali)-[/usr/share/nmap/scripts]
$ nmap --script=http-trace 192.168.37.130
Starting Nmap 7.92 ( https://nmap.org ) at 2022-10-08 01:33 EDT
Nmap scan report for 192.168.37.130
Host is up (0.0020s latency).
Not shown: 977 closed tcp ports (conn-refused)
PORT      STATE SERVICE
21/tcp    open  ftp
22/tcp    open  ssh
23/tcp    open  telnet
25/tcp    open  smtp
53/tcp    open  domain
80/tcp    open  http
|_http-trace: TRACE is enabled
111/tcp   open  rpcbind
139/tcp   open  netbios-ssn
445/tcp   open  microsoft-ds
512/tcp   open  exec
513/tcp   open  login
514/tcp   open  shell
1099/tcp  open  rmiregistry
1524/tcp  open  ingreslock
2049/tcp  open  nfs
2121/tcp  open  ccproxy-ftp
3306/tcp  open  mysql
5432/tcp  open  postgresql
5900/tcp  open  vnc
6000/tcp  open  X11
6667/tcp  open  irc
8009/tcp  open  ajp13
8180/tcp  open  unknown

Nmap done: 1 IP address (1 host up) scanned in 0.39 seconds

(kali@kali)-[/usr/share/nmap/scripts]
$
```

Web Server Vulnerability Scanning:

1. Run metasploitable2 website on Firefox in kali linux



Metasploitable2 - Linux

192.168.37.130

Kali Linux Kali Tools Kali Docs Kali Forums Kali NetHunter Exploit-DB Google Hacking DB OffSec

Metasploitable2

Warning: Never expose this VM to an untrusted network!

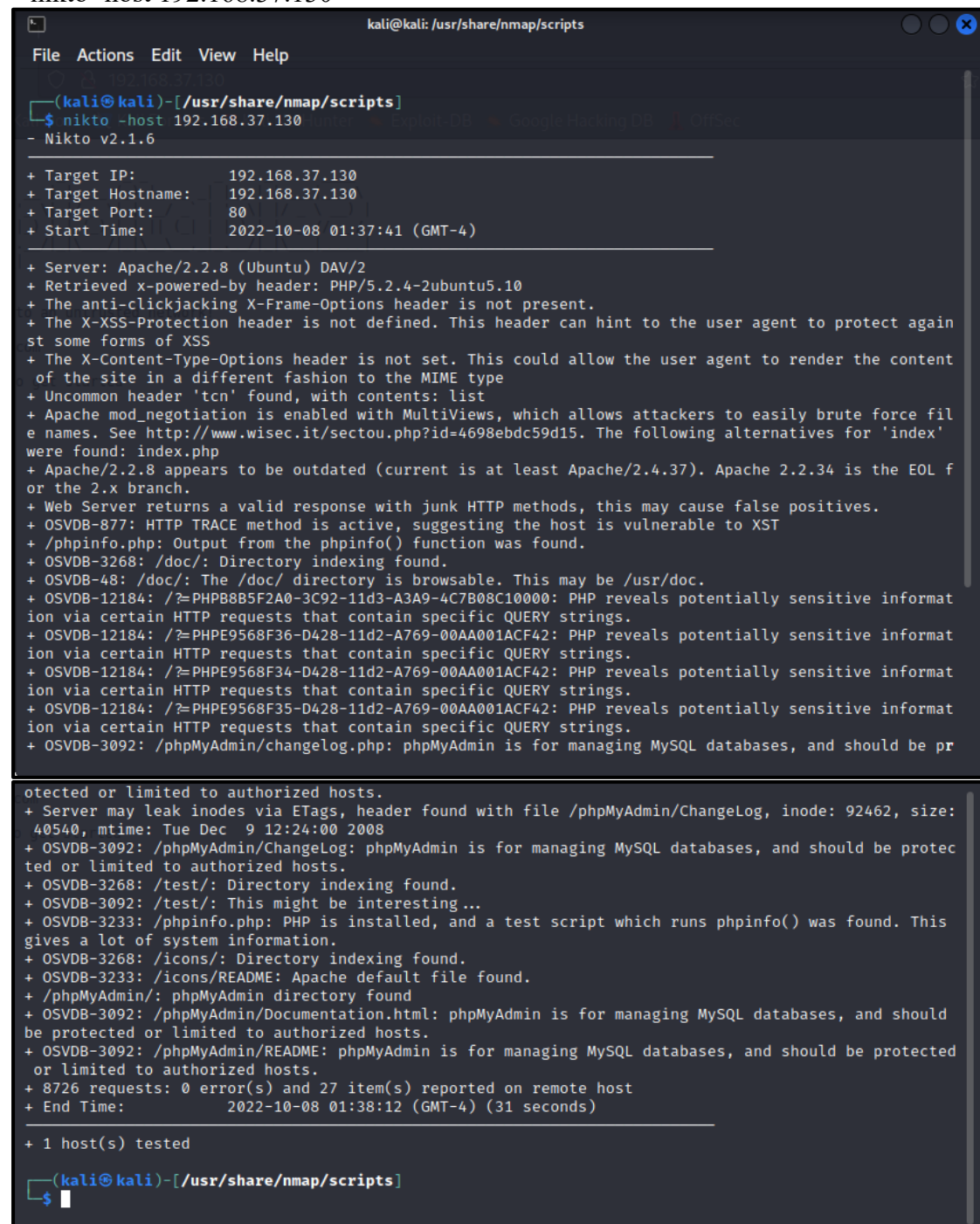
Contact: [msfdev\[at\]metasploit.com](mailto:msfdev[at]metasploit.com)

Login with msfadmin/msfadmin to get started

- [TWiki](#)
- [phpMyAdmin](#)
- [Mutillidae](#)
- [DVWA](#)
- [WebDAV](#)

2. Using Nikto tool scan the target for vulnerabilities

“ nikto -host 192.168.37.130 ”



```
kali@kali: /usr/share/nmap/scripts
File Actions Edit View Help

(kali@kali)-[/usr/share/nmap/scripts]
$ nikto -host 192.168.37.130
- Nikto v2.1.6

+ Target IP: 192.168.37.130
+ Target Hostname: 192.168.37.130
+ Target Port: 80
+ Start Time: 2022-10-08 01:37:41 (GMT-4)

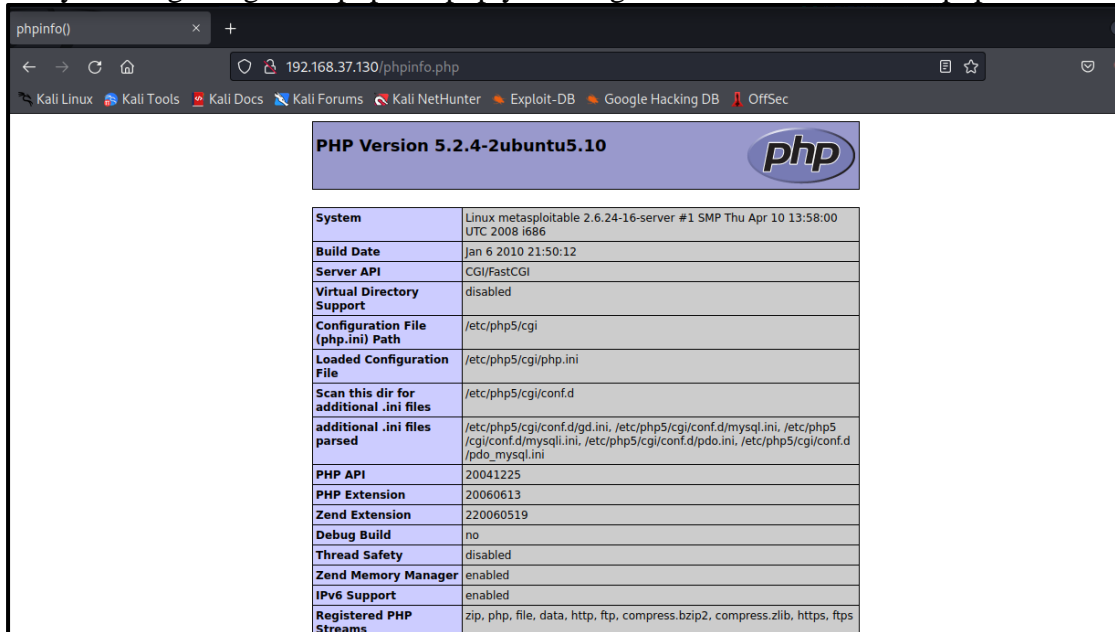
+ Server: Apache/2.2.8 (Ubuntu) DAV/2
+ Retrieved x-powered-by header: PHP/5.2.4-2ubuntu5.10
+ The anti-clickjacking X-Frame-Options header is not present.
+ The X-XSS-Protection header is not defined. This header can hint to the user agent to protect against some forms of XSS
+ The X-Content-Type-Options header is not set. This could allow the user agent to render the content of the site in a different fashion to the MIME type
+ Uncommon header 'tcn' found, with contents: list
+ Apache mod_negotiation is enabled with MultiViews, which allows attackers to easily brute force file names. See http://www.wisec.it/sectou.php?id=4698ebdc59d15. The following alternatives for 'index' were found: index.php
+ Apache/2.2.8 appears to be outdated (current is at least Apache/2.4.37). Apache 2.2.34 is the EOL for the 2.x branch.
+ Web Server returns a valid response with junk HTTP methods, this may cause false positives.
+ OSVDB-877: HTTP TRACE method is active, suggesting the host is vulnerable to XST
+ /phpinfo.php: Output from the phpinfo() function was found.
+ OSVDB-3268: /doc/: Directory indexing found.
+ OSVDB-48: /doc/: The /doc/ directory is browsable. This may be /usr/doc.
+ OSVDB-12184: /?=PHPB8B5F2A0-3C92-11d3-A3A9-4C7B08C10000: PHP reveals potentially sensitive information via certain HTTP requests that contain specific QUERY strings.
+ OSVDB-12184: /?=PHPE9568F36-D428-11d2-A769-00AA001ACF42: PHP reveals potentially sensitive information via certain HTTP requests that contain specific QUERY strings.
+ OSVDB-12184: /?=PHPE9568F34-D428-11d2-A769-00AA001ACF42: PHP reveals potentially sensitive information via certain HTTP requests that contain specific QUERY strings.
+ OSVDB-12184: /?=PHPE9568F35-D428-11d2-A769-00AA001ACF42: PHP reveals potentially sensitive information via certain HTTP requests that contain specific QUERY strings.
+ OSVDB-3092: /phpMyAdmin/changelog.php: phpMyAdmin is for managing MySQL databases, and should be protected or limited to authorized hosts.
+ OSVDB-3268: /test/: Directory indexing found.
+ OSVDB-3092: /test/: This might be interesting...
+ OSVDB-3233: /phpinfo.php: PHP is installed, and a test script which runs phpinfo() was found. This gives a lot of system information.
+ OSVDB-3268: /icons/: Directory indexing found.
+ OSVDB-3233: /icons/README: Apache default file found.
+ /phpMyAdmin/: phpMyAdmin directory found
+ OSVDB-3092: /phpMyAdmin/Documentation.html: phpMyAdmin is for managing MySQL databases, and should be protected or limited to authorized hosts.
+ OSVDB-3092: /phpMyAdmin/README: phpMyAdmin is for managing MySQL databases, and should be protected or limited to authorized hosts.
+ 8726 requests: 0 error(s) and 27 item(s) reported on remote host
+ End Time: 2022-10-08 01:38:12 (GMT-4) (31 seconds)

+ 1 host(s) tested

(kali@kali)-[/usr/share/nmap/scripts]
$
```

As you can see, PHP5 has many vulnerabilities when installed on a server.

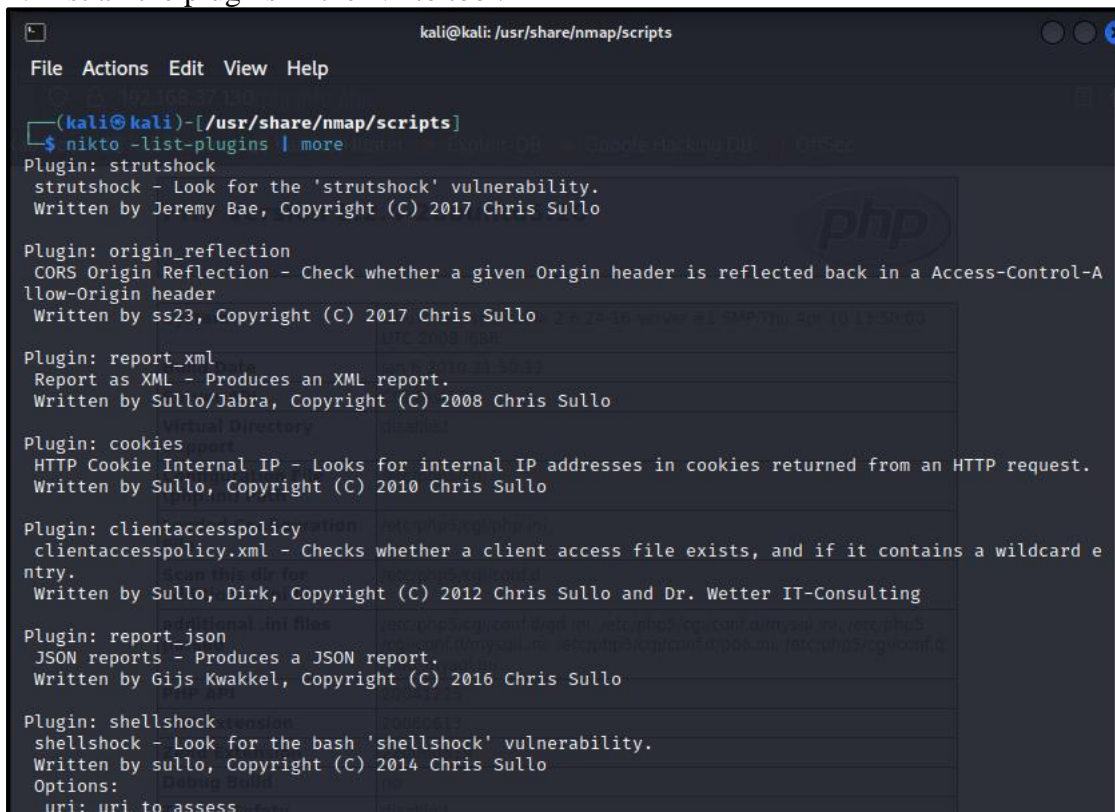
3. By running <targetIP>/phpinfo.php you can get information about the php version



PHP Version 5.2.4-Zubuntu5.10	
System	Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00 UTC 2008 i686
Build Date	Jan 6 2010 21:50:12
Server API	CGI/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php5/cgi
Loaded Configuration File	/etc/php5/cgi/php.ini
Scan this dir for additional .ini files	/etc/php5/cgi/conf.d
additional .ini files parsed	/etc/php5/cgi/conf.d/gd.ini, /etc/php5/cgi/conf.d/mysql.ini, /etc/php5/cgi/conf.d/mysqli.ini, /etc/php5/cgi/conf.d/pdo.ini, /etc/php5/cgi/conf.d/pdo_mysql.ini
PHP API	20041225
PHP Extension	20060613
Zend Extension	220060519
Debug Build	no
Thread Safety	disabled
Zend Memory Manager	enabled
IPv6 Support	enabled
Registered PHP Streams	zip, php, file, data, http, ftp, compress.bzip2, compress.zlib, https, ftps

Customizing Nikto:

1. List all the plugins in the Nikto tool.



```
kali@kali: /usr/share/nmap/scripts
File Actions Edit View Help

(kali@kali)-[/usr/share/nmap/scripts]
$ nikto -list-plugins | more
Plugin: struts shock
struts shock - Look for the 'struts shock' vulnerability.
Written by Jeremy Bae, Copyright (C) 2017 Chris Sullo

Plugin: origin_reflection
CORS Origin Reflection - Check whether a given Origin header is reflected back in a Access-Control-Allow-Origin header
Written by ss23, Copyright (C) 2017 Chris Sullo

Plugin: report_xml
Report as XML - Produces an XML report.
Written by Sullo/Jabra, Copyright (C) 2008 Chris Sullo

Plugin: cookies
HTTP Cookie Internal IP - Looks for internal IP addresses in cookies returned from an HTTP request.
Written by Sullo, Copyright (C) 2010 Chris Sullo

Plugin: clientaccesspolicy
clientaccesspolicy.xml - Checks whether a client access file exists, and if it contains a wildcard entry.
Written by Sullo, Dirk, Copyright (C) 2012 Chris Sullo and Dr. Wetter IT-Consulting

Plugin: report_json
JSON reports - Produces a JSON report.
Written by Gijs Kwakkel, Copyright (C) 2016 Chris Sullo

Plugin: shellshock
shellshock - Look for the bash 'shellshock' vulnerability.
Written by sullo, Copyright (C) 2014 Chris Sullo
Options:
uri: uri to assess
```

2. Running Nikto with specific plugin to find active users on the target server

“ sudo nikto -h 192.168.37.130 -p 80 -Plugins

"apacheusers(enumerate,dictionary:users.txt);report_xml" - output apacheusers.xml

”

```
(kali@kali)-[/usr/share/nmap/scripts]
└─$ sudo nikto -h 192.168.37.130 -p 80 -Plugins "apacheusers(enumerate,dictionary:users.txt);report_xml" - output apacheusers.xml

[sudo] password for kali:
- Nikto v2.1.6

+ Target IP: 192.168.37.130
+ Target Hostname: 192.168.37.130
+ Target Port: 80
+ Start Time: 2022-10-08 01:45:55 (GMT-4)

+ Server: Apache/2.2.8 (Ubuntu) DAV/2
+ 233 requests: 0 error(s) and 0 item(s) reported on remote host
+ End Time: 2022-10-08 01:45:57 (GMT-4) (2 seconds)

+ 1 host(s) tested

(kali@kali)-[/usr/share/nmap/scripts]
└─$
```

```
(kali@kali)-[/tmp]
└─$ cat apacheusers.xml
<?xml version="1.0" ?>
<!DOCTYPE niktoSCAN SYSTEM "/var/lib/nikto/docs/nikto.dtd">
<niktoSCAN>
<niktoSCAN hosttest="0" options="-h 192.168.37.130 -p 80 -Plugins apacheusers(enumerate,dictionary:users.txt);report_xml -output ap
acheusers.xml" version="2.1.6" scanstart="Sat Oct 8 01:49:29 2022" scanend="Wed Dec 31 19:00:00 1969" scanelapsed=" seconds" nxmlve
rsion="1.2">
<scandetails targetip="192.168.37.130" targethostname="192.168.37.130" targetport="80" targetbanner="Apache/2.2.8 (Ubuntu) DAV/2" st
arttime="2022-10-08 01:49:29" siteip="http://192.168.37.130:80/" siteip="http://192.168.37.130:80/" hostheader="192.168.37.130" er
rors="0" checks="6897">
<statistics elapsed="1" itemsfound="0" itemstested="6897" endtime="2022-10-08 01:49:30" />
</scandetails>
</niktoSCAN>
</niktoSCAN>

(kali@kali)-[/tmp]
└─$
```

OWASP ZAP:

It is one of the most effective scanners based on the number of verified vulnerabilities that it has discovered.

1. Install the latest version of OWASP ZAP by

```
kali@kali: ~
File Actions Edit View Help

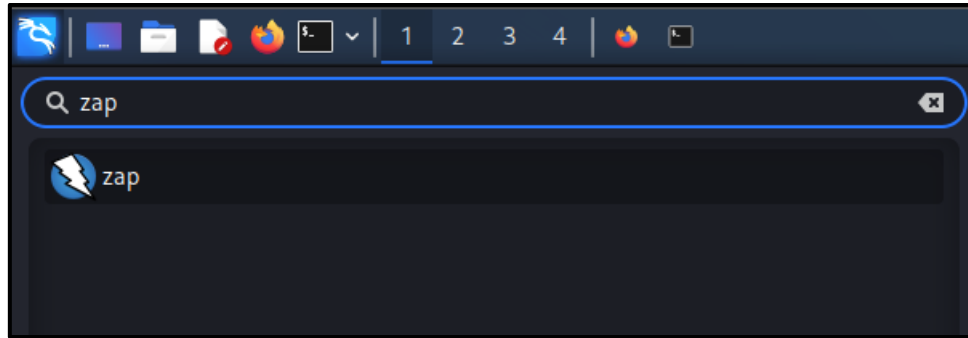
(kali@kali)-[~]
└─$ sudo apt install zapproxy
[sudo] password for kali:
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following NEW packages will be installed:
  zapproxy
0 upgraded, 1 newly installed, 0 to remove and 748 not upgraded.
Need to get 185 MB of archives.
After this operation, 232 MB of additional disk space will be used.
Get:1 http://kali.download/kali kali-rolling/main amd64 zapproxy all 2.11.1-0kali1 [185 MB]
Fetched 80.8 MB in 1min 28s (914 kB/s)
Selecting previously unselected package zapproxy.
(Reading database ... 339662 files and directories currently installed.)
Preparing to unpack .../zapproxy_2.11.1-0kali1_all.deb ...
Unpacking zapproxy (2.11.1-0kali1) ...
Setting up zapproxy (2.11.1-0kali1) ...
Processing triggers for kali-menu (2022.3.1) ...

(kali@kali)-[~]
└─$
```

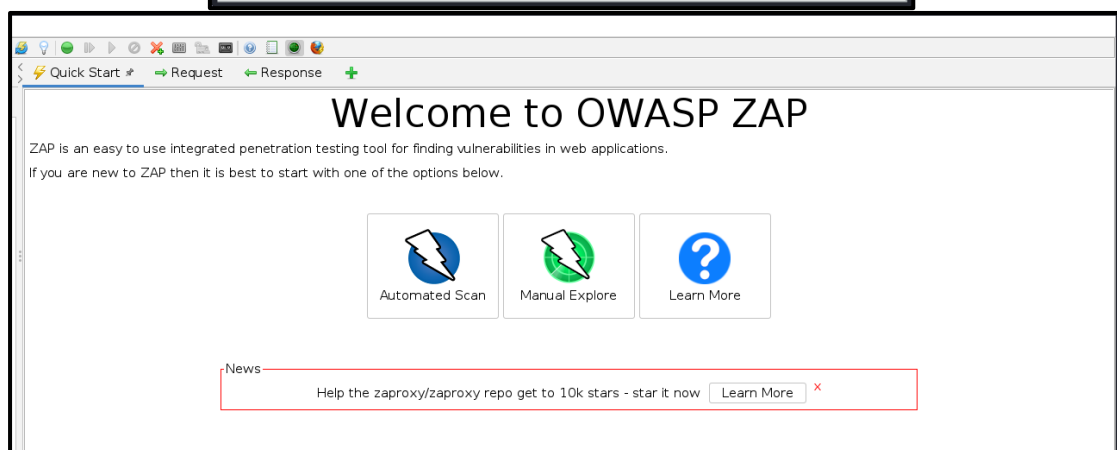
```
PHP Version 5.2.4-2ubuntu5.10

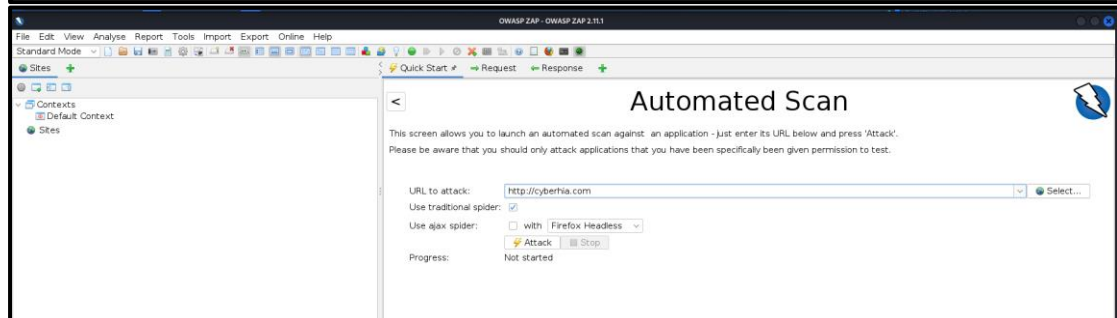
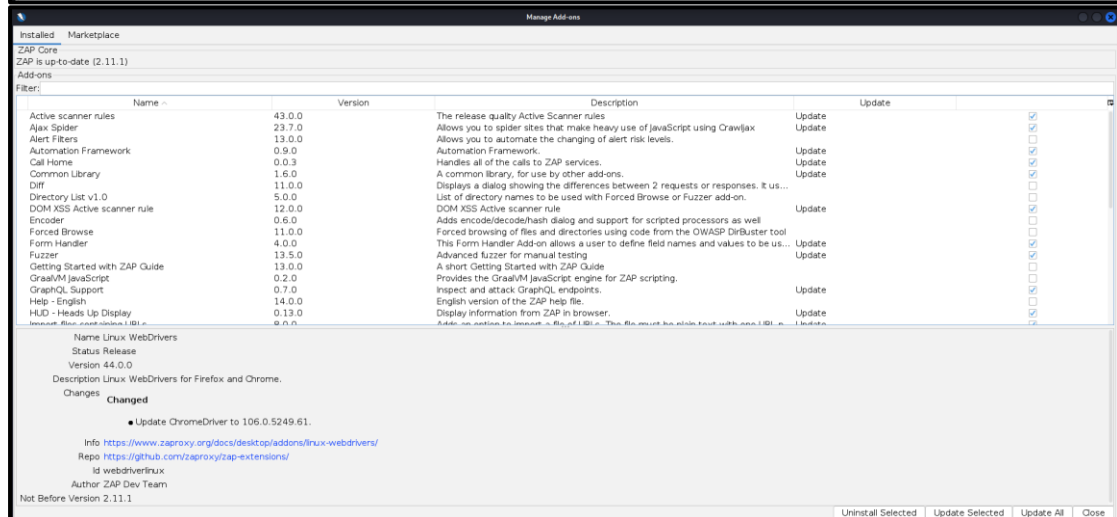
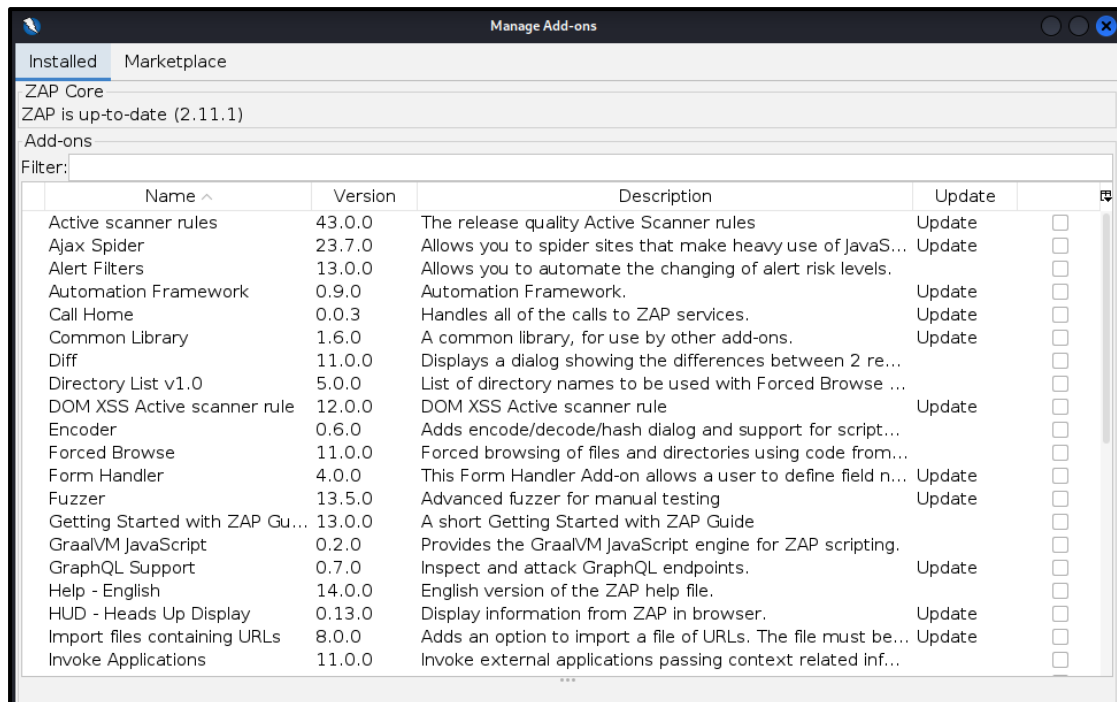
System      | Linux metasploitable 2.6.24-16-server #1 SMP Thu Apr 10 13:58:00
            | UTC 2008 i686
Build Date  | Jan 6 2010 21:50:12
Server API  | CGI/FastCGI
Support     | disabled
Configuration File | /etc/php5/cgi
Loaded Configuration File | /etc/php5/cgi/php.ini
Scan this dir for | /etc/php5/cgi/conf.d
```

2. Run the tool

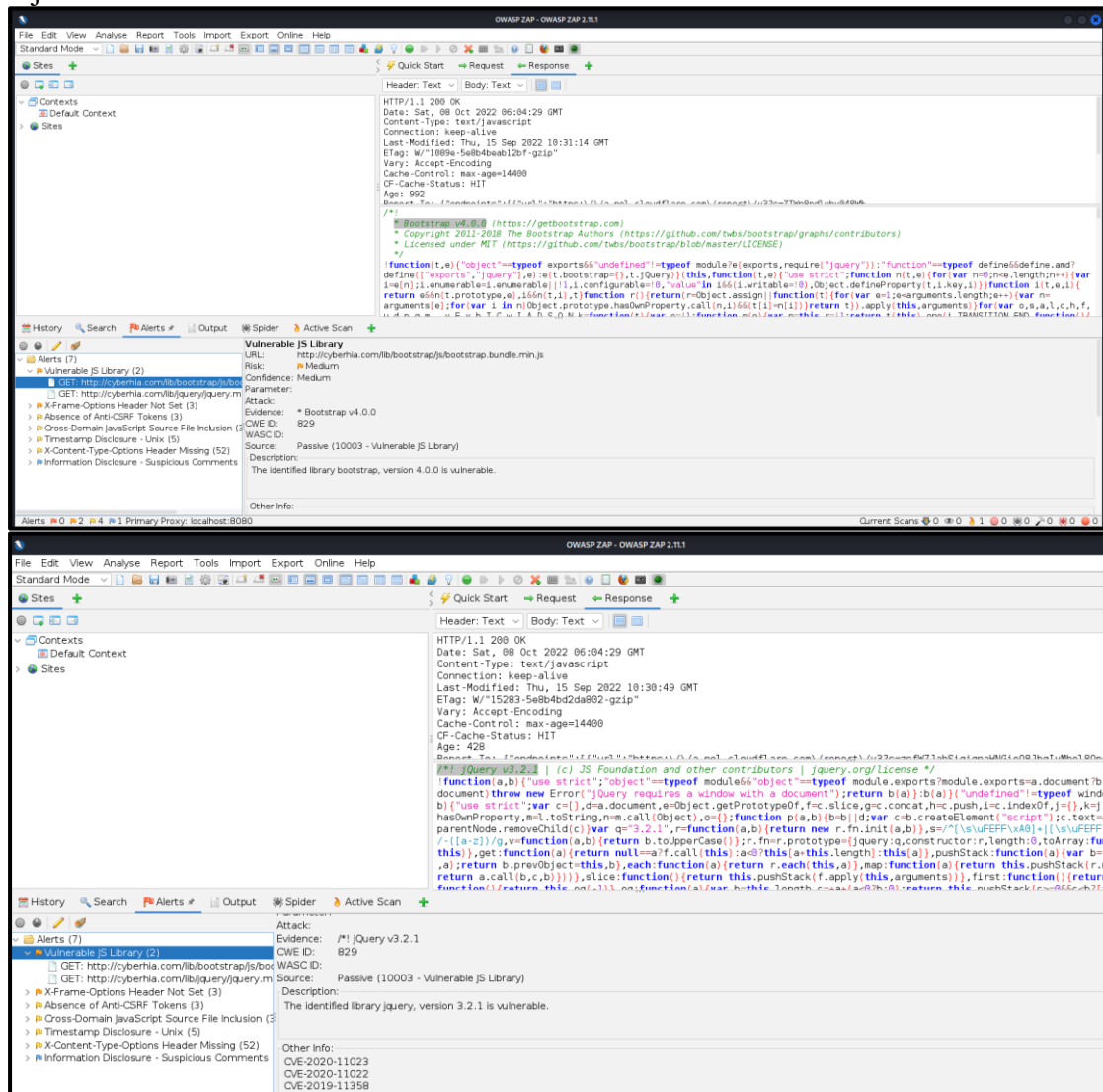


3. On start-up make the appropriate selections and update the plugins





4. After the scan you can click on the identified results to drill down to specific findings. OWASP ZAP can help you find vulnerabilities such as reflected cross-site scripting, stored cross-site scripting, SQL injection, and remote OS command injection.



5. WPScan



```
[!] No WPScan API Token given, as a result vulnerability data has not been output.
[!] You can get a free API token with 25 daily requests by registering at https://wpscan.com/register

[+] Finished: Sat Oct 8 02:08:52 2022
[+] Requests Done: 189
[+] Cached Requests: 5
[+] Data Sent: 48,563 KB
[+] Data Received: 19,438 MB
[+] Memory used: 219.84 MB
[+] Elapsed time: 00:00:44

Attack:
Evidence: /! jQuery v3.2.1
CWE ID: B29
WASC ID:

(kali@kali)-[~]
$
```